



ENGEO Limited

124 Montreal Street, Sydenham, Christchurch 8023

PO Box 373, Christchurch 8140

Tel +64 3 328 9012

www.engeo.co.nz



Project Number 18113.000.001

Geotechnical Investigation

Multiple Sites, Southeast Rolleston

Submitted to:

Urban Estates Ltd

181 High Street

City Centre

Christchurch 8144

Contents

1	Introduction	1
2	Site Description.....	2
3	Geological Model	2
3.1	Regional Geology.....	2
3.2	Geomorphology.....	2
3.3	Geohazards.....	3
3.3.1	Seismicity	3
3.3.2	Liquefaction and Lateral Spreading	3
3.4	Flooding.....	3
3.5	ECan Boreholes	4
3.6	Site Seismic Class	6
4	Site Investigation.....	6
4.1	Site Investigation	6
5	Geotechnical Assessment	7
5.1	Site Seismic Class	7
5.2	Liquefaction Assessment	7
5.3	Foundations	7
6	RMA Section 106 Assessment	8
7	Statement of Professional Opinion	8
8	References.....	9
9	Limitations.....	10

Tables

Table 1: Generalised Summary of ECan Boreholes

Table 2: Summary of Subsurface Investigations

Figures

Figure 1: SDC Flooding map

Figure 2: Nearby ECan Borehole Locations

Appendices

Appendix 1: Site Plan

Appendix 2: Ecan Boreholes

Appendix 3: Test Pit Logs

Appendix 4: Davie Lovell Smith Investigation Data

ENGEO Document Control:

Report Title	Geotechnical Investigation - Multiple Sites, Southeast Rolleston			
Project No.	18113.000.001	Doc ID	04	
Client	Urban Estates Ltd	Client Contact	Brad Wilson (Urban Estates)	
Distribution (PDF)	Ben Fox (Davie Lovell Smith), Brad Wilson (Urban Estates)			
Date	Revision Details / Status	Author	Reviewer	WP
09/12/2020	Issued to Client	JRW	NC	JT
06/07/2023	Revision – Issued to Client	RC	NC	JT

1 Introduction

ENGEO Ltd was requested by Urban Estates Ltd to undertake a geotechnical investigation of several properties (herein referred to as 'the site'). This work has been carried out in accordance with our signed variation agreement dated 5 July 2023.

We have previously completed an initial iteration of this report (dated 9 December 2020) to support a plan change application from general rural zone to general residential zone with an approximate density of 12 lots per hectare. We understand this has now been granted and we have been requested to update our report to address subdivision consent for 40 hectares, including 10 hectares set aside for a retirement village.

This report has been updated with additional testing (presented in Section 4) and includes the following scope of works:

- Review of published geotechnical and geological information relevant to the site.
- Site assessment by an experienced ground engineering professional.
- Coordinate local buried services location contractor.
- Shallow testing including 31 test pits with associated Scala Penetrometers to supplement the previous 18 test pits that were completed in 2020. Davie Lovell Smith have provided us 20 hand auger and Scala Penetrometer logs for the retirement village site which we have used to inform the ground model in this area.
- Commentary on the liquefaction potential for the site based on our site investigations and published literature.
- Prepare a report outlining our findings on the ground conditions and the suitability of the site for residential subdivision. This will include:
 - Foundation recommendations for typical timber framed residential dwellings.
 - Seismic Subsoil category.
 - Address likely geohazards that may affect the site.
 - Provide general geotechnical recommendations related to the proposed development.
 - Provide an assessment against Section 106 of the Resource Management Act (RMA) and a Statement of Professional Opinion for Residential Subdivision.

2 Site Description

The 40 ha site is located on a relatively flat area in Rolleston and made up of the following addresses (Appendix 1):

- 127 Lincoln Rolleston Road
- 391 Lincoln Rolleston Road
- 548 Selwyn Road
- 2/554 Selwyn Road
- 3/554 Selwyn Road
- 1/554 Selwyn Road
- 1/572 Selwyn Road (Lot 2 DP 337894)
- 2/572 Selwyn Road (Lot 3 DP 337894)
- 4/572 Selwyn Road (Lot 4 DP 337894)

The site is currently lifestyle blocks mostly used for light grazing with various existing dwellings and sheds on-site.

3 Geological Model

3.1 Regional Geology

The site has been regionally mapped by GNS (Forsyth et al., 2008) as being underlain by brownish grey river alluvium (Q2a).

3.2 Geomorphology

The site comprises relatively flat ground, with gentle undulations and depressions in some areas. As evident on aerial imagery (Canterbury Maps, 2020) and observed during our site walkover conducted on 2 December 2020, a number of areas of undulating and depressed ground can be attributed to paleo-channels, which traverse the site in a general northwest to southeast direction. Based on observations, sandy silt deposits with variable thickness are expected to have in-filled the paleo-channels where they have not remained as channel features.

3.3 Geohazards

3.3.1 Seismicity

There are no known or mapped faults in the immediate area of the site, however, the site may be at risk of ground shaking induced by movement of other faults.

The site is located between two recently discovered fault systems, the Greendale Fault and the Port Hills Fault, the ruptures of which initiated the ongoing Canterbury Earthquake Sequence (CES). The Greendale Fault has been mapped approximately 6 km northwest of the site and trends roughly east-west with a surface rupture of approximately 28 km (GNS, 2015), while the Port Hills Fault remains unmapped as the fault did not rupture the surface. Movement on the Port Hills Fault is believed to have occurred at a depth of 1 km to 2 km below the ground surface.

Large regional areas of faulting (GNS, 2015) namely the Ashley Fault, Porters Pass-Amberley Fault Zone, and the Hope and Alpine Faults, are further afield but present a high seismic hazard to the Christchurch area due to the anticipated size of earthquakes generated. The largest of these faults is the Alpine Fault, which has a return period of 250-300 years and is expected to produce a M8 earthquake. The last rupture on the Alpine Fault is believed to have occurred in 1717 (Pettinga et al., 2001).

3.3.2 Liquefaction and Lateral Spreading

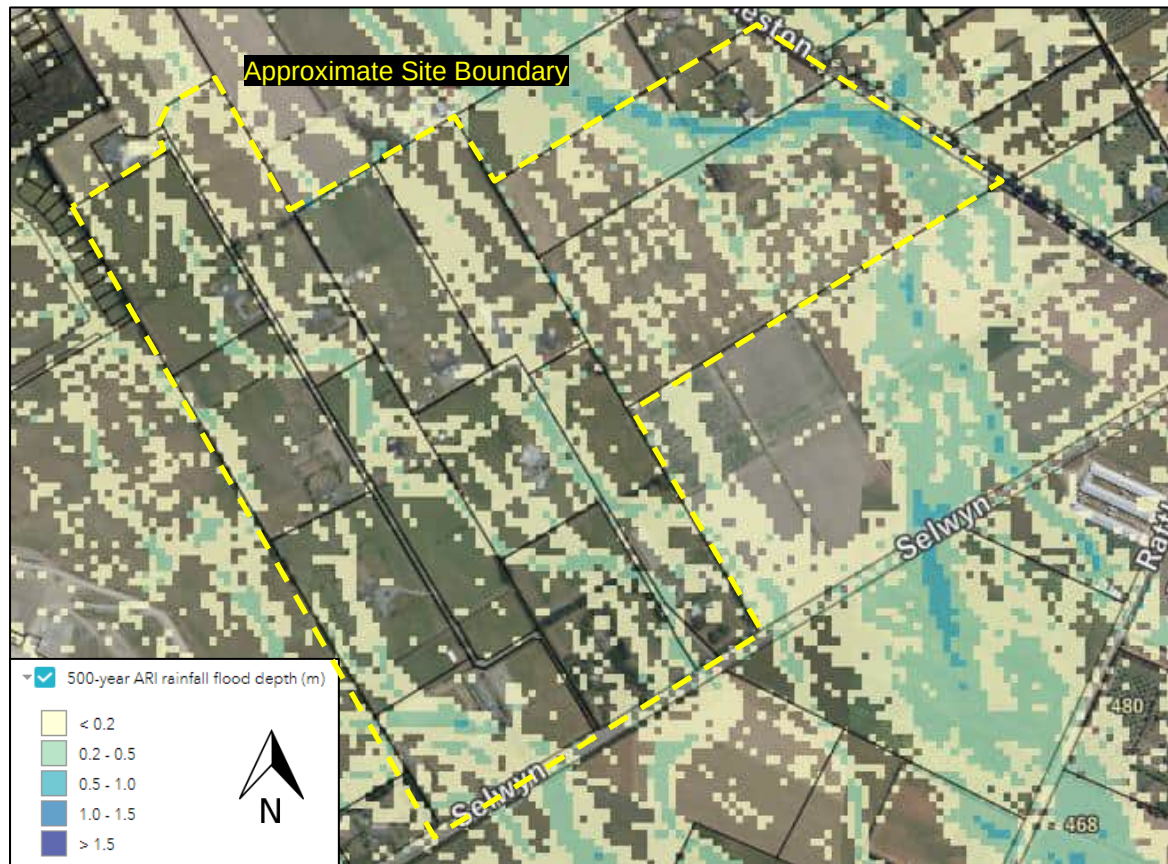
The site is located in an area mapped where “damaging liquefaction is unlikely” (NZGD Map CGD5140, 2012), and a “zone of very low liquefaction potential” (GNS, 2006).

3.4 Flooding

The site is outside of any defined flood zones in the Selwyn District Council (SDC) Operative District Plan (SDC, 2015). The closest flood zone is the Lower Plains Flood Area which is approximately 4 km southeast of the site towards the Port Hills.

The Selwyn District Council have carried out computer-based flood modelling to predict the extent and depth of flooding that could happen during a one-in-200-year and a one-in-500-year flood. Based on this modelling, the water depth through the site may be up to 0.8 m deep in the existing channel feature (Figure 1) during the 500 year flood.

Figure 1: SDC Flooding Map



From Canterbury Maps and Selwyn Council. Not to scale.

3.5 ECan Boreholes

We have reviewed deep ECan borehole logs located on the site (as shown in Figure 2), and have reviewed the monitoring well data from the monitoring wells on the site (part of the ECan Water Level Monitoring Network).

The logs for the wells located on the site, or close to the site boundary indicate the underlying soil generally comprises of gravels which extend to the bottom of the drill holes with isolated clay and silt layers at depth. The groundwater levels recorded in these wells are an average of approximately 10.6 m depth. The details for the wells are provided in Appendix 2 (including available drill logs).

Table 1: Generalised Summary of ECan Boreholes

ECan Borehole	Total Depth (m)	Initial Water Level Below Ground Level (m)	Generalised Borelog as Logged by Driller
M36/4015	28	10.5	Gravel to 28.3 m depth.
M36/7850	42	12.2	Gravel to 42 m depth.
BX23_0262	42	7.3	Gravel to the maximum depth of testing with a 3 m thick clay layer from 26 m to 29 m depth.
M36_1816	13.67	7.64	No data available.
M36_2996	59.4	9.6	No data available.
M26_3018	65.7	9.32	Not logged up to 39 m depth. Gravel from 39 m to 65.7 m depth.
M36_3836	56.6	10.7	Gravel to the maximum depth of drilling.
M36_4433	30	9.7	Gravel to the maximum depth of testing with a 1 m thick clay layer from 26 m to 27 m depth.
M36_7975	37.5	10	Gravel to the maximum depth of testing with a 1 m thick silt layer from 25 m to 26 m depth.
M36_7976	36	10.2	Gravel to the maximum depth of drilling.
M36_8002	66	12.1	Gravel to the maximum depth of testing with 1 m thick clay layers from 26 m to 27 m depth and 32 m to 33 m.
M36_8009	36	11.8	Gravel to the maximum depth of drilling.
M36_8138	36	14.2	Gravel to the maximum depth of drilling.
M36_8299	90	20.4*	Gravel to the maximum depth of drilling with a 6 m layer of river sands with some clay from 8 m to 14 m depth.
M36_8300	42	13.4	Gravel to the maximum depth of drilling.
M36_8392	36	10	Gravel to the maximum depth of drilling
Average Groundwater depth		10.6	

*Excluded from the average as an outlier.

Figure 2: Nearby ECan Borehole Locations



Aerial photograph sourced from Canterbury Maps. Not to scale.

3.6 Site Seismic Class

In accordance with NZS 1170.5:2004, Class D applies to this particular site, defining it as a 'deep soft soil site'.

4 Site Investigation

4.1 Site Investigation

Site investigations to assess the shallow subsurface material types and strength characteristics were undertaken by ENGEO on 3 to 4 December 2020, and 21 to 22 June 2023. A total of 49 test pits with associated Scala Penetrometer tests have been completed to a maximum depth of 2.2 m below ground level. A further 20 hand augers and Scala penetrometers have been completed by Davie Lovell Smith on 10 February 2023 for the retirement village site.

The Davie Lovell Smith testing refused on the top of the gravel layer and is supplemented by three test pits from our 2020 investigation over the retirement village area. Given the consistency of the near surface geology in this area we consider the data provided sufficient to inform the ground model.

The investigations revealed subsurface conditions across the site are consistent with the published geological mapping, as summarised in Table 2.

Table 2: Summary of Subsurface Investigations

Soil Type	Depth to Top of Layer (m)	General Layer Thickness (m)	Density / Consistency	Additional Comments
TOPSOIL	0.0	0.3	-	-
SILT / SAND*	0.3	0.5**	Very Stiff to Hard / Medium Dense	-
Sandy GRAVEL	0.3	Unknown	Medium Dense to Very Dense	Tightly packed and consistent across the site. Deep roots observed up to 2 m depth.

*Not observed in all test pit locations.

**Thickness varies.

All investigation locations are provided in Appendix 1 with the ENGEO test pits logs in Appendix 3 and the Davie Lovell Smith plan and logs in Appendix 4.

5 Geotechnical Assessment

5.1 Site Seismic Class

For the purpose of seismic design, we consider the soil classification in line with NZS 1170.5:2004 to be 'Class D – Deep or soft soil sites'

5.2 Liquefaction Assessment

Owing to the nature of the subsurface materials and depth to groundwater at the site, we consider the potential for liquefaction and lateral spreading on the site to be very low.

We therefore consider future land performance to be in line with Technical Category 1 (TC1), whereby future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.

5.3 Foundations

Foundations for future one or two storey residential dwellings within the subdivision are likely to comprise pad, strip or slab foundations designed in accordance with the provisions of NZS 3604 Timber Framed Buildings. In areas where native gravel is < 400 mm of the surface, it is likely that standard 3604 foundations will be suitable. In areas where foundations are native on alluvial silt or sand, standard foundations will likely be suitable however engineering judgement may be required to design the foundations to accommodate for a reduced bearing capacity. This should be confirmed by lot specific reporting completed during the building consent process.

The retirement village may have larger buildings than those noted above, however, they will be subject to specific engineering design and in our opinion the ground is geotechnically suitable to support the typical buildings associated with retirement villages.

6 RMA Section 106 Assessment

Section 106 of the Resource Management Act 1991 (updated October 2017) states a consent authority may refuse to grant subdivision consent, or may grant a consent subject to specific consent conditions, if it considers that there is a risk from natural hazards and which requires a combined assessment of:

- The likelihood of natural hazards occurring (whether individually or in combination).
- The material damage to land in response of which the consent is sought, other land, or structural that would result from natural hazards.
- Any likely subsequent use of the land in response to which the consent is sought that would accelerate, worsen or result in material damage of the kind referred to above.

Based on our observations and the nature of the site, and the site's distance from the nearest significant watercourse, we consider it unlikely for the site to be subject to the potential hazards noted in Section 3.3 and, as such, the site is considered suitable for subdivision from a geotechnical perspective.

As discussed in Section 3.4 of this report, we recommend that flooding hazard is considered during subdivision design.

7 Statement of Professional Opinion

In our opinion, we consider that the site is suitable for subdivision from a geotechnical perspective. Prior to construction a geo-professional should be given the opportunity to review the civil earthworks plans and provide an Earthworks Specification to guide the bulk earthworks required to form the new subdivision.

8 References

Canterbury Maps, Groundwater. Retrieved December 2020 from <http://canterburymaps.govt.nz/Viewer>.

Forsyth, P., Barrell, D. J., & Jongens, R. (2008). Sheet 16 - Geology of the Christchurch Area 1:250,000. Lower Hutt: Institute of Geological and Nuclear Sciences.

New Zealand Geotechnical Database (NZGD). Retrieved December 2020 from <https://www.nzgd.org.nz/>

Selwyn District Council (2015), Selwyn District Council Operative District Plan. Retrieved December 2020, from <http://www.selwyn.govt.nz/services/planning/district-plan>.

Selwyn District Council (2015), Property Search. Retrieved December 2020, from <https://www.selwyn.govt.nz/my-property/rates/search-properties>.

The Ministry of Business, Innovation, and Employment. (2012). Guidance-Repairing and rebuilding houses affected by the Canterbury earthquakes. Christchurch: The Ministry of Business, Innovation, and Employment.

We also acknowledge the New Zealand GeoNet project and its sponsors EQC, GNS Science and LINZ, for providing data used in this report.

9 Limitations

- i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Urban Estates Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.
- ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.
- iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.
- iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.
- v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by



Rowan Cook, CMEngNZ (PEngGeol)

Associate Engineering Geologist

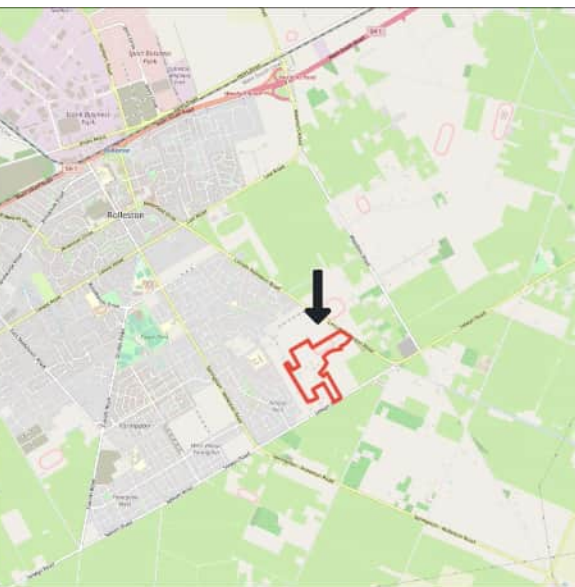
Report reviewed by



Neil Charters, CMEngNZ (CPEng)

Principal Geotechnical Engineer

APPENDIX 1: Site Plan



- Legend**
- 2023 Test Pits
 - 2020 Test Pits
 - Retirement Village Site Boundary
 - Subdivision Site Boundary
 - Retirement village Plan

0 50 m 100 m
© Nearmap

ENGEO

Produced by **Datanest.earth**

Title: Site Plan		
Client: Urban Esates		
Project: Rolleston Megasite	Drawn: DD	Figure No.: 001 Size: A3
Date: 02-06-2023	Checked: RC	
Proj No.: 18113.000.002	Scale: 1:3500	Version: 1.0

APPENDIX 2:

Ecan Boreholes

Bore or Well No	BX23/0262		
Well Name	Selwyn Road		
Owner	MR & MRS J E & A T HEYL		
Well Number	BX23/0262	File Number	CRC141970
Owner	MR & MRS J E & A T HEYL	Well Status	Active (exist, present)
Street/Road	Selwyn Road	NZTM Grid Reference	BX23:52560-70858
Locality	ROLLESTON	NZTM X and Y	1552560 - 5170858
Location Description		Location Accuracy	10 - 50m
CWMS Zone	Selwyn - Waihora	Use	Domestic Supply, Stock Supply
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	42.00m	Water Level Count	1
Diameter	150mm	Initial Water Level	7.80m below MP
Measuring Point Description	Top of Casing	Highest Water Level	7.80m below MP
Measuring Point Elevation		Lowest Water Level	7.80m below MP
Elevation Accuracy		First reading	05 Nov 2013
Ground Level	0.50m below MP	Last reading	05 Nov 2013
Strata Layers	9	Calc Min 80%	
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	1
Drill Date	05 Nov 2013	Max Tested Yield	
Driller	McMillan Drilling Ltd	Drawdown at Max Tested Yield	
Drilling Method	Rotary/Percussion	Specific Capacity	0.28 l/s/m
Casing Material	Steel	Last Updated	29 Nov 2013
Pump Type		Last Field Check	05 Nov 2013
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	40.48	42	2.5		125	

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
05 Nov 2013	1	1.67	22.040966	5.93	1.25

Comments

Comment Date	Comment
14 Nov 2013	NZMG Map Reference updated from: M36:62523-32589 shifted 124m
14 Nov 2013	Driller confirms

Bore Log

Borelog for well BX23/0262

Grid Reference (NZTM): 1552561 mE, 5170859 mN

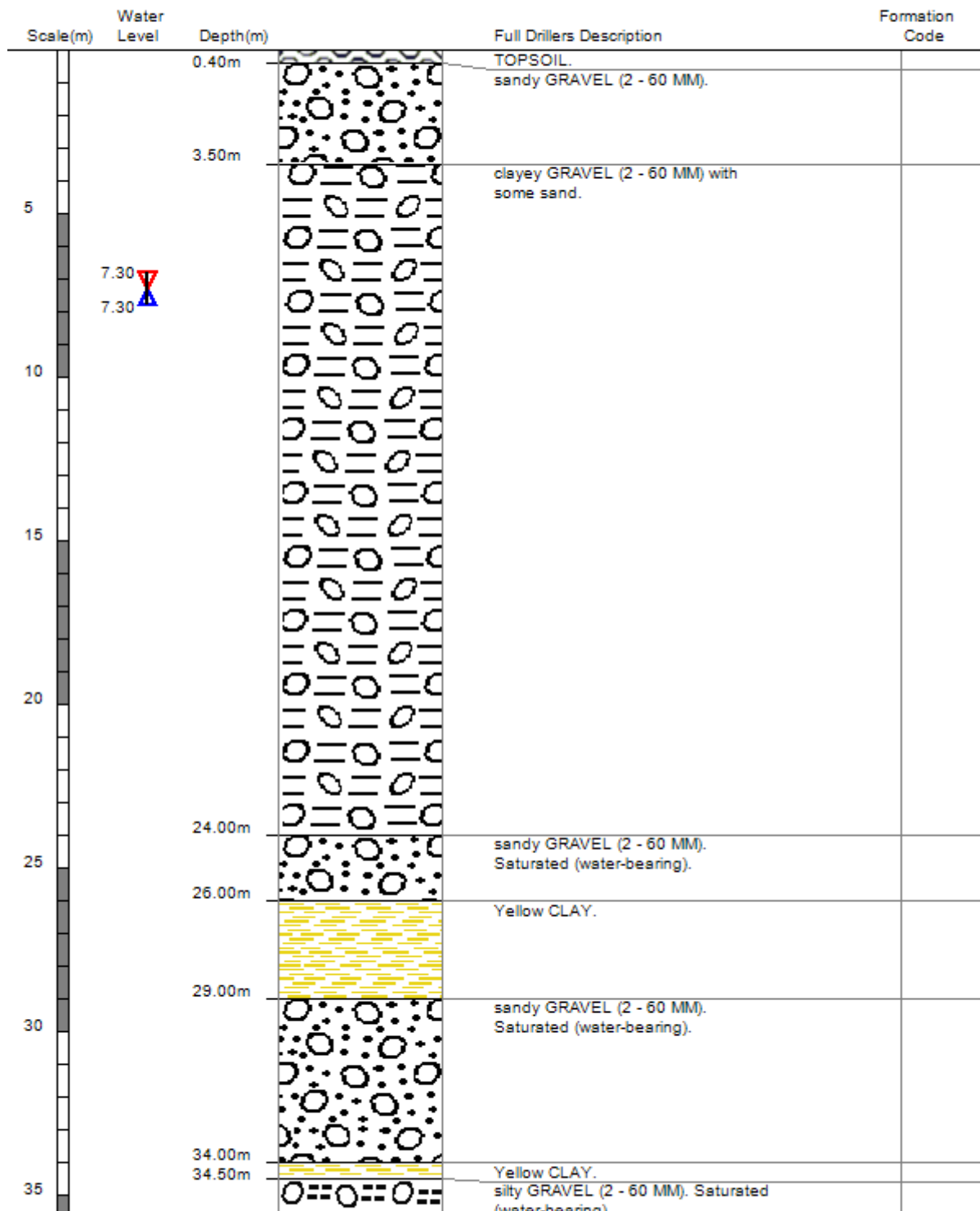
Location Accuracy: 10 - 50m

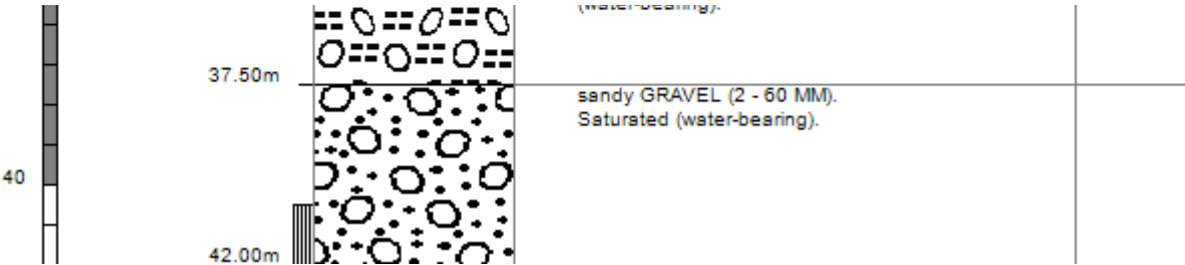
Ground Level Altitude: m +MSD Accuracy:

Driller: McMillan Drilling Ltd

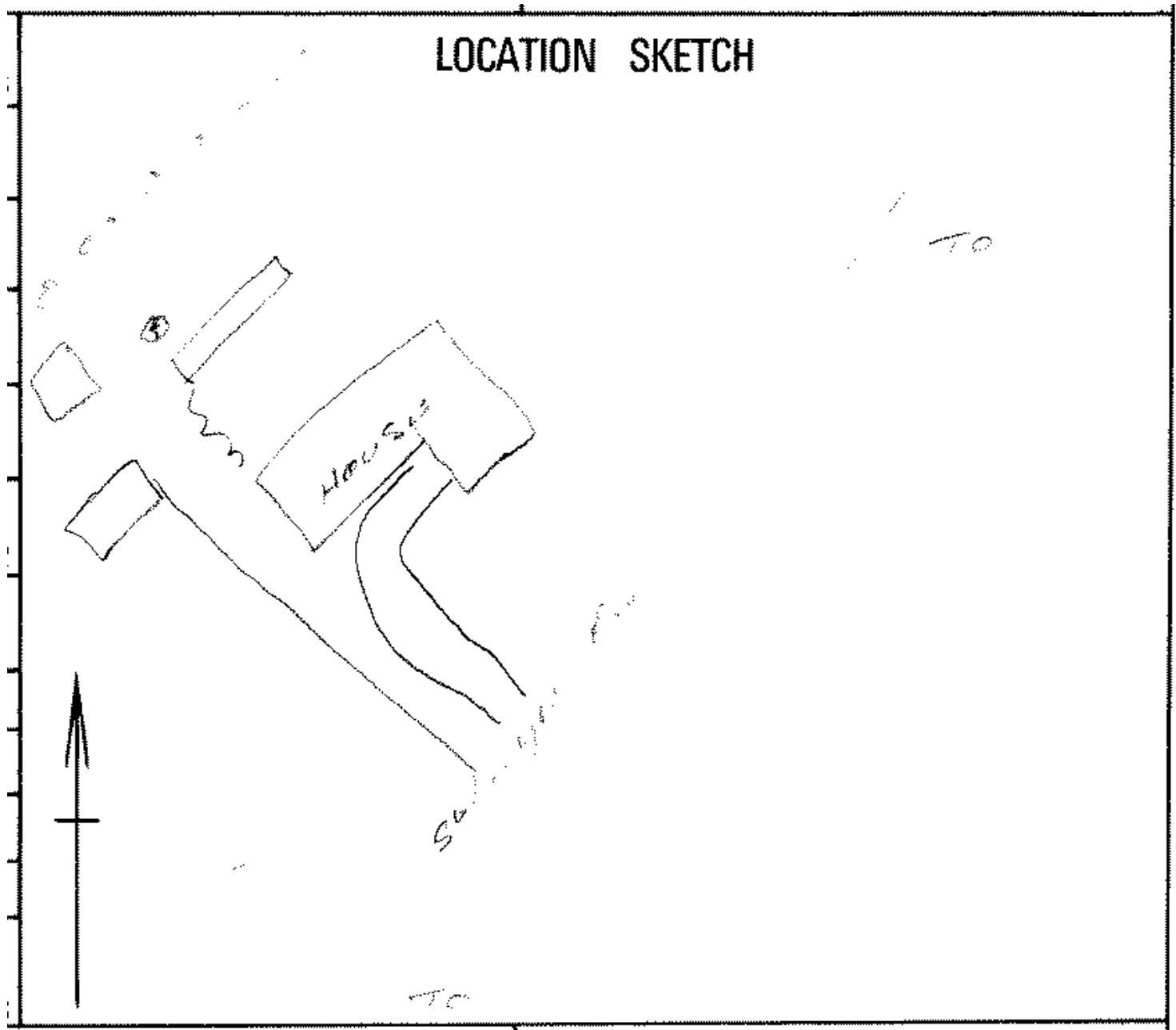
Drill Method: Rotary/Percussion

Borelog Depth: 42.0 m Drill Date: 05-Nov-2013





Bore or Well No	M36/1816		
Well Name	SELWYN RD		
Owner	MCLAUGHLAN		
Well Number	M36/1816	File Number	
Owner	MCLAUGHLAN	Well Status	Not Used
Street/Road	SELWYN RD	NZTM Grid Reference	BX23:52806-70690
Locality	ROLLESTON	NZTM X and Y	1552806 - 5170690
Location Description		Location Accuracy	< 50m
CWMS Zone	Selwyn - Waihora	Use	,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	13.67m	Water Level Count	0
Diameter	150mm	Initial Water Level	7.64m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	35.80m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	0	Calc Min 80%	9.27m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	0
Drill Date		Max Tested Yield	
Driller	McMillan Drilling Ltd	Drawdown at Max Tested Yield	
Drilling Method	Cable Tool	Specific Capacity	
Casing Material	STEEL	Last Updated	29 Jan 2007
Pump Type	Unknown	Last Field Check	
Water Use Data	No		

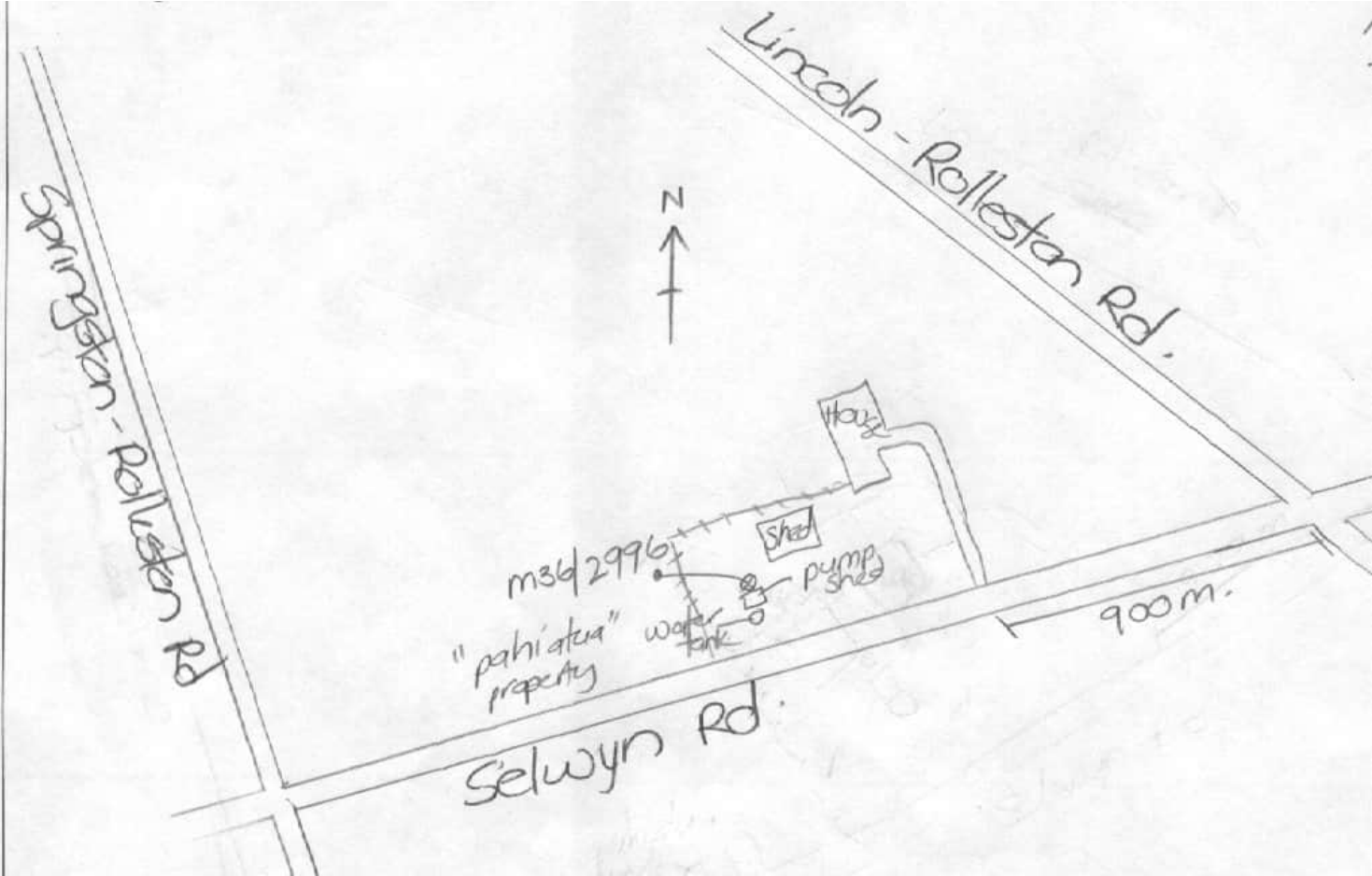


No screen data for this well

No step tests for this well

No comments for this well

Bore or Well No	M36/2996		
Well Name	SELWYN ROAD		
Owner	NISBET, NA & EM		
Well Number	M36/2996	File Number	CO6C/01455
Owner	NISBET, NA & EM	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52913-70536
Locality	ROLLESTON	NZTM X and Y	1552913 - 5170536
Location Description	NEAR HAYSHED	Location Accuracy	2 - 15m
CWMS Zone	Selwyn - Waihora	Use	Irrigation, Domestic Supply
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	59.40m	Water Level Count	0
Diameter	200mm	Initial Water Level	9.60m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	35.67m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	0	Calc Min 80%	11.50m below MP (Estimated)
Aquifer Name	Linwood Gravel	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	1
Drill Date	15 Oct 1984	Max Tested Yield	11 l/s
Driller	McMillan Drilling Ltd	Drawdown at Max Tested Yield	14 m
Drilling Method	Rotary Rig	Specific Capacity	0.84 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type	Unknown	Last Field Check	
Water Use Data	No		



Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	55.7	59.4				

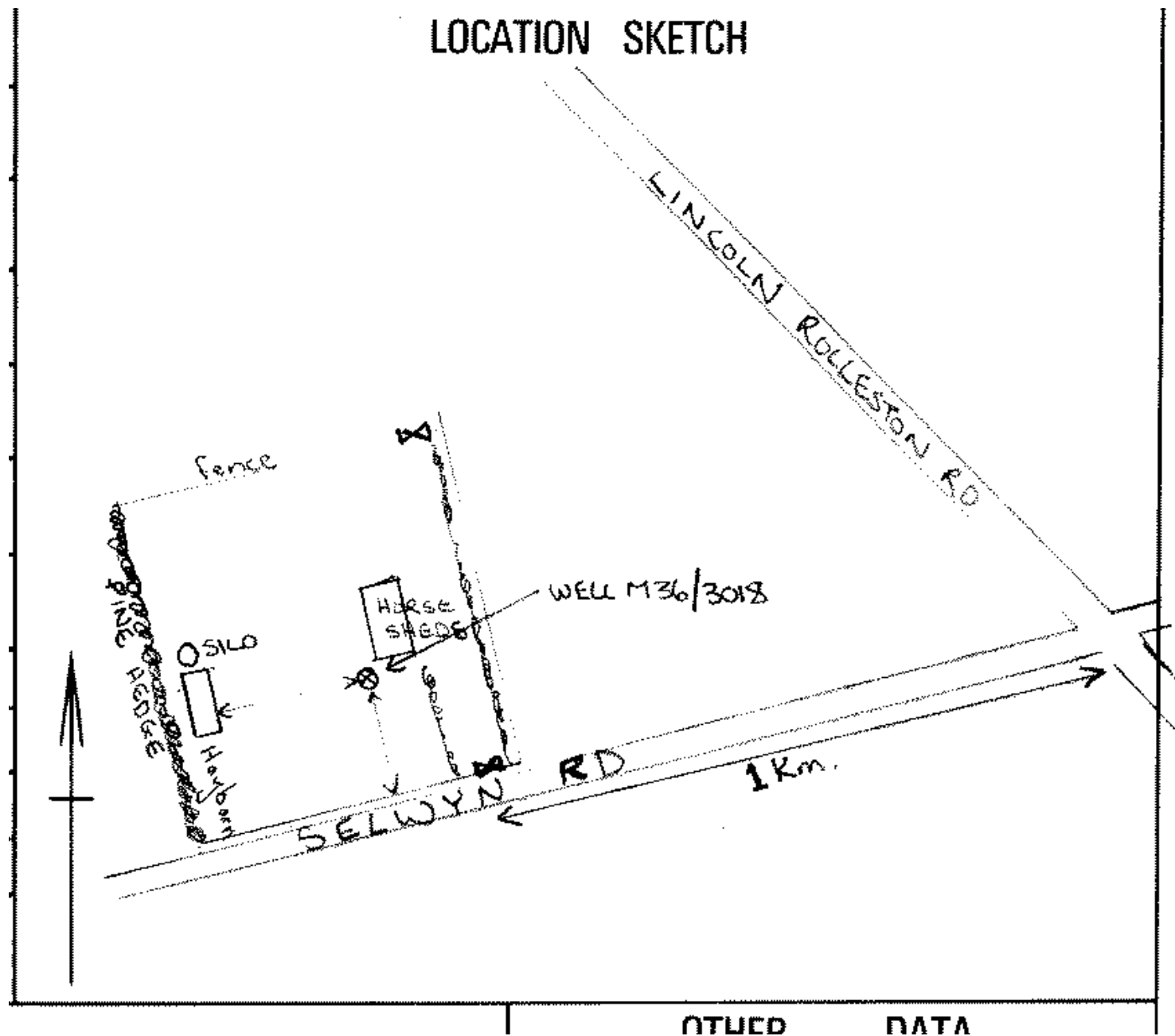
Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
15 Oct 1984	1	11.4	150.45929	13.6	18

Comments

Comment Date	Comment
	NO LOG EXISTS. SCREENED IN MEDIUM STAINED GRAVELS.

Bore or Well No	M36/3018		
Well Name	SELWYN RD		
Owner	BOWDEN M.L.		
Well Number	M36/3018	File Number	
Owner	BOWDEN M.L.	Well Status	Active (exist, present)
Street/Road	SELWYN RD	NZTM Grid Reference	BX23:52606-70440
Locality	ROLLESTON	NZTM X and Y	1552606 - 5170440
Location Description	NEAR STABLES	Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Irrigation, Domestic and Stockwater
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	65.70m	Water Level Count	0
Diameter	200mm	Initial Water Level	9.32m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	34.95m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	9	Calc Min 80%	11.68m below MP (Estimated)
Aquifer Name	Linwood Gravel	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	1
Drill Date	13 Jan 1986	Max Tested Yield	16 l/s
Driller	McMillan Drilling Ltd	Drawdown at Max Tested Yield	22 m
Drilling Method	Rotary/Percussion	Specific Capacity	0.75 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type	Submersible	Last Field Check	
Water Use Data	No		



Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	58.4	61.3				
2	Stainless steel	63.3	65.4				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
13 Jan 1986	1	16.3	215.130386	21.7	14

Comments

Comment Date	Comment
	DRILLED TO 42M IN 1985.11.4/s 23M DD

Bore Log

Borelog for well M36/3018

Grid Reference (NZTM): 1552607 mE, 5170441 mN

Location Accuracy: 50 - 300m

Ground Level Altitude: 35.0 m +MSD Accuracy: < 2.5 m

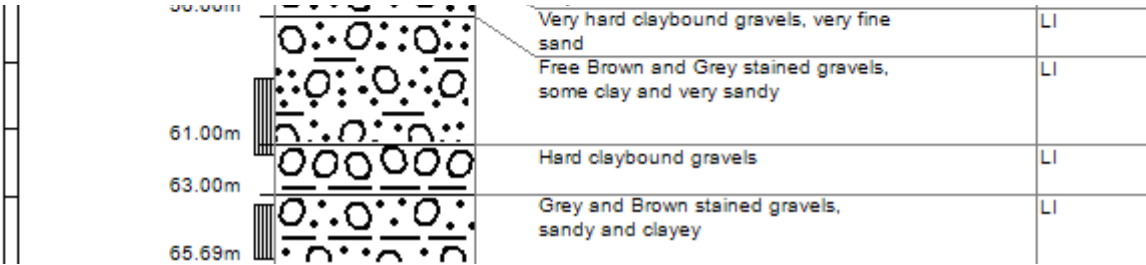
Driller: McMillan Drilling Ltd

Drill Method: Rotary/Percussion

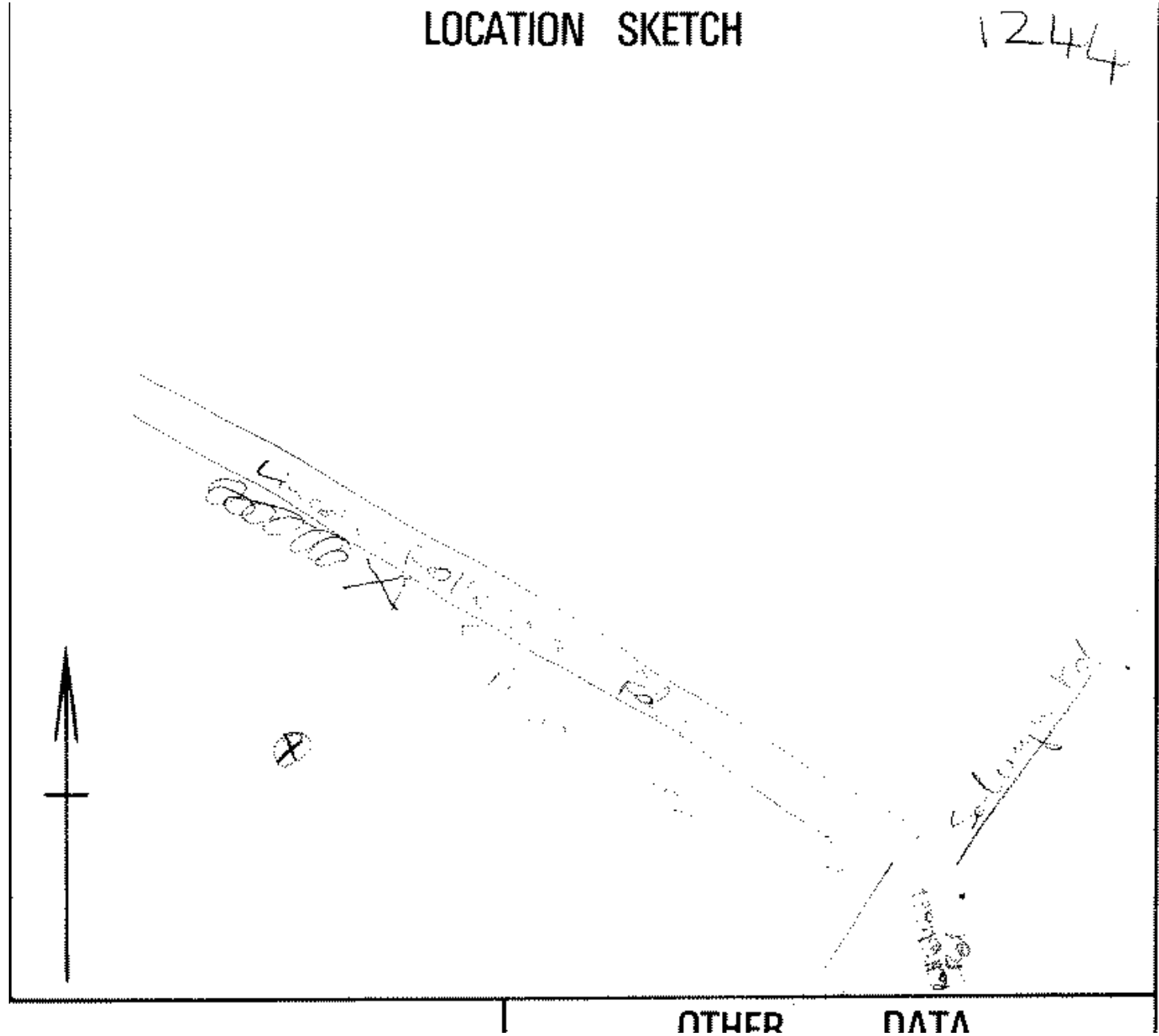
Borelog Depth: 65.7 m Drill Date: 13-Jan-1986



Scale(m)	Water Level	Depth(m)	Full Drillers Description	Formation Code
			Not logged	SP-LI
13				
26				
39		39.00m	Grey and Brown stained gravels, sandy	LI
		46.50m	Grey and Brown Or stained gravels, very sandy and clayey	LI
53		51.50m	Tight claybound gravels	LI
		53.00m		
		54.50m	Grey and Brown Black stained gravels, fine sand and Orange/Yellow clays	LI
		55.00m		



Bore or Well No	M36/3836		
Well Name	LINCOLN ROLLESTON RD		
Owner	Mr & Mrs K M & J A Saulsbury		
Well Number	M36/3836	File Number	CO6C/02068
Owner	Mr & Mrs K M & J A Saulsbury	Well Status	Active (exist, present)
Street/Road	LINCOLN ROLLESTON RD	NZTM Grid Reference	BX23:53106-71190
Locality	BROADFIELD	NZTM X and Y	1553106 - 5171190
Location Description		Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Irrigation,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	56.60m	Water Level Count	0
Diameter	220mm	Initial Water Level	10.70m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	37.24m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	8	Calc Min 80%	11.88m below MP (Estimated)
Aquifer Name	Linwood Gravel	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	1
Drill Date	01 Nov 1987	Max Tested Yield	11 l/s
Driller	McMillan Drilling Ltd	Drawdown at Max Tested Yield	14 m
Drilling Method	Cable Tool	Specific Capacity	0.83 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type	Submersible	Last Field Check	
Water Use Data	Yes		



Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	53.6	56.6				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
01 Nov 1987	1	11.4	150.45929	13.7	4

Comments

Comment Date	Comment
21 Jul 2011	Previous owner VAN DE KLUNDERT A.W.

Bore Log

Borelog for well M36/3836

Grid Reference (NZTM): 1553107 mE, 5171191 mN

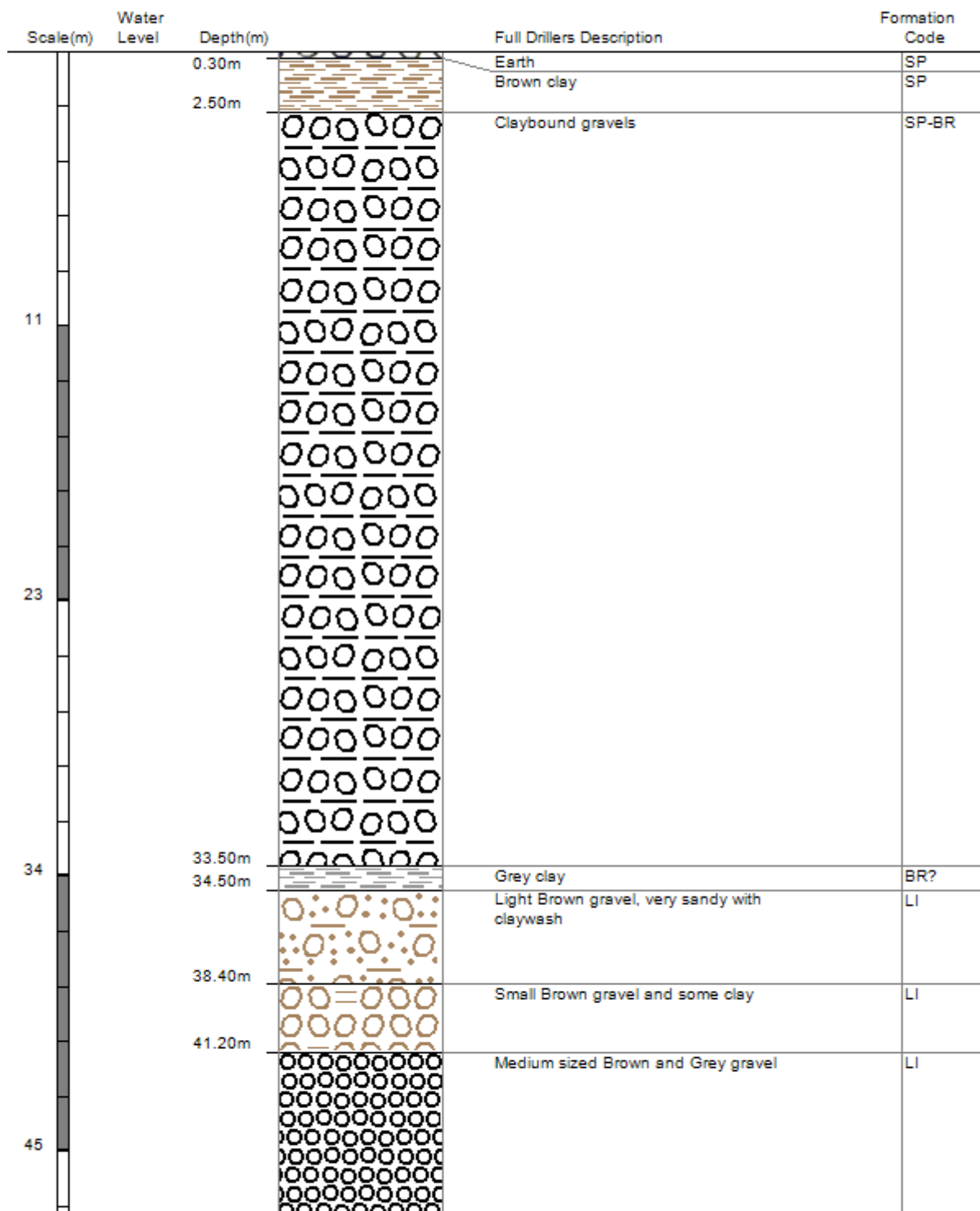
Location Accuracy: 50 - 300m

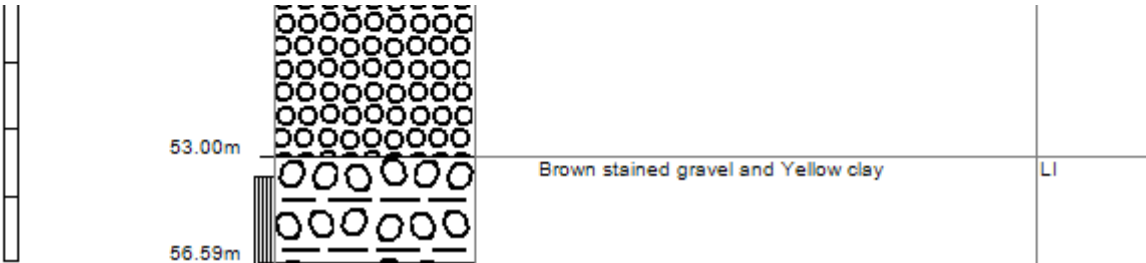
Ground Level Altitude: 37.2 m +MSD Accuracy: < 2.5 m

Driller: McMillan Drilling Ltd

Drill Method: Cable Tool

Borelog Depth: 56.6 m Drill Date: 01-Nov-1987





Bore or Well No	M36/4433		
Well Name	SELWYN ROAD		
Owner	Mr & Mrs H J & D P Bates		
Well Number	M36/4433	File Number	CO6C/02646
Owner	Mr & Mrs H J & D P Bates	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52875-70540
Locality	ROLLESTON	NZTM X and Y	1552875 - 5170540
Location Description		Location Accuracy	2 - 15m
CWMS Zone	Selwyn - Waihora	Use	Irrigation, Domestic Supply
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	30.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	9.70m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	35.61m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	10	Calc Min 80%	12.08m below MP (Estimated)
Aquifer Name	Bromley Formation	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	1
Drill Date	20 Dec 1991	Max Tested Yield	2 l/s
Driller	Smiths Welldrilling	Drawdown at Max Tested Yield	4 m
Drilling Method	Cable Tool	Specific Capacity	0.52 l/s/m
Casing Material		Last Updated	08 Nov 2013
Pump Type	Unknown	Last Field Check	
Water Use Data	No		



Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	28	30				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
20 Dec 1991	1	2.2	29.036005	4.2	2

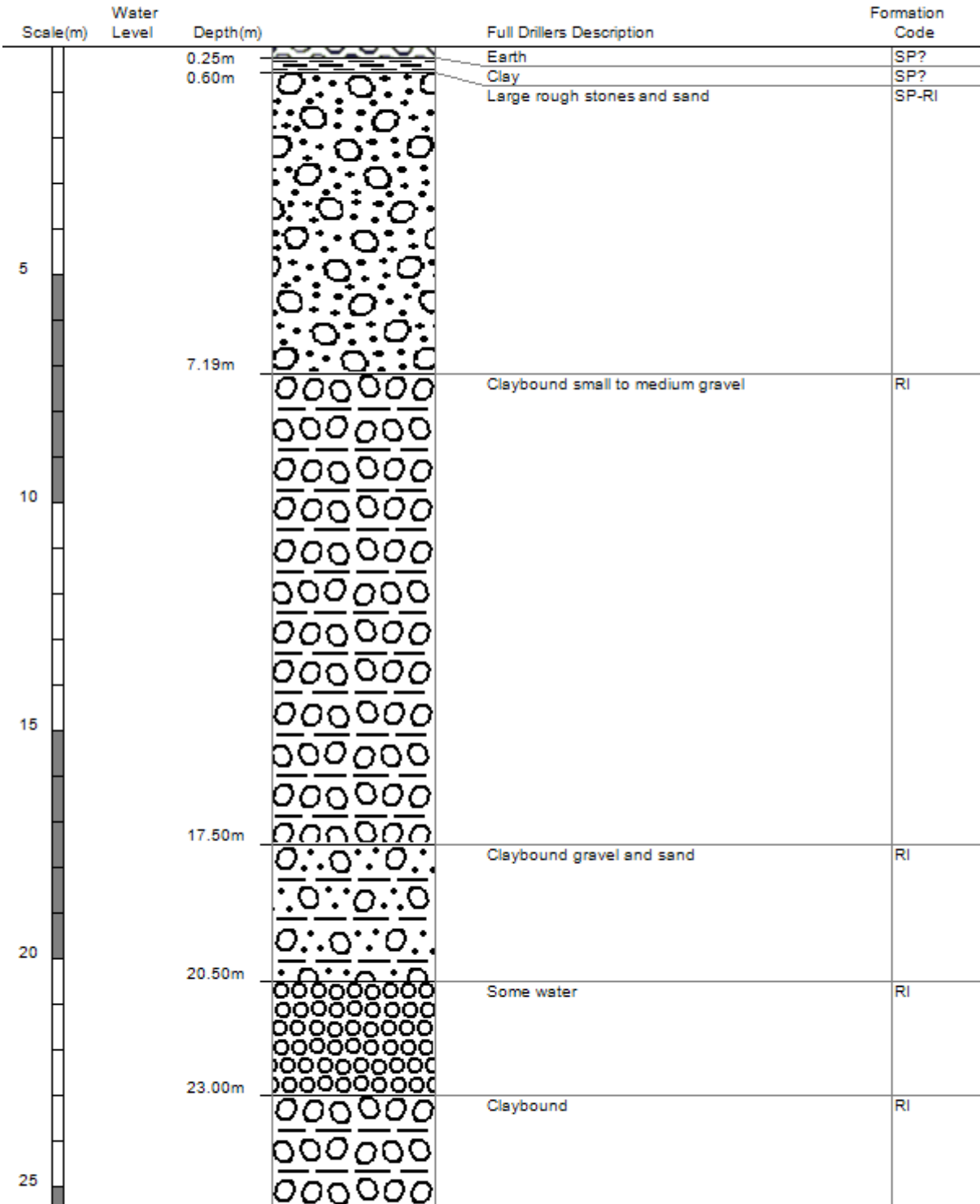
Comments

Comment Date	Comment
	Previous owner S Matheson.

Bore Log

Borelog for well M36/4433

Grid Reference (NZTM): 1552876 mE, 5170541 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 35.6 m +MSD Accuracy: < 2.5 m
Driller: Smiths Welldrilling
Drill Method: Cable Tool
Borelog Depth: 30.0 m Drill Date: 20-Dec-1991





Bore or Well No	M36/7975	 Environment Canterbury Regional Council <i>Kaunihera Taiao ki Waitaha</i>	
Well Name	SELWYN ROAD		
Owner	MR & MS SH & EL LOEFFLER & HUISMANS		
Well Number	M36/7975	File Number	CO6C/23830
Owner	MR & MS SH & EL LOEFFLER & HUISMANS	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52316-71000
Locality	ROLLESTON	NZTM X and Y	1552316 - 5171000
Location Description		Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Domestic Supply,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	37.50m	Water Level Count	0
Diameter	150mm	Initial Water Level	10.00m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	38.00m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.30m below MP	Last reading	
Strata Layers	12	Calc Min 80%	12.03m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	3
Drill Date	05 Sep 2005	Max Tested Yield	6 l/s
Driller	Dynes Road Drilling	Drawdown at Max Tested Yield	17 m
Drilling Method	Cable Tool	Specific Capacity	0.43 l/s/m
Casing Material	Steel	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	35	37.5				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
05 Sep 2005	1	3.636864	48	8.5	1
05 Sep 2005	2	5.379528	71	12.2	1

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
05 Sep 2005	3	6.364512	84	17.3	2

No comments for this well

Bore Log

Borelog for well M36/7975

Grid Reference (NZTM): 1552317 mE, 5171001 mN

Location Accuracy: 50 - 300m

Ground Level Altitude: 37.7 m +MSD Accuracy: < 2.5 m

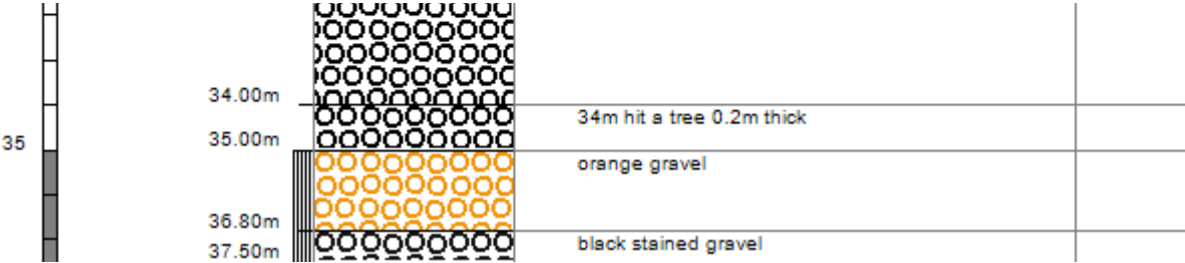
Driller: Dynes Road Drilling

Drill Method: Cable Tool

Borelog Depth: 37.5 m Drill Date: 05-Sep-2005



Scale(m)	Water Level	Depth(m)	Full Drillers Description	Formation Code
		0.70m	brown topsoil	
			small-med gravel some silt	
5				
10				
		12.00m	small rounded gravel	
15				
20		19.00m	small-med subrounded gravel	
25		25.00m		
		26.00m	solid yellow silt water sealing	
			small-med rounded gravel - some stained	
		28.00m		
		28.50m	some sand with gravel	
			small rounded stained gravel	
30		30.00m		
			loose rounded med gravel	



Bore or Well No	M36/7976		
Well Name	SELWYN ROAD		
Owner	WEATHERBY ESTATE LIMITED		
Well Number	M36/7976	File Number	CO6C/23897
Owner	WEATHERBY ESTATE LIMITED	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52386-70950
Locality	BROADFIELD	NZTM X and Y	1552386 - 5170950
Location Description		Location Accuracy	10 - 50m
CWMS Zone	Selwyn - Waihora	Use	Domestic and Stockwater,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	36.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	10.60m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	37.00m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.40m below MP	Last reading	
Strata Layers	11	Calc Min 80%	12.04m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	1
Drill Date	24 Aug 2005	Max Tested Yield	2 l/s
Driller	Daly Water Wells Ltd	Drawdown at Max Tested Yield	3 m
Drilling Method	Rotary Rig	Specific Capacity	0.63 l/s/m
Casing Material	Steel	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	34	36				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
24 Aug 2005	1	2	26.396368	3.2	4

Comments

Comment Date	Comment
28 Mar 2006	Gridref changed from: M36:6233-3268



Bore or Well No	M36/8002		
Well Name	SELWYN ROAD		
Owner	MR & MRS AT & JM MULCAY		
Well Number	M36/8002	File Number	CO6C/24021
Owner	MR & MRS AT & JM MULCAY	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52536-70700
Locality	ROLLESTON	NZTM X and Y	1552536 - 5170700
Location Description		Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Domestic and Stockwater,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	66.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	12.40m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	36.00m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.30m below MP	Last reading	
Strata Layers	13	Calc Min 80%	11.96m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	1
Drill Date	28 Oct 2005	Max Tested Yield	4 l/s
Driller	Smiths Welldrilling	Drawdown at Max Tested Yield	11 m
Drilling Method	Rotary/Percussion	Specific Capacity	0.37 l/s/m
Casing Material	Steel	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	64.5	66				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
30 Oct 2005	1	4.06	53.5846252	11	2

Comments

Comment Date	Comment
04 May 2007	Gridref changed from: M36:6249-3232, original gridref incorrect (on road) still waiting for BCR

Bore Log

Borelog for well M36/8002

Grid Reference (NZTM): 1552537 mE, 5170701 mN

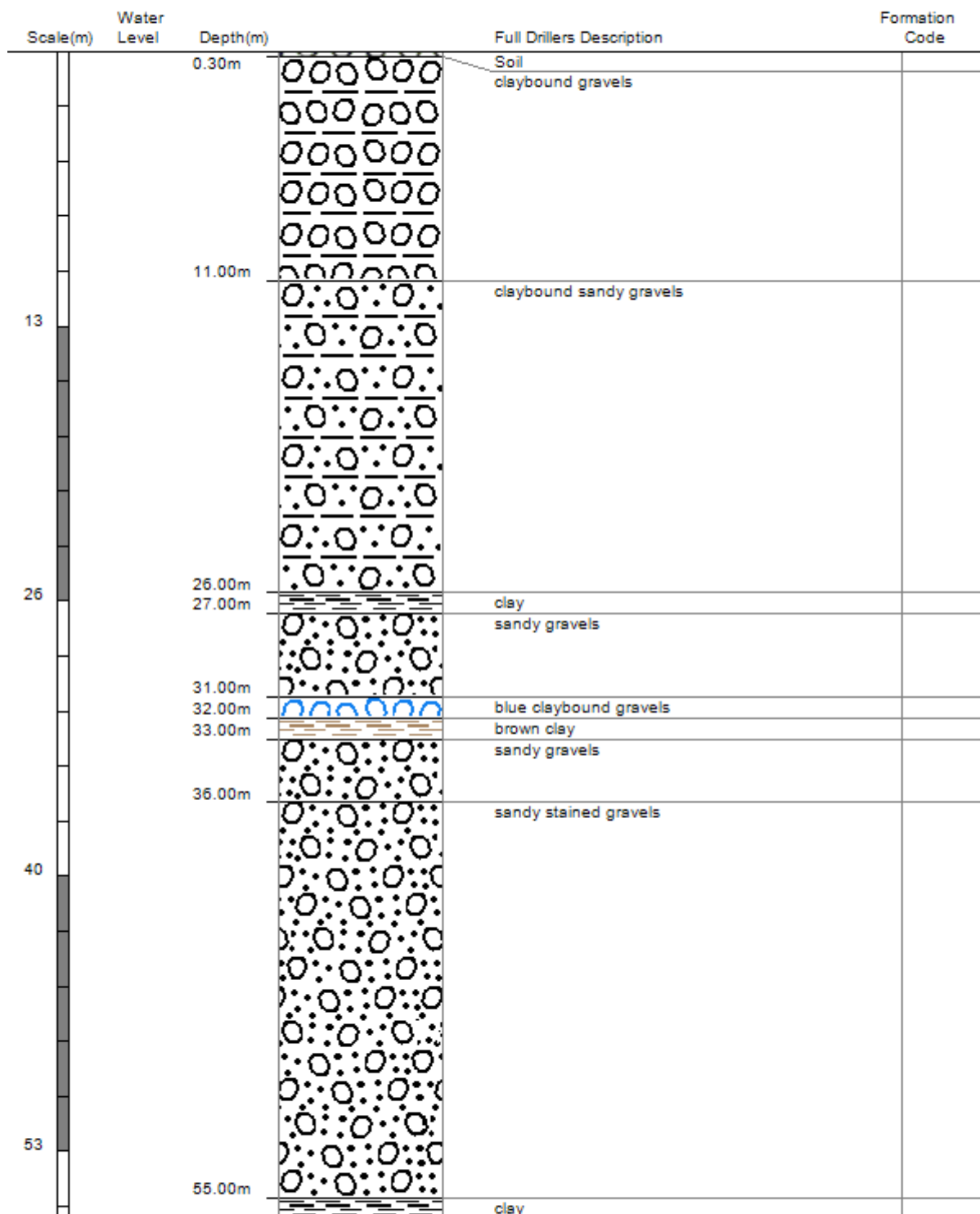
Location Accuracy: 50 - 300m

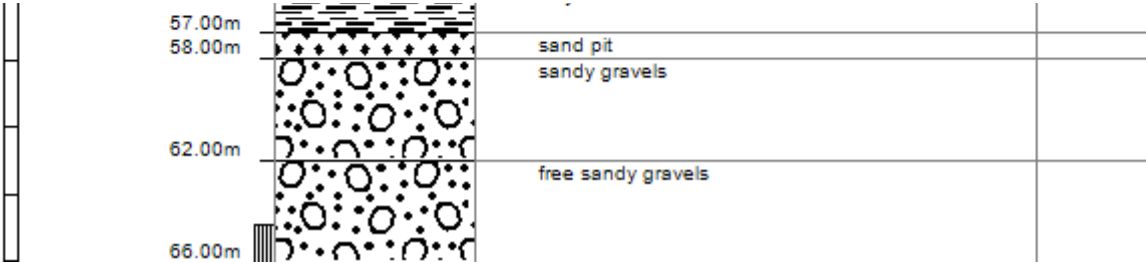
Ground Level Altitude: 35.7 m +MSD Accuracy: < 2.5 m

Driller: Smiths Welldrilling

Drill Method: Rotary/Percussion

Borelog Depth: 66.0 m Drill Date: 28-Oct-2005





Bore or Well No	M36/8009		
Well Name	SELWYN ROAD		
Owner	MR & MRS GC & PM MORGAN		
Well Number	M36/8009	File Number	CO6C/24231
Owner	MR & MRS GC & PM MORGAN	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52356-70860
Locality	BROADFIELD	NZTM X and Y	1552356 - 5170860
Location Description		Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Domestic and Stockwater,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	36.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	12.20m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	36.18m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 5 m	First reading	
Ground Level	0.40m below MP	Last reading	
Strata Layers	10	Calc Min 80%	11.92m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	1
Drill Date	01 Nov 2005	Max Tested Yield	2 l/s
Driller	Daly Water Wells Ltd	Drawdown at Max Tested Yield	3 m
Drilling Method	Rotary Rig	Specific Capacity	0.63 l/s/m
Casing Material	Steel	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

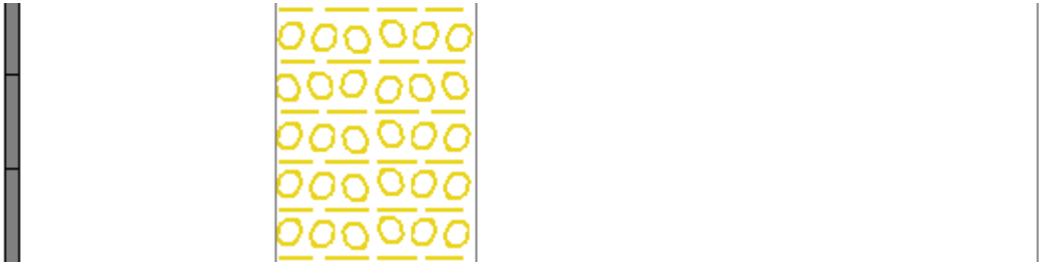
Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Slotted PVC	34	36				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
01 Nov 2006	1	2	26.396368	3.2	3

No comments for this well



Bore or Well No	M36/8138		
Well Name	LINCOLN ROLLESTON ROAD		
Owner	MR & MRS RG & VA HUBBARD		
Well Number	M36/8138	File Number	CO6C/24642
Owner	MR & MRS RG & VA HUBBARD	Well Status	Active (exist, present)
Street/Road	LINCOLN ROLLESTON ROAD	NZTM Grid Reference	BX23:52946-71200
Locality	ROLLESTON	NZTM X and Y	1552946 - 5171200
Location Description		Location Accuracy	10 - 50m
CWMS Zone	Selwyn - Waihora	Use	Domestic and Stockwater,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	36.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	14.60m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	35.69m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 5 m	First reading	
Ground Level	0.40m below MP	Last reading	
Strata Layers	5	Calc Min 80%	12.83m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	1
Drill Date	16 Jan 2006	Max Tested Yield	2 l/s
Driller	Daly Water Wells Ltd	Drawdown at Max Tested Yield	4 m
Drilling Method	Rotary Rig	Specific Capacity	0.51 l/s/m
Casing Material	Steel	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	34	36				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
16 Jan 2006	1	2	26.396368	3.9	0

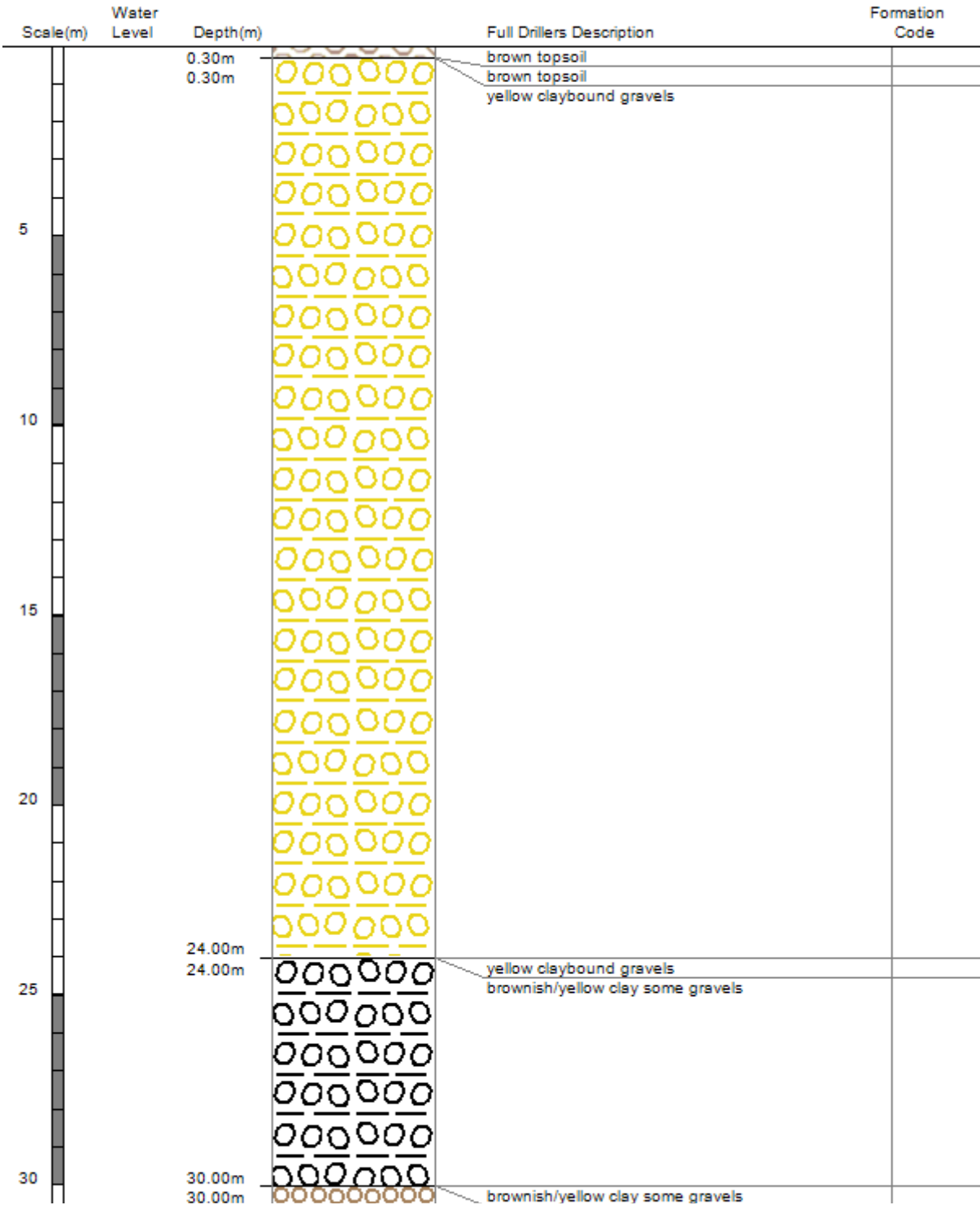
Comments

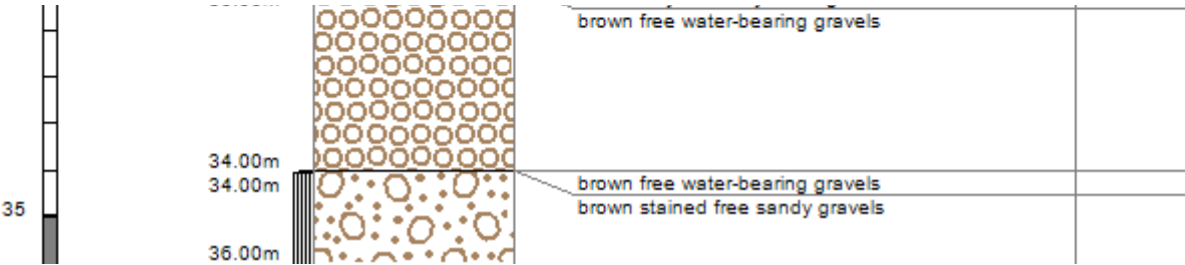
Comment Date	Comment
27 May 2008	Gridref changed from: M36:6294-3282 (BCP received)

Bore Log

Borelog for well M36/8138

Grid Reference (NZTM): 1552947 mE, 5171201 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 35.3 m +MSD Accuracy: < 0.5 m
Driller: Daly Water Wells Ltd
Drill Method: Rotary Rig
Borelog Depth: 36.0 m Drill Date: 16-Jan-2006





Bore or Well No	M36/8299		
Well Name	SELWYN ROAD		
Owner	MR GJ & MRS BA SCURR		
Well Number	M36/8299	File Number	CO6C/24910
Owner	MR GJ & MRS BA SCURR	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52686-70750
Locality	BROADFIELDS	NZTM X and Y	1552686 - 5170750
Location Description		Location Accuracy	10 - 50m
CWMS Zone	Selwyn - Waihora	Use	Domestic Supply,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	90.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	21.00m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	34.56m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 5 m	First reading	
Ground Level	0.60m below MP	Last reading	
Strata Layers	7	Calc Min 80%	11.87m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	0
Drill Date	20 Feb 2008	Max Tested Yield	
Driller	Giltrap Drilling	Drawdown at Max Tested Yield	
Drilling Method	Rotary Rig	Specific Capacity	
Casing Material	Steel	Last Updated	19 Mar 2010
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	88.5	90				

No step tests for this well

Comments

Comment Date	Comment
19 Mar 2010	Gridref changed from: M36:6266-3237 to M36:6268-3236 BCP confirms

Bore Log

Borelog for well M36/8299

Grid Reference (NZTM): 1552687 mE, 5170751 mN

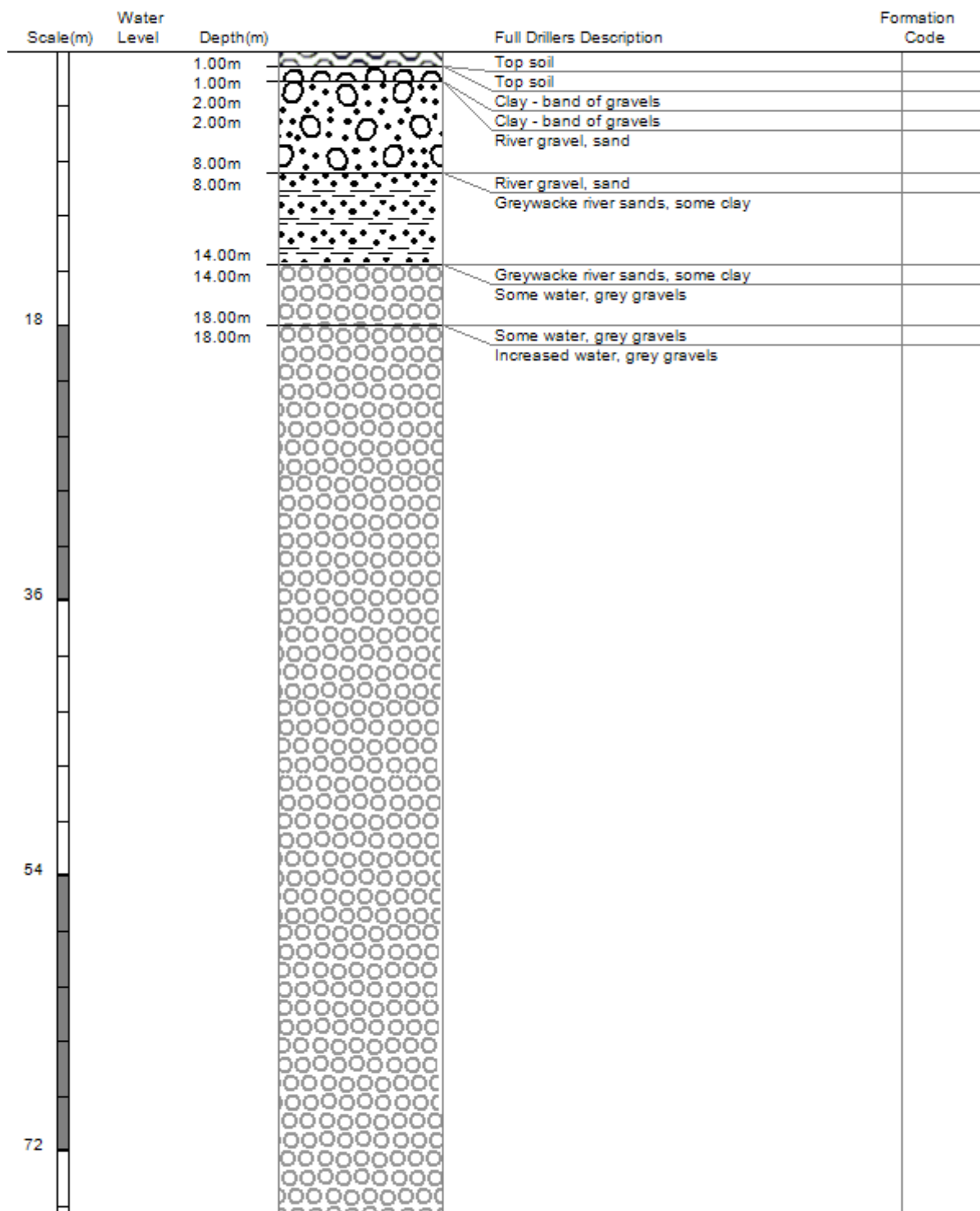
Location Accuracy: 10 - 50m

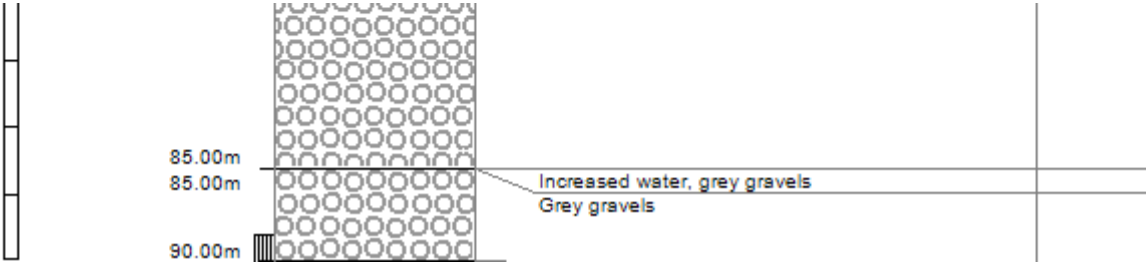
Ground Level Altitude: 34.0 m +MSD Accuracy: < 0.5 m

Driller: Giltrap Drilling

Drill Method: Rotary Rig

Borelog Depth: 90.0 m Drill Date: 20-Feb-2008





Bore or Well No	M36/8300		
Well Name	SELWYN ROAD		
Owner	Mr & Mrs G J & B A Scurr		
Well Number	M36/8300	File Number	CO6C/24910
Owner	Mr & Mrs G J & B A Scurr	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:52676-70960
Locality	BROADFIELDS	NZTM X and Y	1552676 - 5170960
Location Description		Location Accuracy	10 - 50m
CWMS Zone	Selwyn - Waihora	Use	Domestic Supply,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	42.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	14.00m below MP
Measuring Point Description	ToC	Highest Water Level	
Measuring Point Elevation	35.29m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 5 m	First reading	
Ground Level	0.60m below MP	Last reading	
Strata Layers	5	Calc Min 80%	12.33m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	0
Drill Date	25 Feb 2008	Max Tested Yield	
Driller	Giltrap Drilling	Drawdown at Max Tested Yield	
Drilling Method	Rotary Rig	Specific Capacity	
Casing Material	Steel	Last Updated	19 May 2010
Pump Type		Last Field Check	
Water Use Data	Yes		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	39	40.5				

No step tests for this well

Comments

Comment Date	Comment
19 Mar 2010	Gridref changed from: M36:6262-3256 to M36:6267-3257 BCP confirms

Bore Log

Borelog for well M36/8300

Grid Reference (NZTM): 1552677 mE, 5170961 mN

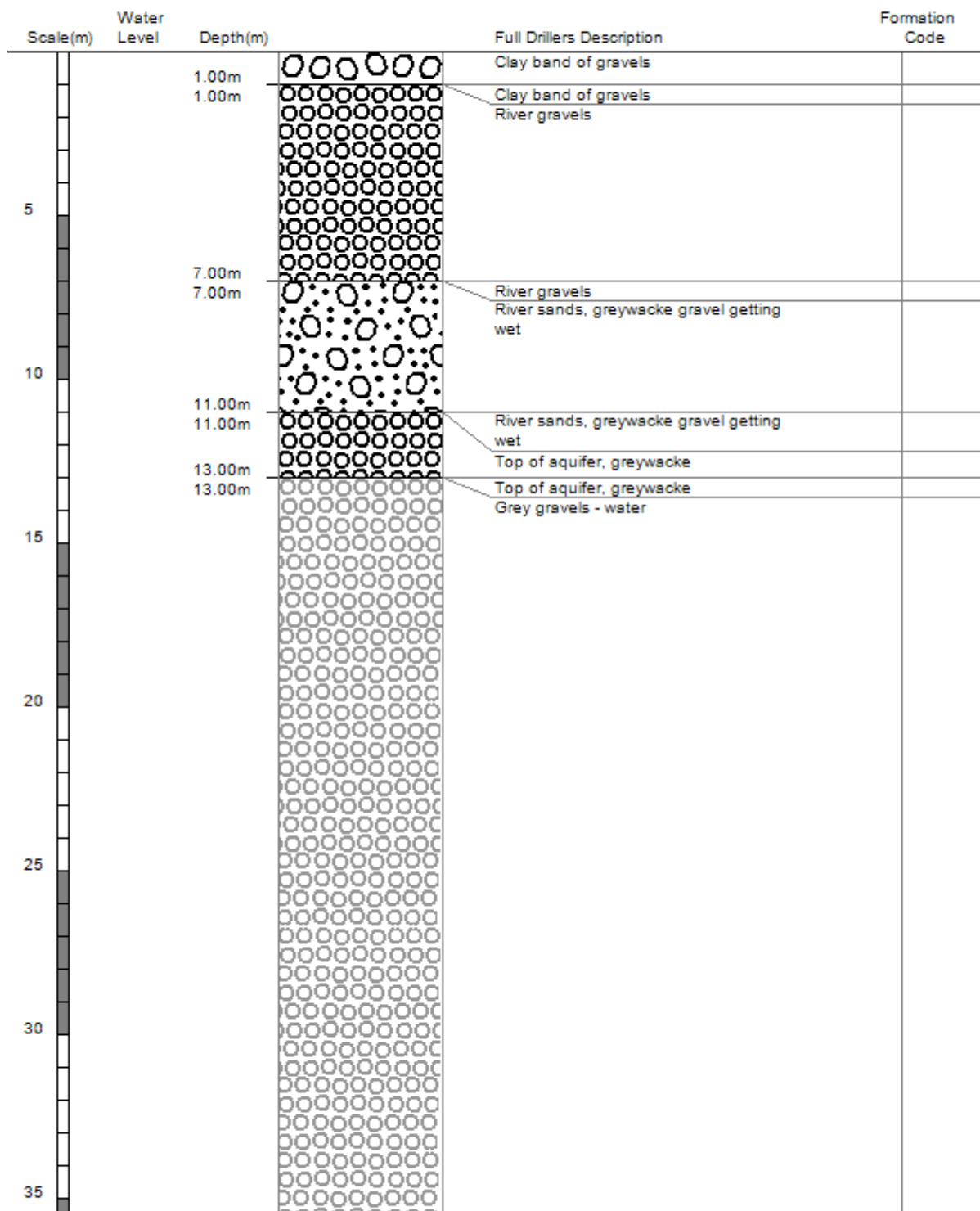
Location Accuracy: 10 - 50m

Ground Level Altitude: 34.7 m +MSD Accuracy: < 0.5 m

Driller: Giltrap Drilling

Drill Method: Rotary Rig

Borelog Depth: 42.0 m Drill Date: 25-Feb-2008





Bore or Well No	M36/8392		
Well Name	572 SELWYN ROAD		
Owner	A J LLOYD		
Well Number	M36/8392	File Number	CO6C/26653
Owner	A J LLOYD	Well Status	Active (exist, present)
Street/Road	572 SELWYN ROAD	NZTM Grid Reference	BX23:52567-70574
Locality	SPRINGSTON	NZTM X and Y	1552567 - 5170574
Location Description		Location Accuracy	2 - 15m
CWMS Zone	Selwyn - Waihora	Use	Domestic Supply,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	36.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	10.00m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	34.26m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	5	Calc Min 80%	11.83m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	1
Drill Date	12 Jun 2007	Max Tested Yield	2 l/s
Driller	Daly Water Wells Ltd	Drawdown at Max Tested Yield	11 m
Drilling Method	Rotary Rig	Specific Capacity	0.18 l/s/m
Casing Material	Steel	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	34	36				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
12 Jun 2007	1	2	26.396368	11	0

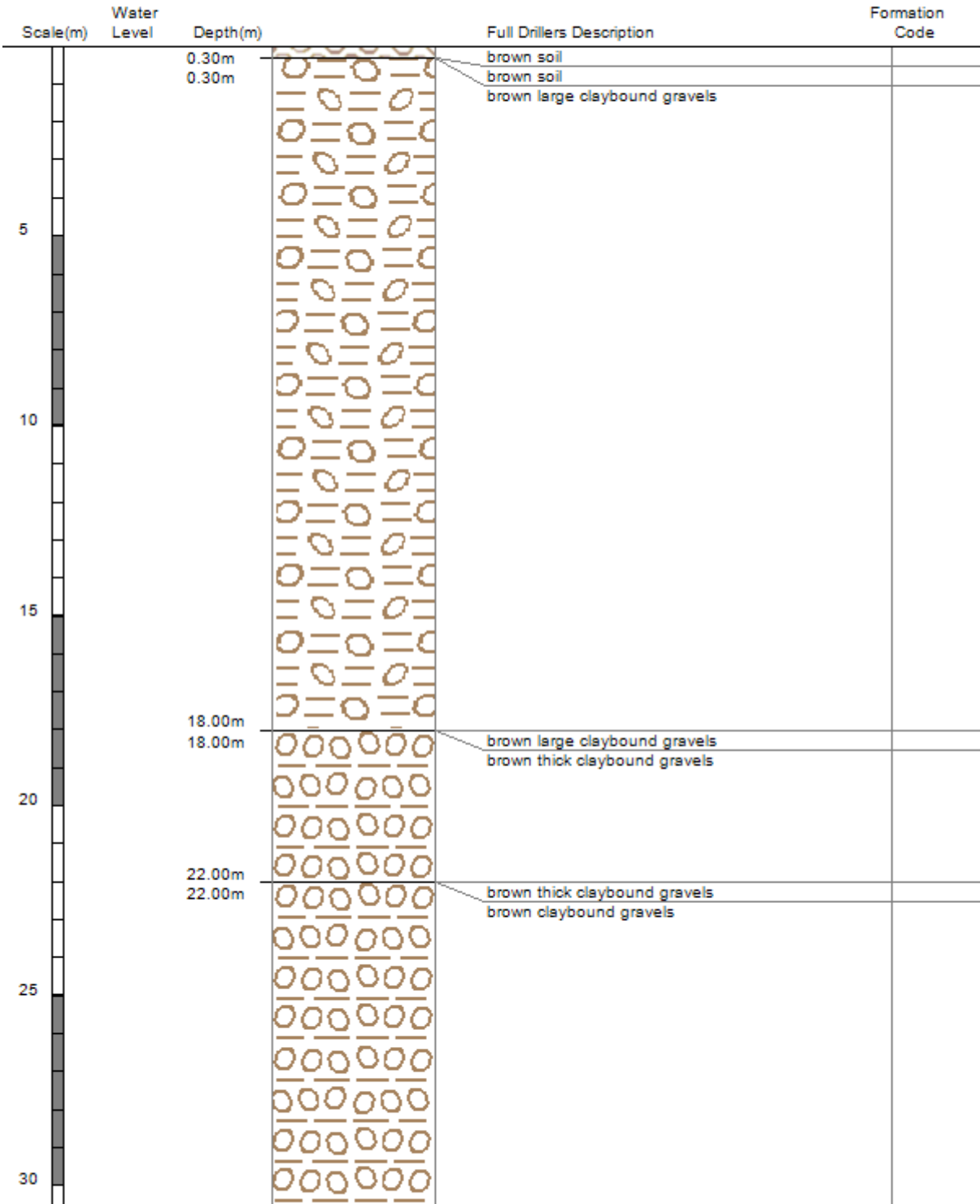
Comments

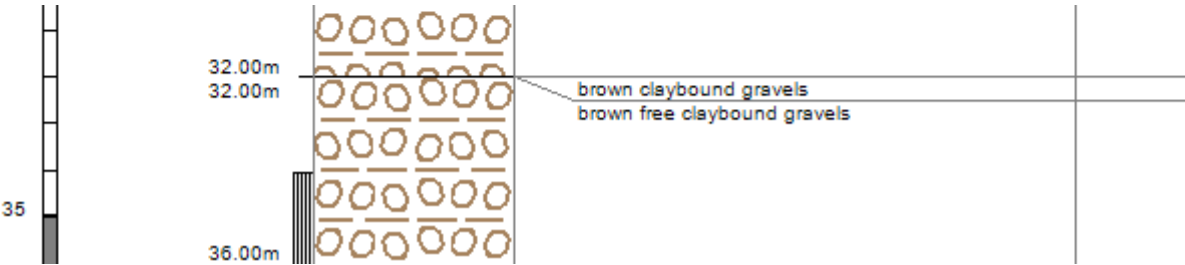
Comment Date	Comment
20 Sep 2007	Gridref changed from: M36:6247-3217, BCR confirms
12 Nov 2007	Gridref changed from: M36:6255-3216. New gridref from plan in BCR
09 Jun 2009	Gridref changed from: M36:62572-32149 - Site visit 5 June 09, location GPS'd

Bore Log

Borelog for well M36/8392

Grid Reference (NZTM): 1552568 mE, 5170575 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 34.3 m +MSD Accuracy: < 0.5 m
Driller: Daly Water Wells Ltd
Drill Method: Rotary Rig
Borelog Depth: 36.0 m Drill Date: 12-Jun-2007







APPENDIX 3:

Test Pit Logs

LOG OF TEST PIT TP01

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.613299
Longitude : 172.4096156

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier									
		Harder									
			ML	[TOPSOIL] SILT with minor sand and trace rootlets; dark brown. Low plasticity; sand is fine.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine to medium.				M	S-F		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	St-VSt		
1.5									Loosely Packed		
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.9 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP02

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 1 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.614842
Longitude : 172.4109924

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; brown. Low plasticity; sand is fine to medium.				M	N/A		
0.5	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.0											
1.5											
2.0											
Depth of Excavation: 1.9 m Termination Condition: Target depth											



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.4 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP03

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6138242
Longitude : 172.4107588

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine to medium.				M	N/A		
0.5			ML	SILT with minor sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					S-VS		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W			
1.5				1.2 m - Rootlets cease.					Tightly Packed		
2.0				Depth of Excavation: 1.9 m Termination Condition: Target depth							



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.7 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP04

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6143129
Longitude : 172.4110687

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine to coarse.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine to medium.					F-St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.5											
2.0											

Depth of Excavation: 1.9 m
Termination Condition: Target depth



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.6 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP05

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6147447
Longitude : 172.4120913

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier	ML	[TOPSOIL] SILT with some sand and trace rootlets; brown. Low plasticity; sand is fine to medium.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine to medium.				M	F-St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subangular to rounded, greywacke.				W	Tightly Packed		
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 1 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP06

Rolleston Megaside

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.615654
Longitude : 172.4119587

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; brown. Low plasticity; sand is fine to medium.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown. Low plasticity; sand is fine to medium.					F		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.5											
2.0				1.8 m - Fine to medium GRAVEL; grey. Poorly graded; gravel is subrounded to rounded, greywacke.							
				Depth of Excavation: 2 m Termination Condition: Target depth							



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.8 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP07

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6159924
Longitude : 172.4131133

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with minor sand and trace rootlets; dark brown. Low plasticity; sand is fine.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown. Low plasticity; sand is fine to medium.					F-St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.5				1 m to 1.1 m - Fine to coarse GRAVEL; grey. Well graded; gravel is subrounded to rounded.							
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP08

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6167175
Longitude : 172.4131495

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine to medium.				M	N/A		
0.5			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 150 mm x 150 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.0	ALLUVIUM										
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.4 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP09

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 1 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6164947
Longitude : 172.4121966

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; brown. Low plasticity; sand is fine to medium.					N/A		
0.5				Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; cobbles are subrounded to rounded, 100 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke. 0.5 m - Rootlets ceased			M				
1.0	ALLUVIUM		GW	0.8 m to 0.9 m - Fine to coarse GRAVEL; grey. Well graded; gravel is subrounded to rounded, greywacke.			W		Tightly Packed		
1.5											
2.0				Depth of Excavation: 1.9 m Termination Condition: Target depth							



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.3 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP10

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6151119
Longitude : 172.4141894

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier	ML	[TOPSOIL] Sandy SILT with trace rootlets; dark brown. Low plasticity; sand is fine to medium.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.				M	F-St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 200 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.5				1.5 m - Rootlets cease.							
2.0				1.6 m to 1.7 - Fine to coarse GRAVEL; grey. Well graded; gravel is subrounded to rounded, greywacke.							
Depth of Excavation: 2.1 m Termination Condition: Target depth											



Excavator met target depth at 2.1 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP11

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6148366
Longitude : 172.4127142

Depth (m BGL)	Material	Excavatability (Relative Scale)	Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS			ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine; maximum root diameter is 30 mm.				M	N/A		
0.5				ML	Sandy SILT with trace rootlets; light brown. Low plasticity; sand is fine to medium.					VS-S		
1.0	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 150 mm x 100 mm x 50 mm; gravel is subrounded to rounded, greywacke.				D	Tightly Packed		
1.5												
2.0												
Depth of Excavation: 2 m Termination Condition: Target depth												



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP12

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6145522
Longitude : 172.4133992

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier	ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.				M	F-St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 150 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.5											
2.0											

Depth of Excavation: 1.9 m
Termination Condition: Target depth



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.7 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

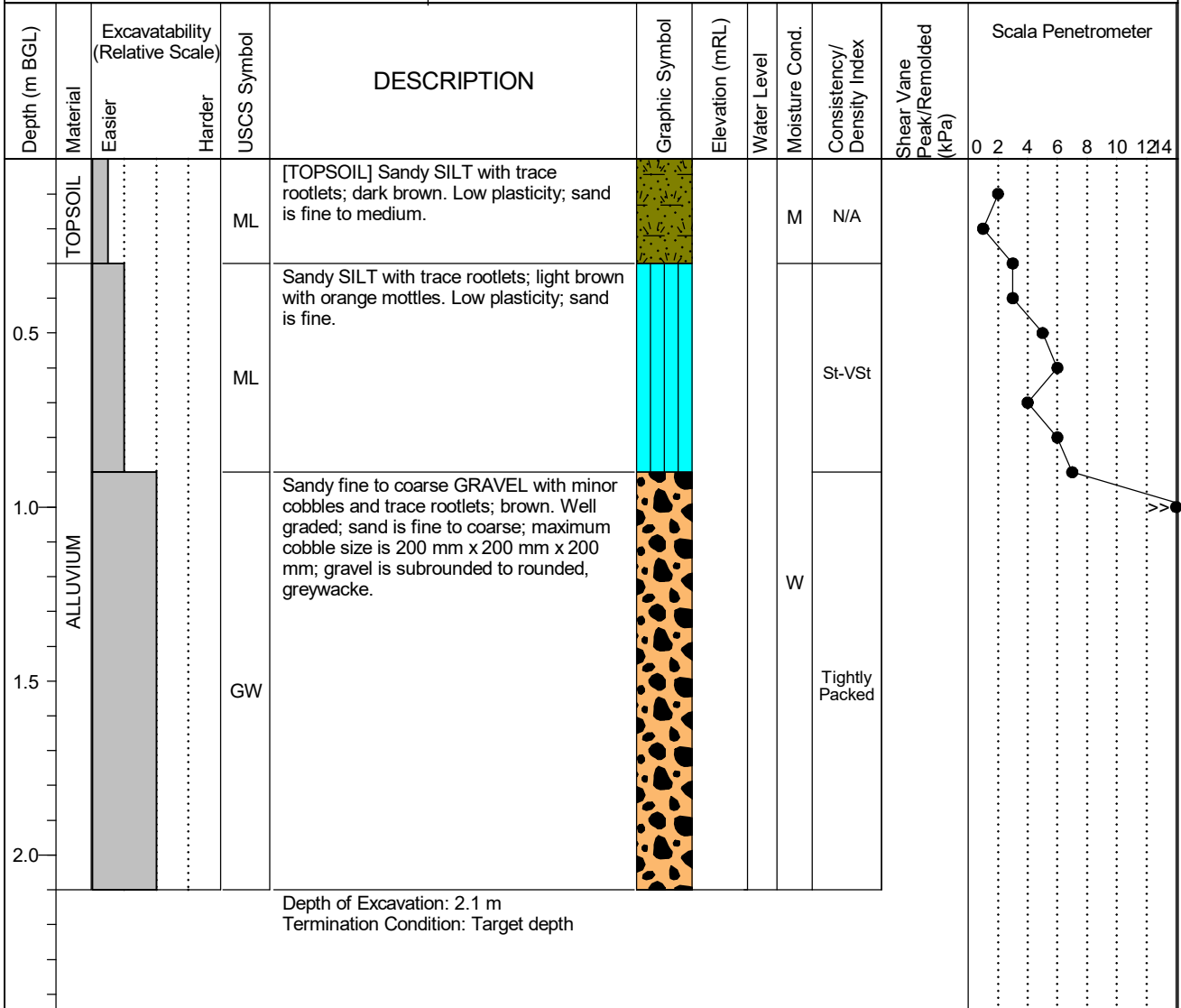
LOG OF TEST PIT TP13

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6137085
Longitude : 172.4129876



Excavator met target depth at 2.1 m.
Scala Penetrometer met practical refusal at 1 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP14

Rolleston Megashite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.613048
Longitude : 172.4128132

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine. (Roots max 30 mm diameter)				M	N/A		
0.5			SM	Silty fine SAND with trace rootlets; light brown. Poorly graded. (Hard to excavate from 0.5 m)					MD		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.				D	Tightly Packed		
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 1 m
Standing groundwater was not encountered

N/A = Not Assessed

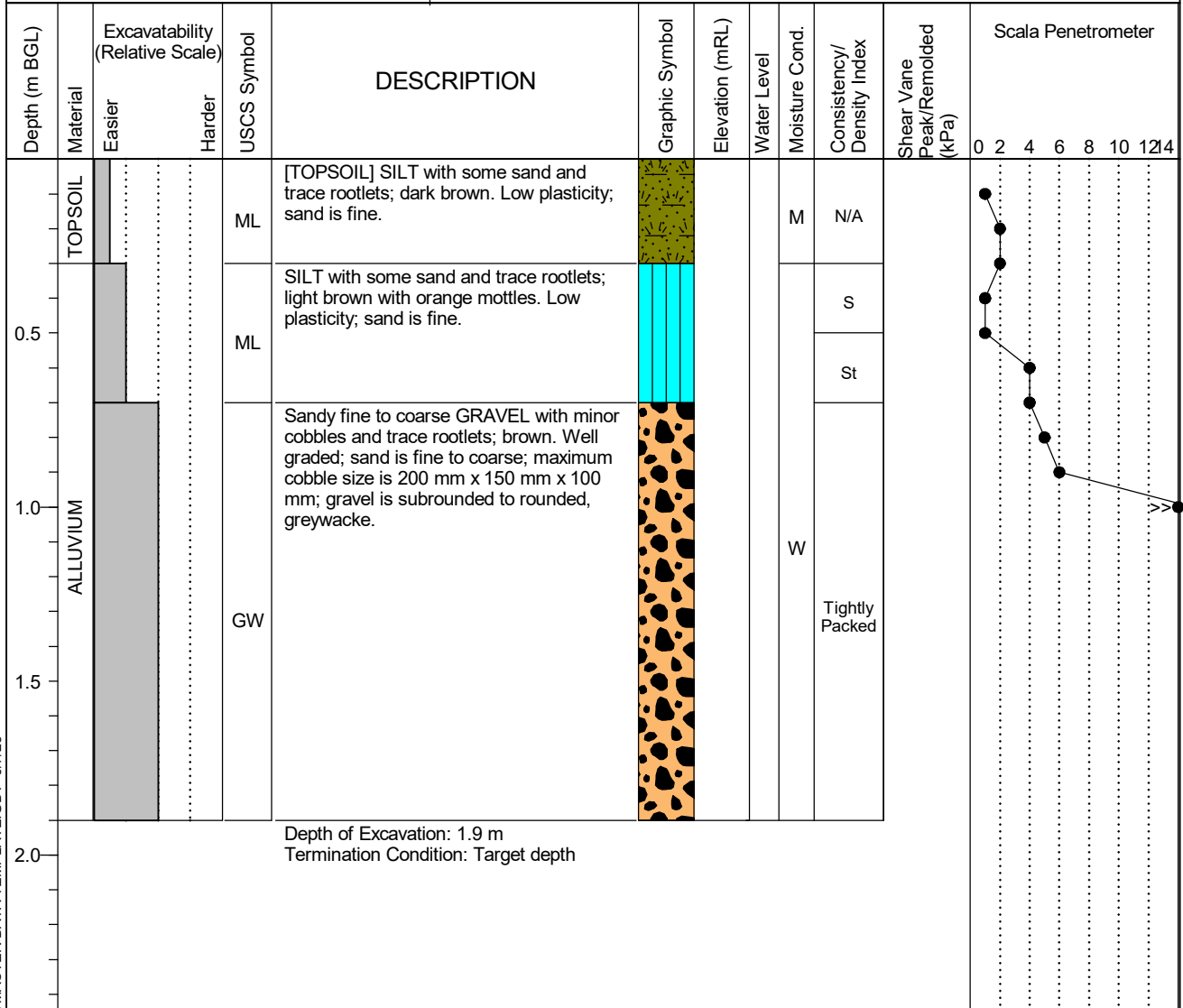
LOG OF TEST PIT TP15

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6130588
Longitude : 172.4112919



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 1.1 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP16

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6118884
Longitude : 172.4117886

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine to medium.					N/A		
0.5			ML	Sandy SILT with trace rootlets; light brown. Low plasticity; sand is fine.				M	St		
									H		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 50 mm; gravel is subrounded to rounded, greywacke. 1 m to 1.1 m - Fine to medium GRAVEL; grey. Poorly graded; gravel is subrounded to rounded; greywacke.				W	Tightly Packed		
1.5											
2.0											
Depth of Excavation: 1.9 m Termination Condition: Target depth											



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP17

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6111998
Longitude : 172.4112616

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine to medium.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown. Low plasticity; sand is fine.				VSt			
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.			W		H		
1.5									Tightly Packed		
2.0											
Depth of Excavation: 2.1 m Termination Condition: Target depth											



Excavator met target depth at 2.1 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP18

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6111179
Longitude : 172.4118656

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine to medium.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					F		
									H		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 50 mm x 50 mm; gravel is subrounded to rounded, greywacke.			W		Tightly Packed		
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP19

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6108894
Longitude : 172.4127861

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL			[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					F		
1.0	ALLUVIUM			Sandy fine to coarse GRAVEL with minor cobbles; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 50 mm; gravel is subrounded to rounded, greywacke.				W	VSt		
1.5			GW						Tightly Packed		
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 1 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP20

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.611932
Longitude : 172.413608

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier									
		Harder									
			ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					S-F		
1.0									St-VSt		
1.5			GW	Sandy fine to coarse GRAVEL with minor cobbles; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 50 mm; gravel is subrounded to rounded, greywacke.				M	Tightly Packed		
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.9 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

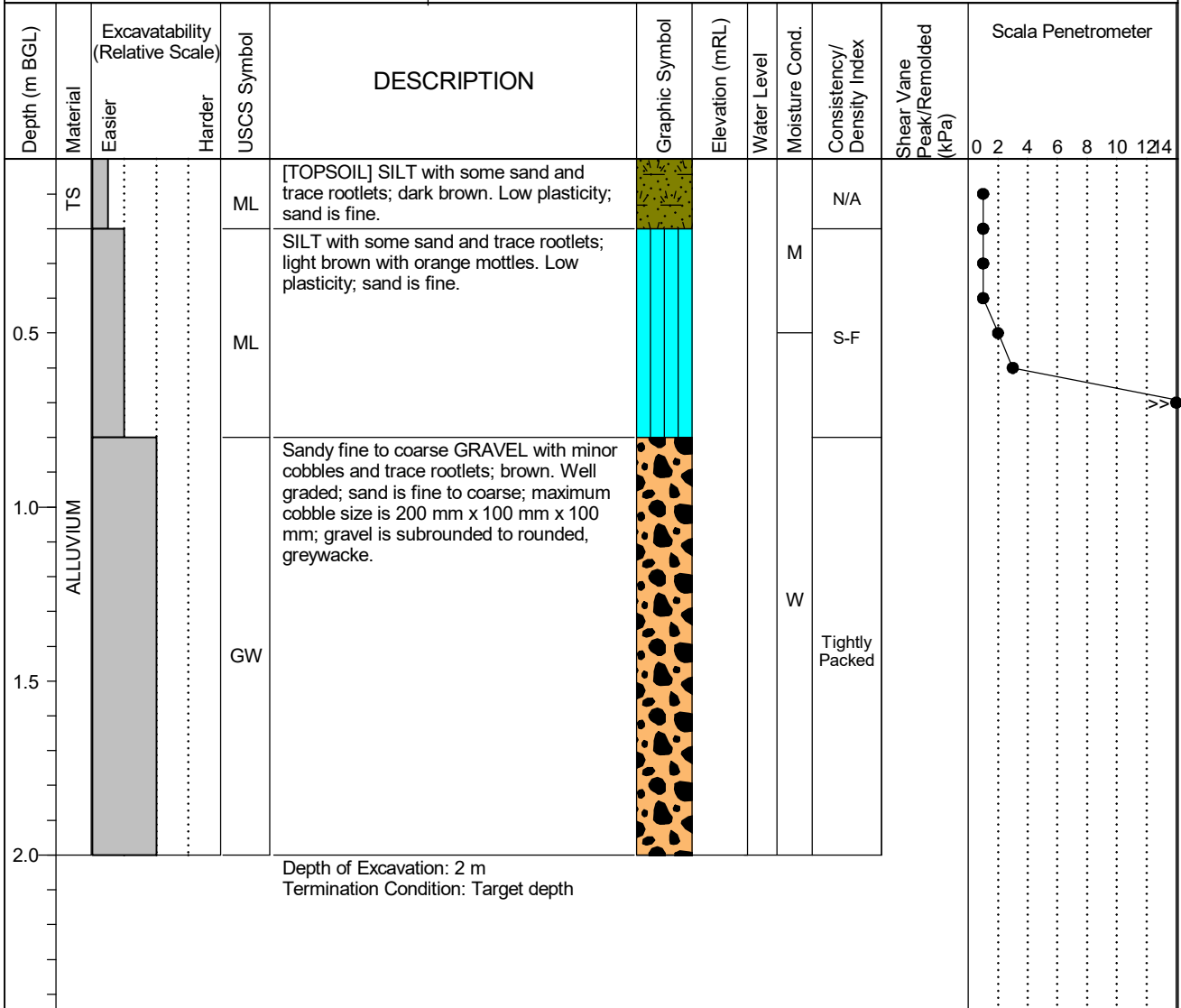
LOG OF TEST PIT TP21

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6123366
Longitude : 172.4126481



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.7 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP22

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2.3 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6132719
Longitude : 172.4146191

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier	ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					S-F		
1.0			ML					D	VSt-H		
1.5			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 150 mm x 150 mm x 150 mm; gravel is subrounded to rounded, greywacke.					N/A		
2.0								M	Tightly Packed		
Depth of Excavation: 2.3 m Termination Condition: Target depth											



Excavator met target depth at 2.3 m.
Scala Penetrometer met practical refusal at 0.9 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP23

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 22-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.61152
Longitude : 172.414978

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL			[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.					N/A		
0.5				Sandy SILT with trace rootlets; light brown with orange mottles. Low plasticity; sand is fine to medium.					F-St		
1.0											
1.5	ALLUVIUM			Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 50 mm; gravel is subrounded to rounded, greywacke.					VSt		
2.0									Tightly Packed		
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 1.5 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP24

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 22-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6104976
Longitude : 172.4153818

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL			[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.				M	N/A		
				SILT with some sand and trace rootlets; light brown. Low plasticity; sand is fine.					VSt		
0.5				Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 200 mm x 100 mm; gravel is subrounded to rounded, greywacke.				W	Tightly Packed		
1.0	ALLUVIUM										
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.4 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP25

Rolleston Megashite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 22-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6099948
Longitude : 172.4164851

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TOPSOIL			[TOPSOIL] Sandy SILT with trace rootlets; dark brown. Low plasticity; sand is fine to medium.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown. Poorly graded; sand is fine.					S-F		
			SM	Silty fine to medium SAND with trace rootlets; light brown with orange mottles. Poorly graded.					L-MD		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 150 mm x 150 mm x 100 mm; gravel is subrounded to rounded, greywacke.			W		Tightly Packed		
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 1.1 m
Standing groundwater was not encountered

N/A = Not Assessed

LOG OF TEST PIT TP26

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 22-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6096198
Longitude : 172.4179193

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier	ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.				M	N/A		
0.5			SP	Silty fine to medium SAND with trace rootlets; light brown. Poorly graded.					L		
									VD		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 200 mm x 100 mm; gravel is subrounded to rounded, greywacke.			W		Tightly Packed		
1.5											
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.5 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP27

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 22-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6102308
Longitude : 172.4179785

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.					N/A		
			ML	SILT with some sand and trace rootlets; light brown. Low plasticity; sand is fine.				M	S-F		
0.5			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 100 mm x 100 mm x 50 mm; gravel is subrounded to rounded, greywacke.							
1.0	ALLUVIUM							W	Loosely Packed		
1.5											
2.0											

Depth of Excavation: 1.9 m
Termination Condition: Target depth



Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 0.6 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP28

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2.2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6138064
Longitude : 172.4146196

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier									
		Harder									
			ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.				M	N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					S-F		
1.0									F-St		
1.5			GW	Sandy fine to coarse GRAVEL with minor cobbles; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.			W		Tightly Packed		
2.0											
Depth of Excavation: 2.2 m Termination Condition: Target depth											



Excavator met target depth at 2.2 m.
Scala Penetrometer met practical refusal at 1.2 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP29

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6147292
Longitude : 172.4148766

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
		Easier	Harder								0 2 4 6 8 10 12 14
	TS		ML	[TOPSOIL] SILT with some sand and trace rootlets; dark brown. Low plasticity; sand is fine.					N/A		
0.5			ML	Sandy SILT with trace rootlets; light brown. Low plasticity; sand is fine.					F		
1.0									St		
1.5			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 200 mm x 100 mm; gravel is subrounded to rounded, greywacke.				M	Tightly Packed		
2.0											
Depth of Excavation: 2 m Termination Condition: Target depth											



Excavator met target depth at 2 m.
Scala Penetrometer met practical refusal at 1.2 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

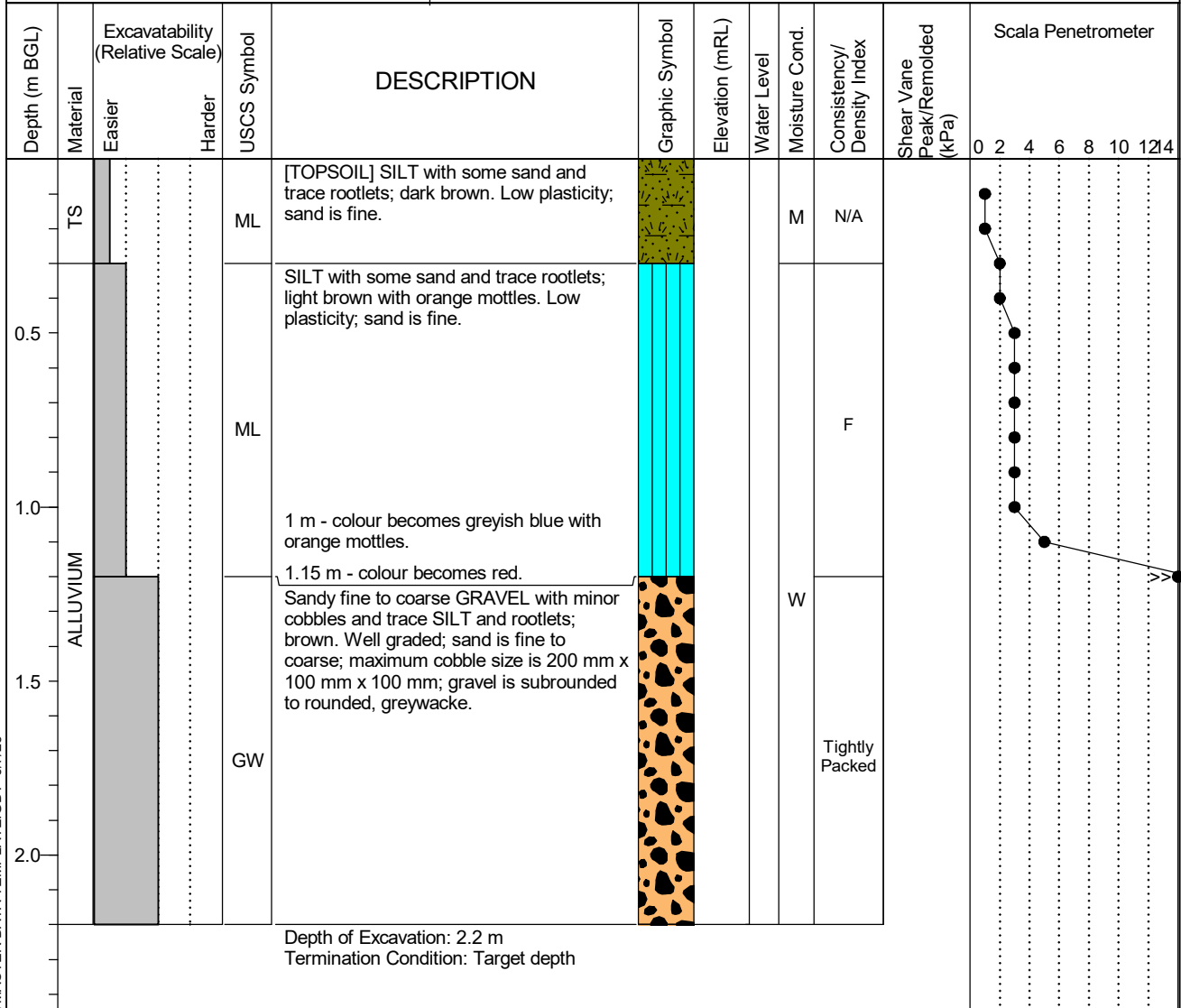
LOG OF TEST PIT TP30

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 2.2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6152057
Longitude : 172.416259



Excavator met target depth at 2.2 m.
Scala Penetrometer met practical refusal at 1.2 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed

LOG OF TEST PIT TP31

Rolleston Megasite

548 Selwyn Road
Rolleston, Christchurch
18113.000.002

Client : Urban Estates
Date : 21-06-2023
Max Test Pit Depth : 1.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 0.5 m

Shear Vane No : N/A
Logged By : DD
Reviewed By : JC
Latitude : -43.6167009
Longitude : 172.4173099

Depth (m BGL)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer
	TS	Easier	ML	[TOPSOIL] Sandy SILT with trace rootlets; dark brown. Low plasticity; sand is fine to medium.					N/A		
0.5			ML	SILT with some sand and trace rootlets; light brown with orange mottles. Low plasticity; sand is fine.					F-St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Well graded; sand is fine to coarse; maximum cobble size is 200 mm x 100 mm x 100 mm; gravel is subrounded to rounded, greywacke.			W		Tightly Packed		
1.5											
2.0											

Depth of Excavation: 1.9 m
Termination Condition: Target depth



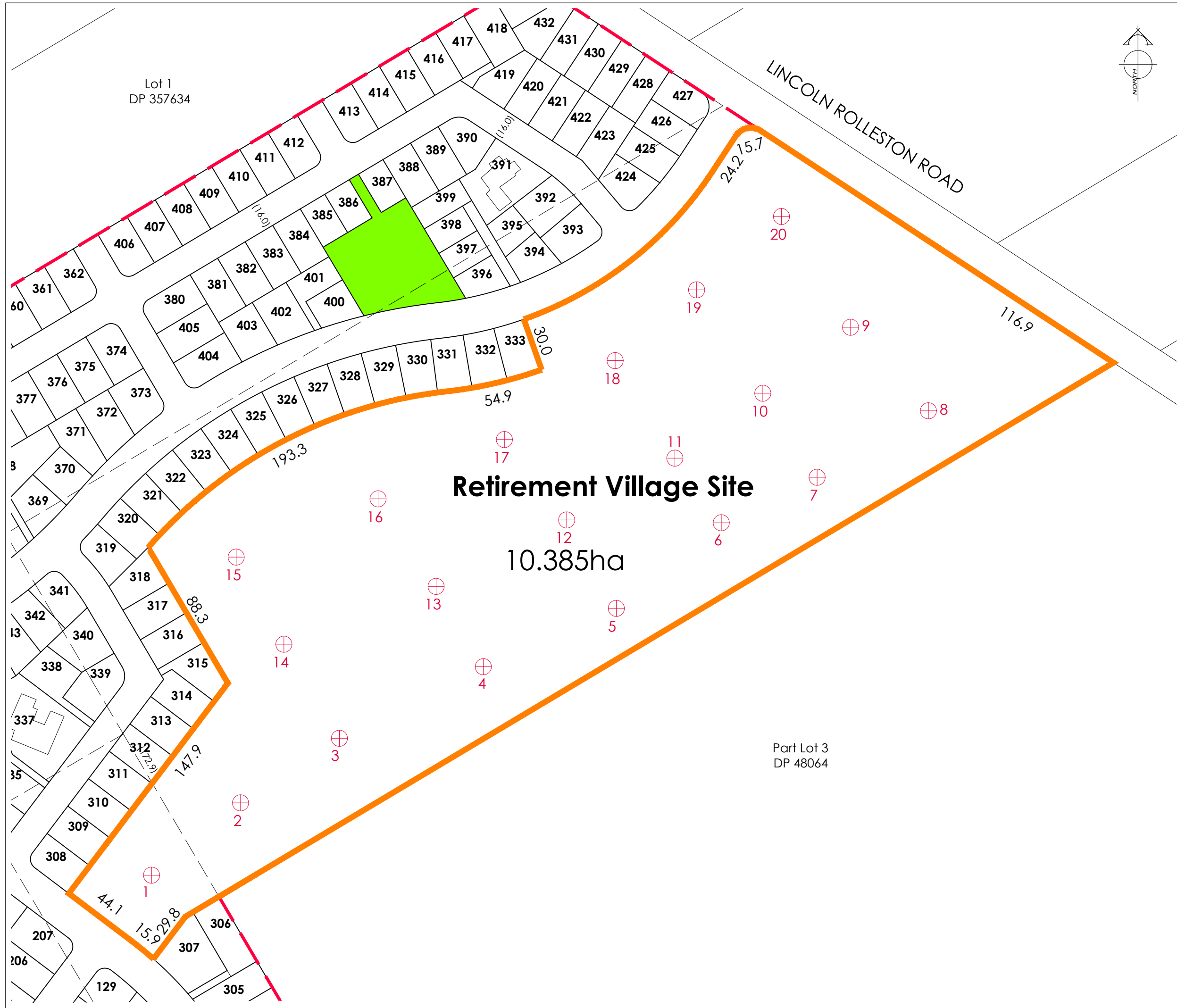
Excavator met target depth at 1.9 m.
Scala Penetrometer met practical refusal at 1.1 m
Standing groundwater was not encountered

TS = TOPSOIL
N/A = Not Assessed



APPENDIX 4:

Davie Lovell Smith Investigation Data



AMENDMENTS:		
AMENDMENT	DATE	DESCRIPTION

- NOTES:
1. This plan has been prepared to show test sites only. No liability is accepted if the plan is used for any other purpose.
 2. This plan has been prepared for the use of our client and no liability is accepted in relation to any other parties.
 3. Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
 4. This plan is subject to the granting of subdivision and/or resource consents and should be treated as a proposal until such time as the necessary consents have been granted by the relevant authorities.

CONCEPT ONLY
FOR DISCUSSION



DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

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

JOB TITLE:
East Rolleston

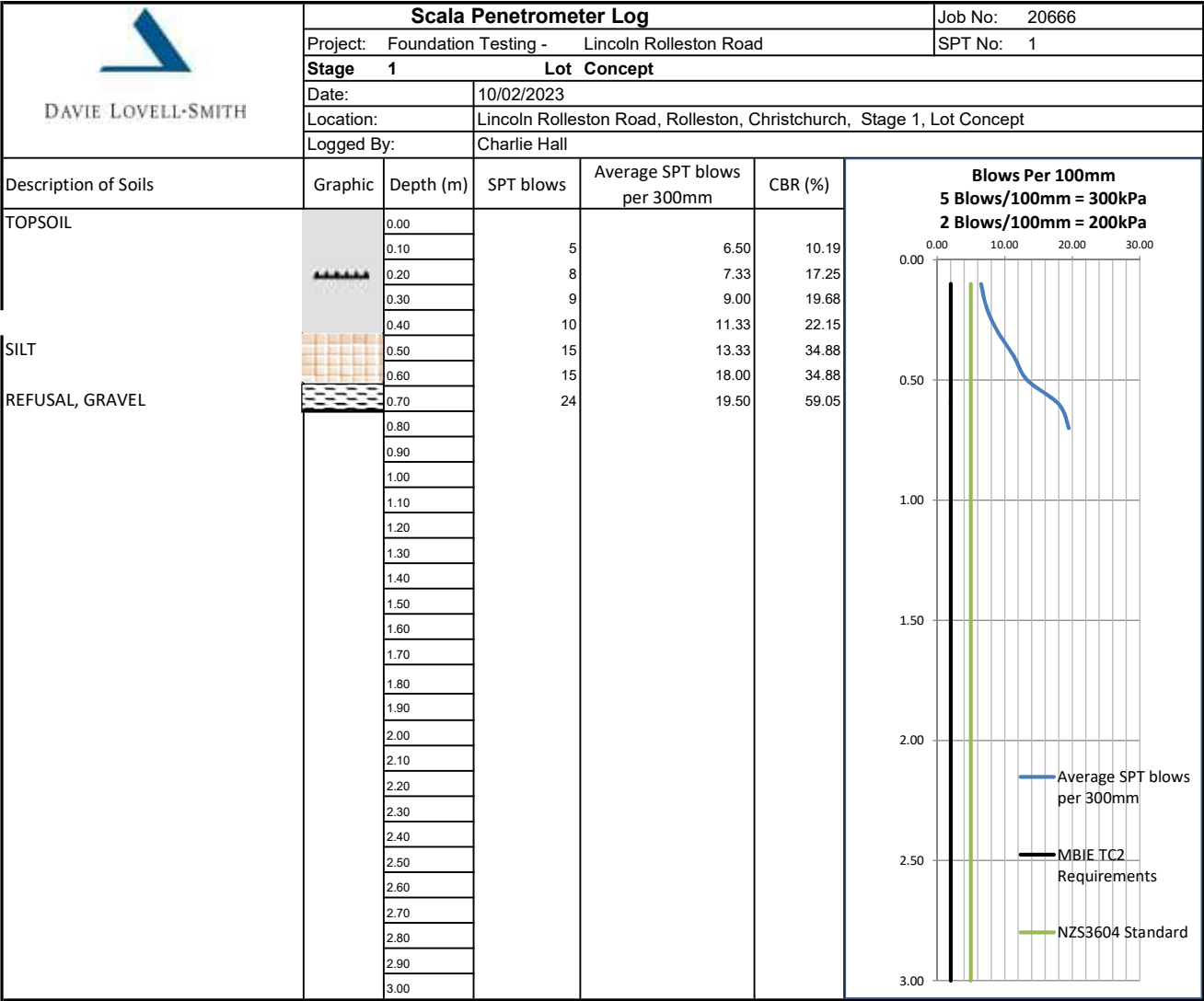
SHEET TITLE:
**Summerset Village Site
Soil Test Site Locations**

DRAWING STATUS:
For Information Purposes

SCALE: 1:1000@A1 1:2000@A3	DATE: February 2023
-------------------------------	---------------------

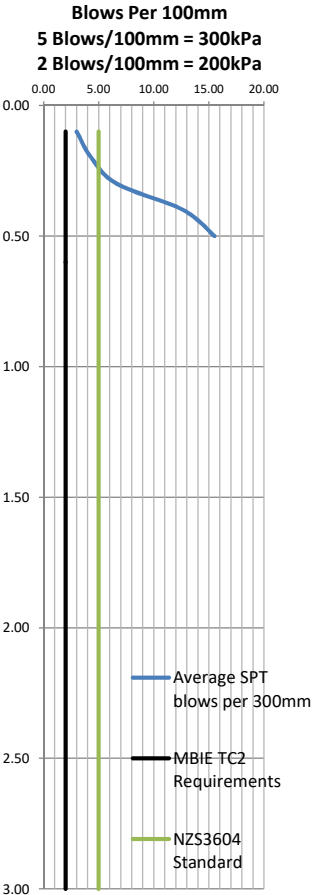
CAD FILE: J:\20666\SUBCON\E20666 Retirement Village R0 Site Location.dwg	REVISION:
DRAWING No: E20666	SHEET No: 1 OF 1

R0

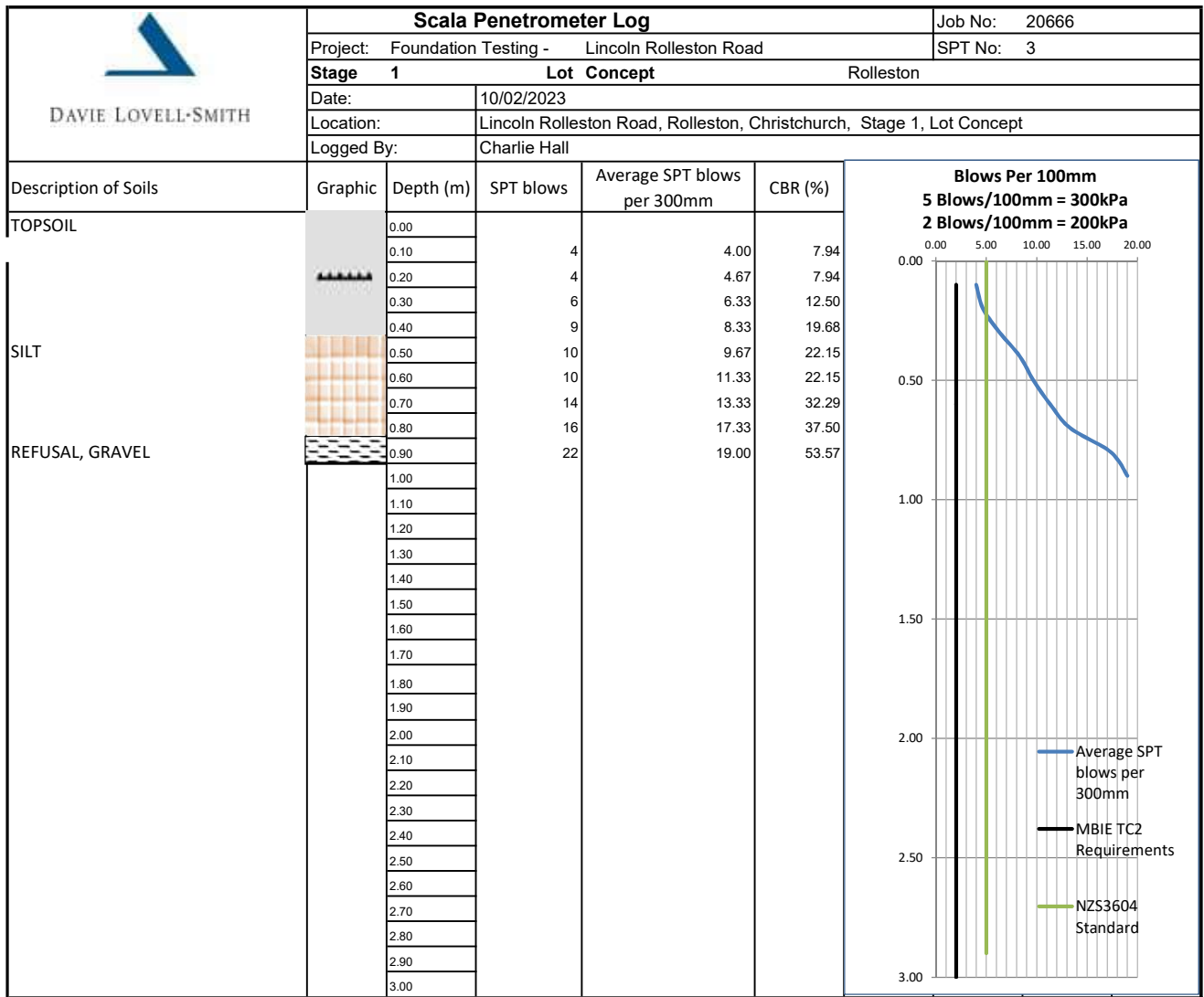


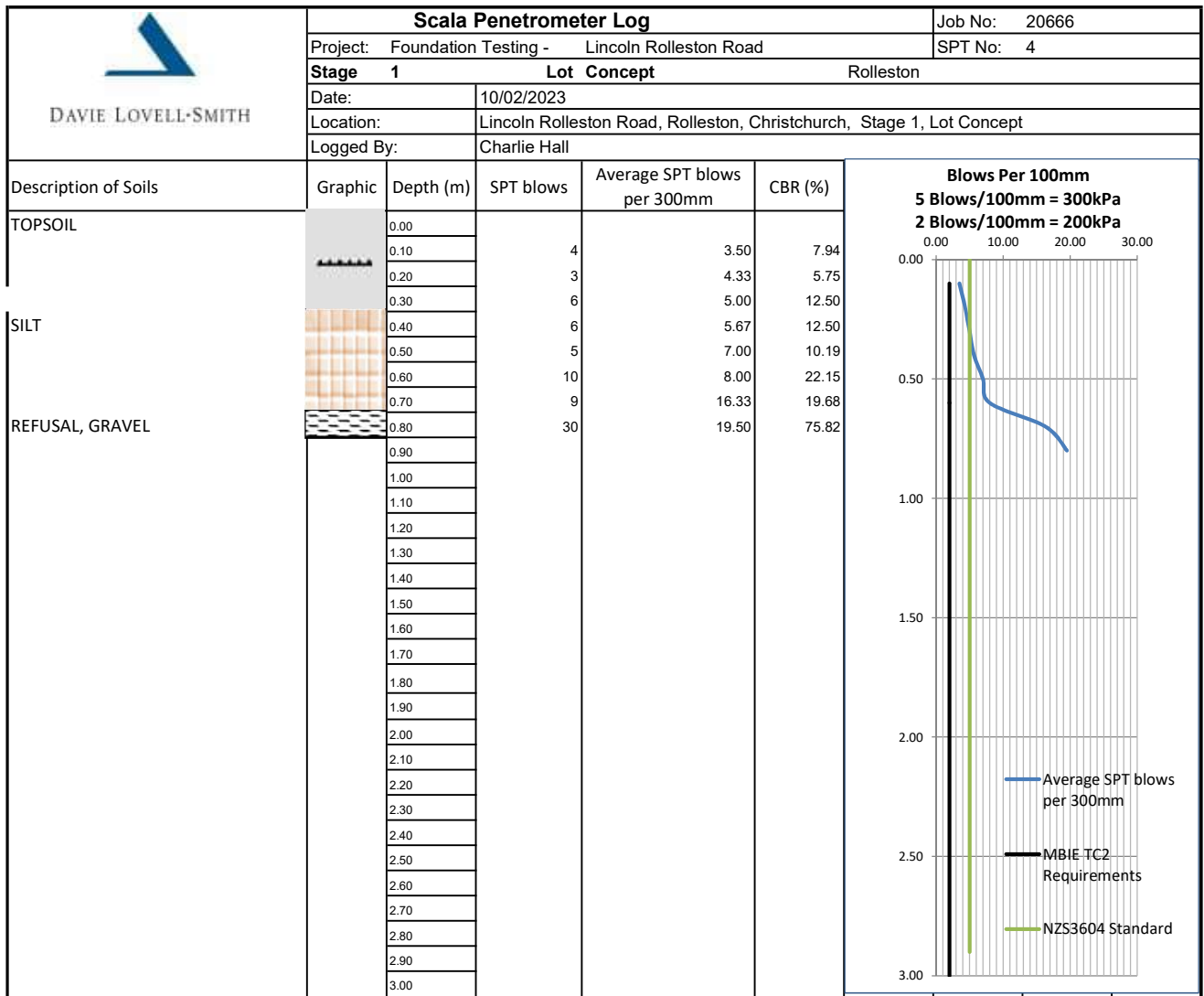
 DAVIE LOVELL-SMITH	Scala Penetrometer Log				Job No: 20666
	Project: Foundation Testing - Lincoln Rolleston Road				SPT No: 2
	Stage 1	Lot Concept			Rolleston
	Date:	10/02/2023			
	Location:	Lincoln Rolleston Road, Rolleston, Christchurch, Stage 1, Lot Concept			
	Logged By:	Charlie Hall			
Description of Soils	Graphic	Depth (m)	SPT blows	Average SPT blows per 300mm	CBR (%)
TOPSOIL		0.00			
		0.10	3	3.00	5.75
		0.20	3	4.33	5.75
		0.30	7	6.67	14.86
SILT		0.40	10	12.67	22.15
REFUSAL, GRAVEL		0.50	21	15.50	50.85
		0.60			
		0.70			
		0.80			
		0.90			
		1.00			
		1.10			
		1.20			
		1.30			
		1.40			
		1.50			
		1.60			
		1.70			
		1.80			
		1.90			
		2.00			
		2.10			
		2.20			
		2.30			
		2.40			
		2.50			
		2.60			
		2.70			
		2.80			
		2.90			
		3.00			

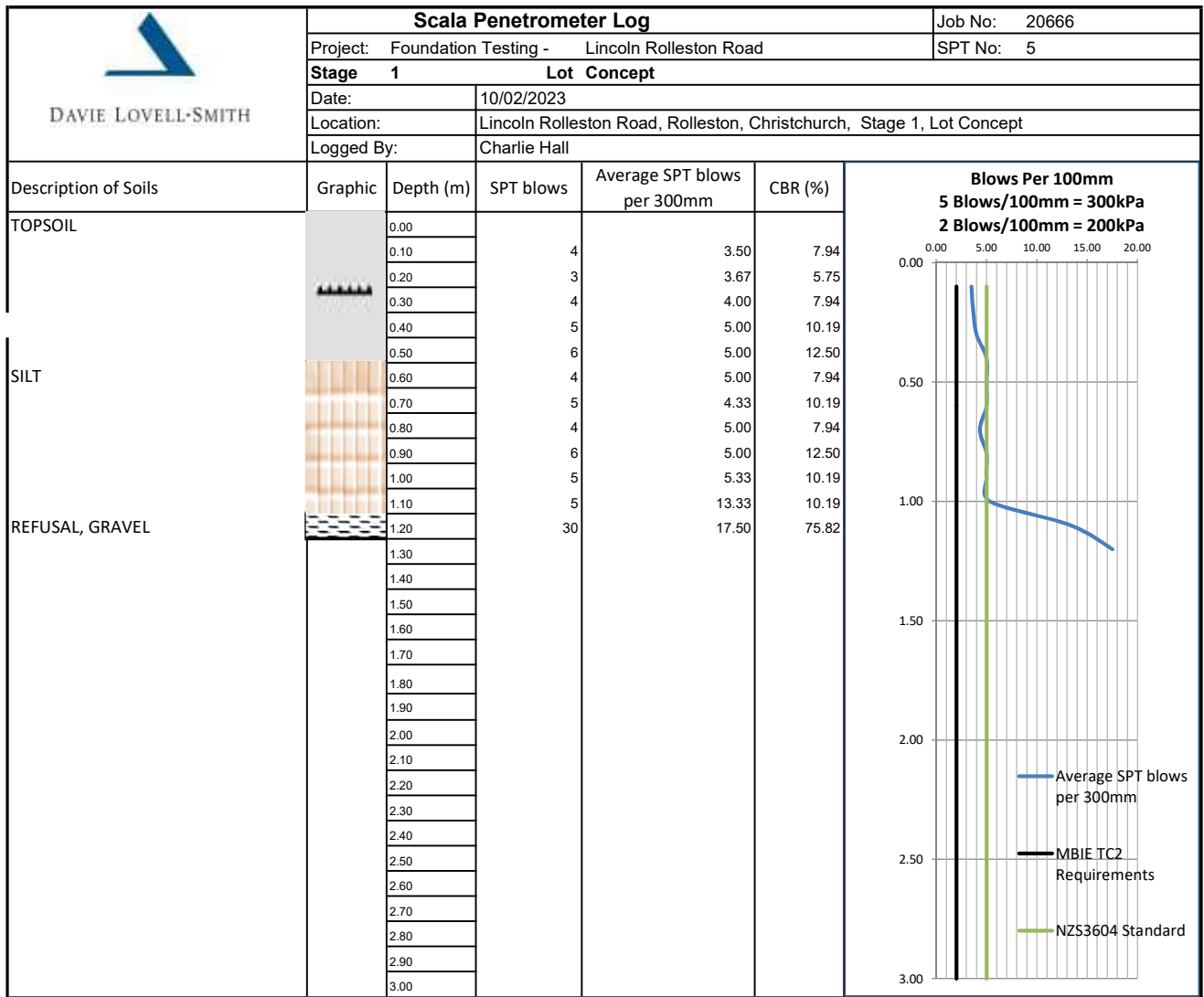
Blows Per 100mm
 5 Blows/100mm = 300kPa
 2 Blows/100mm = 200kPa

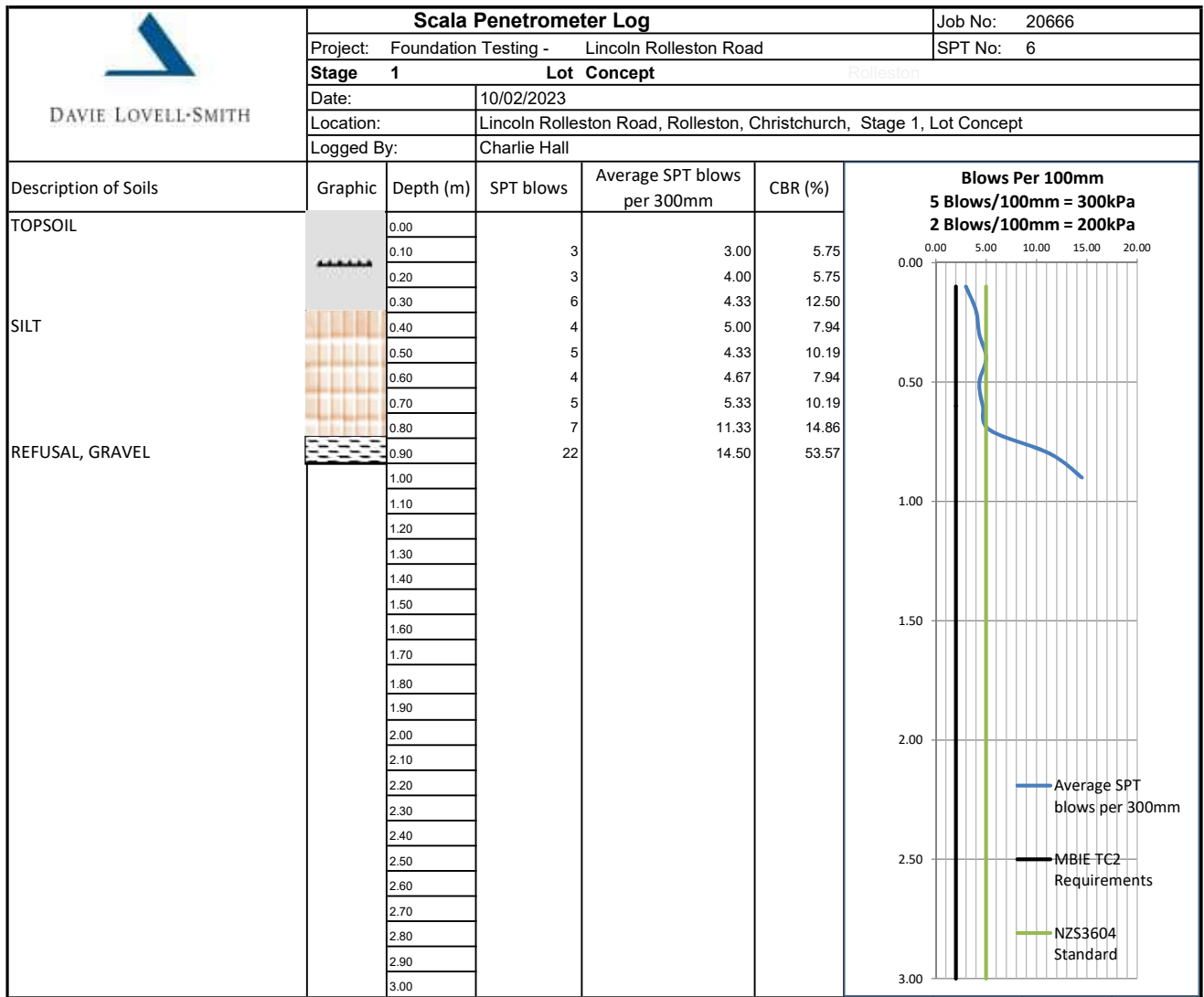


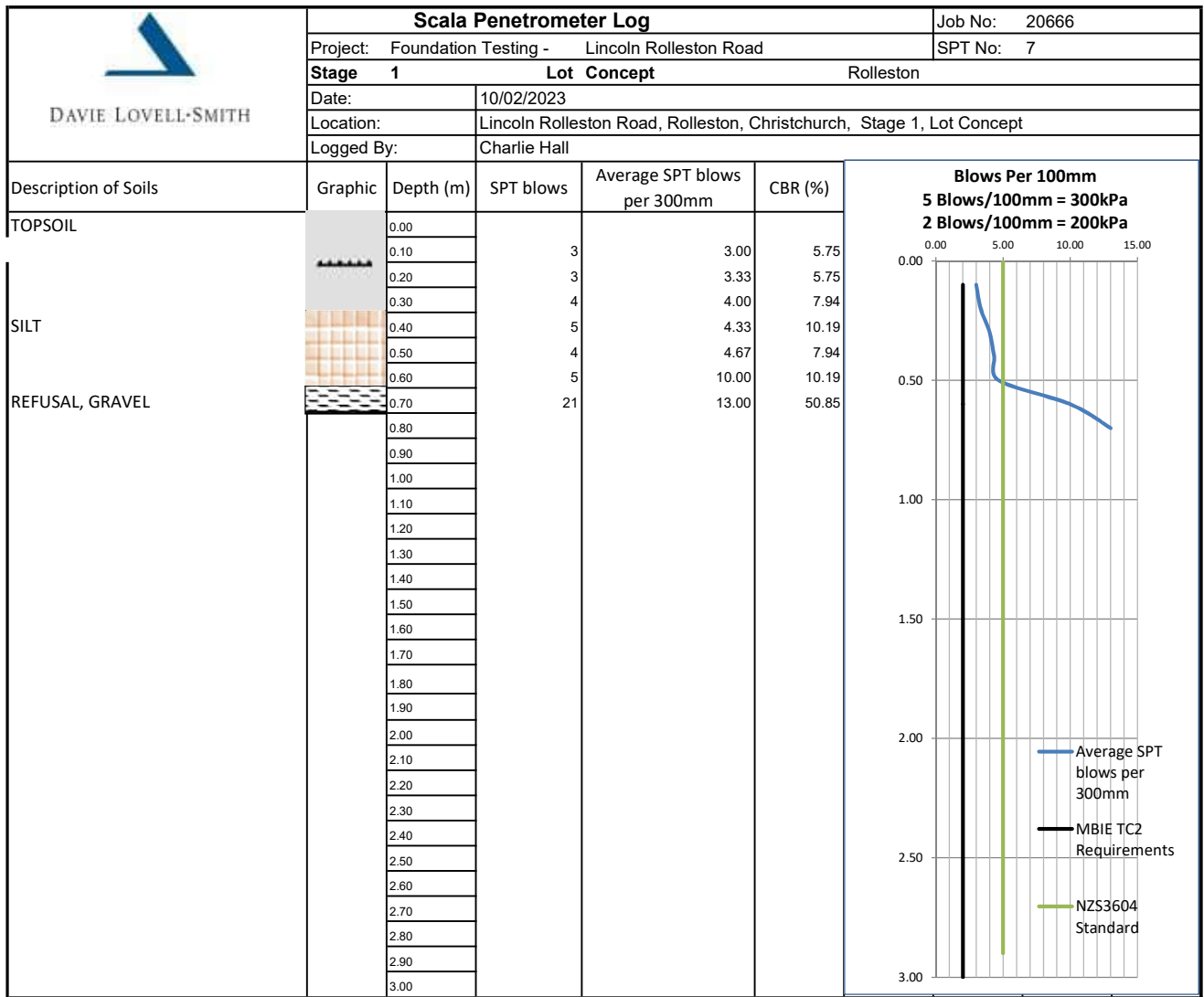
— Average SPT blows per 300mm
 — MBIE TC2 Requirements
 — NZS3604 Standard

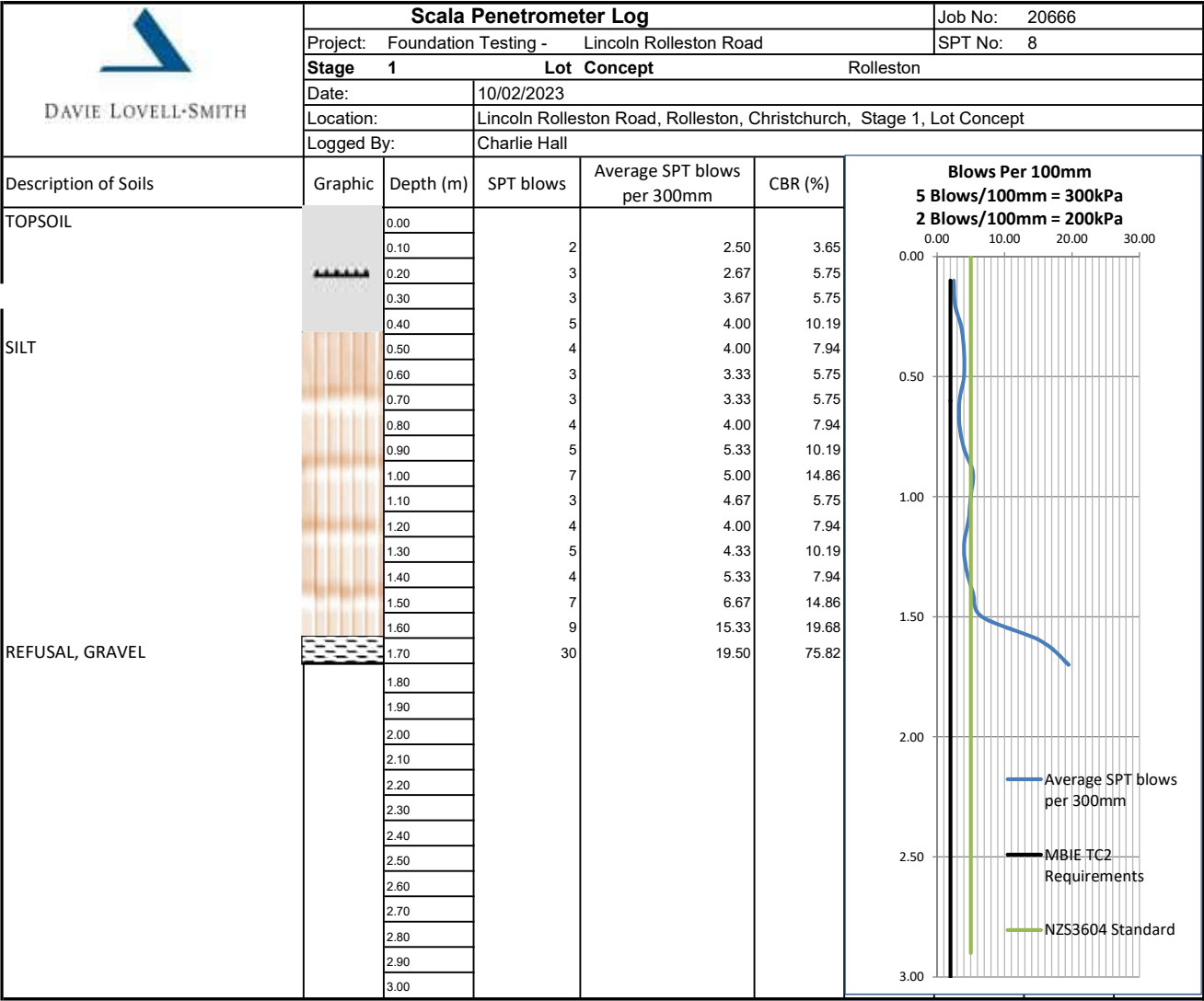


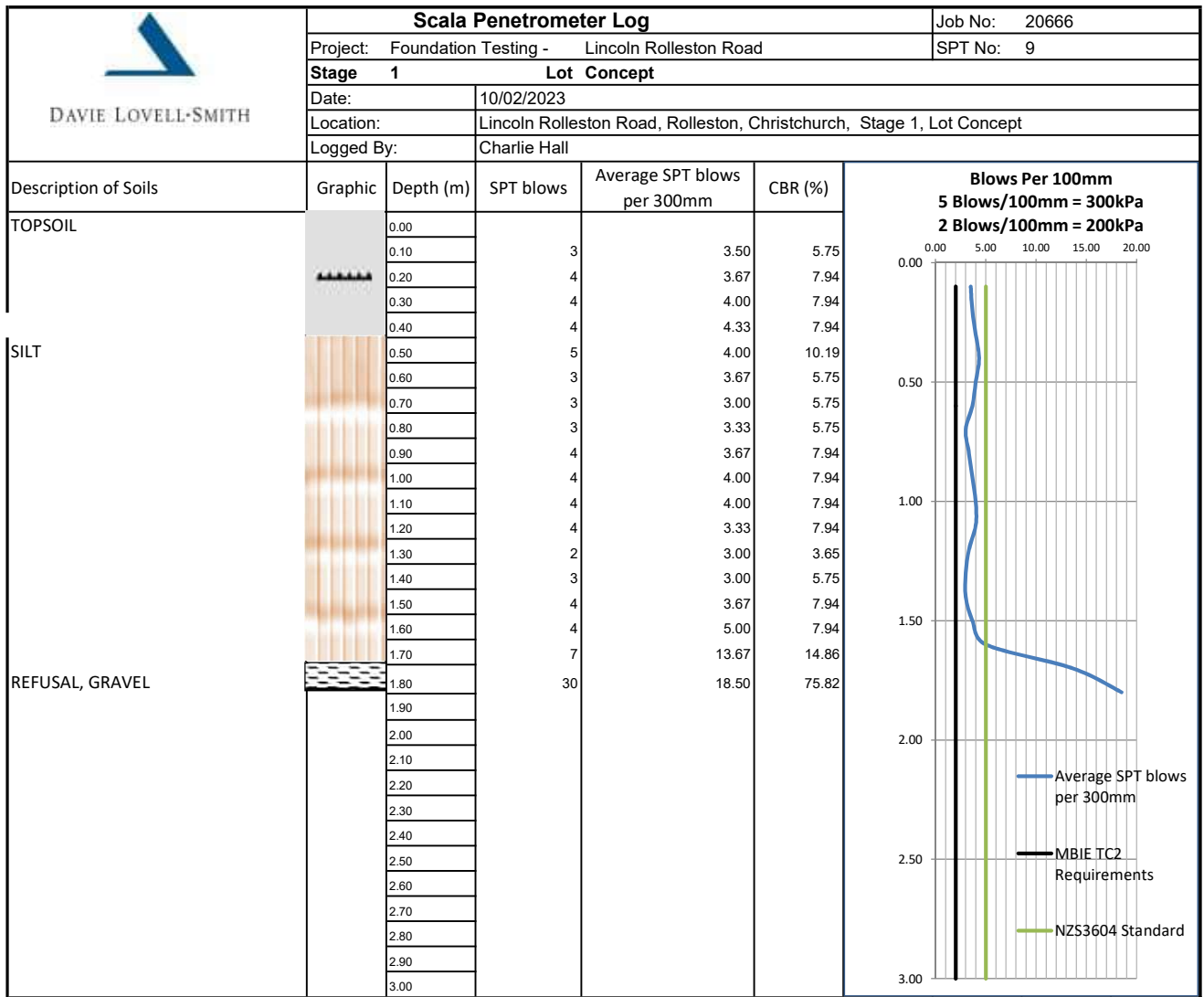


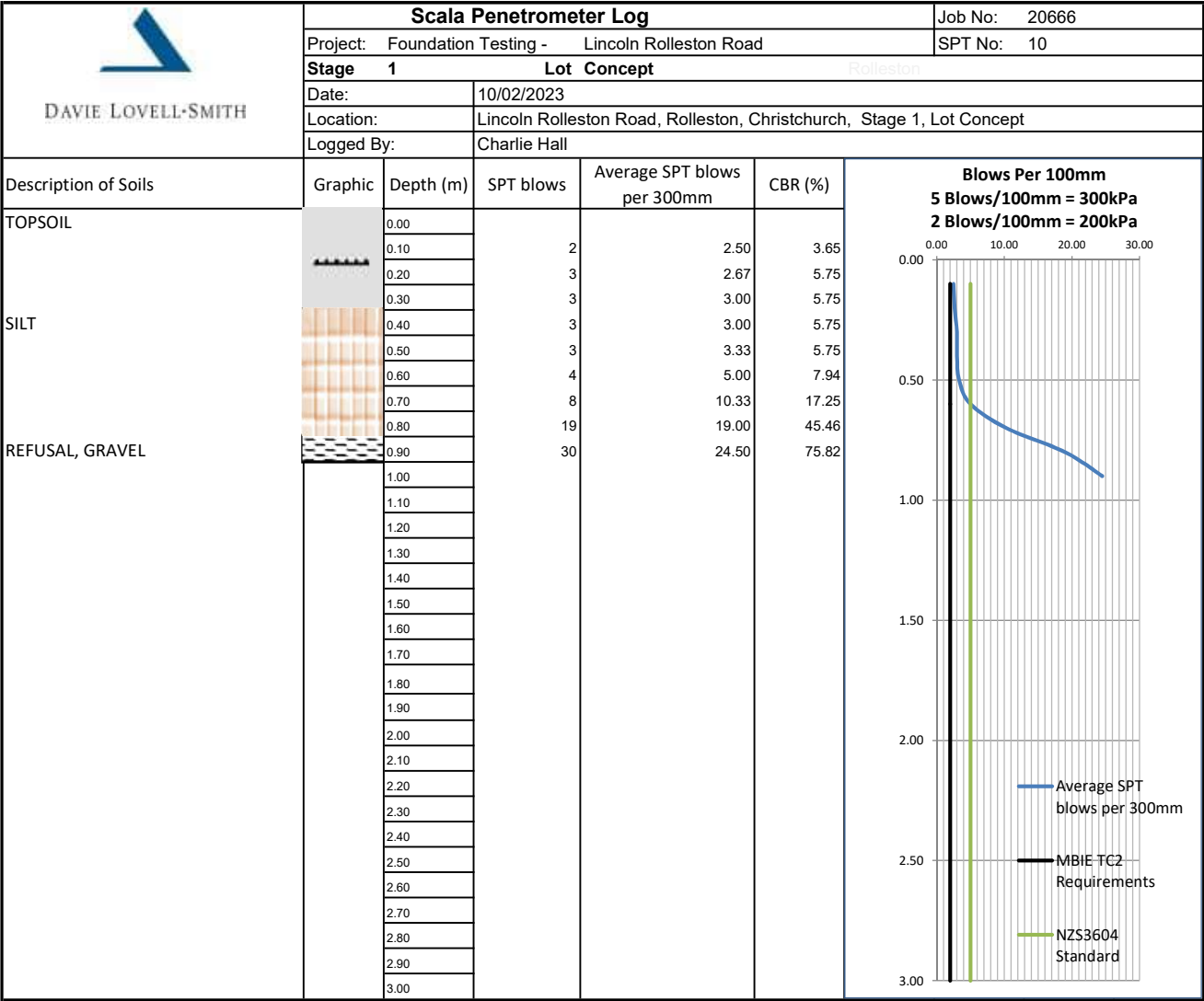


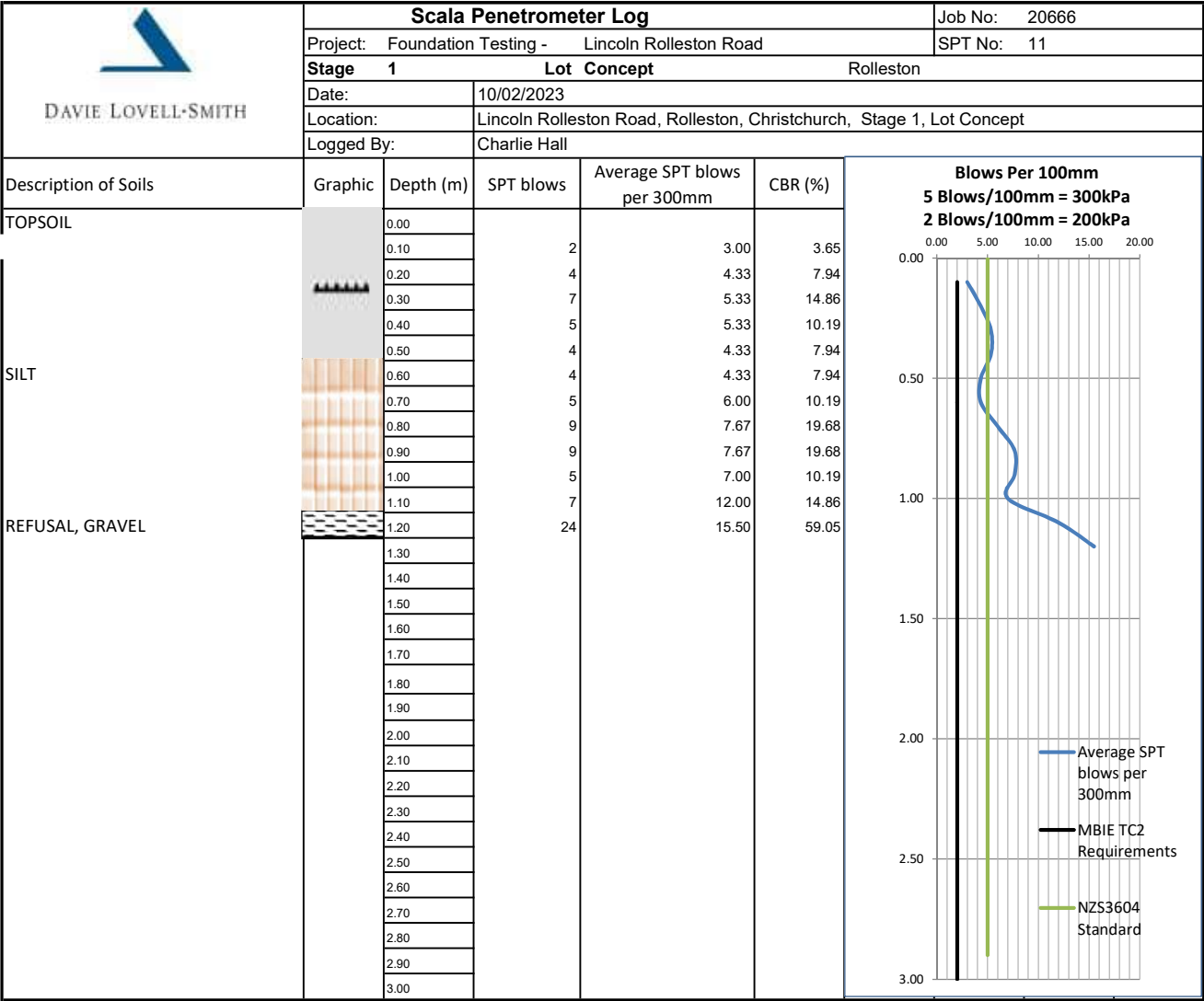


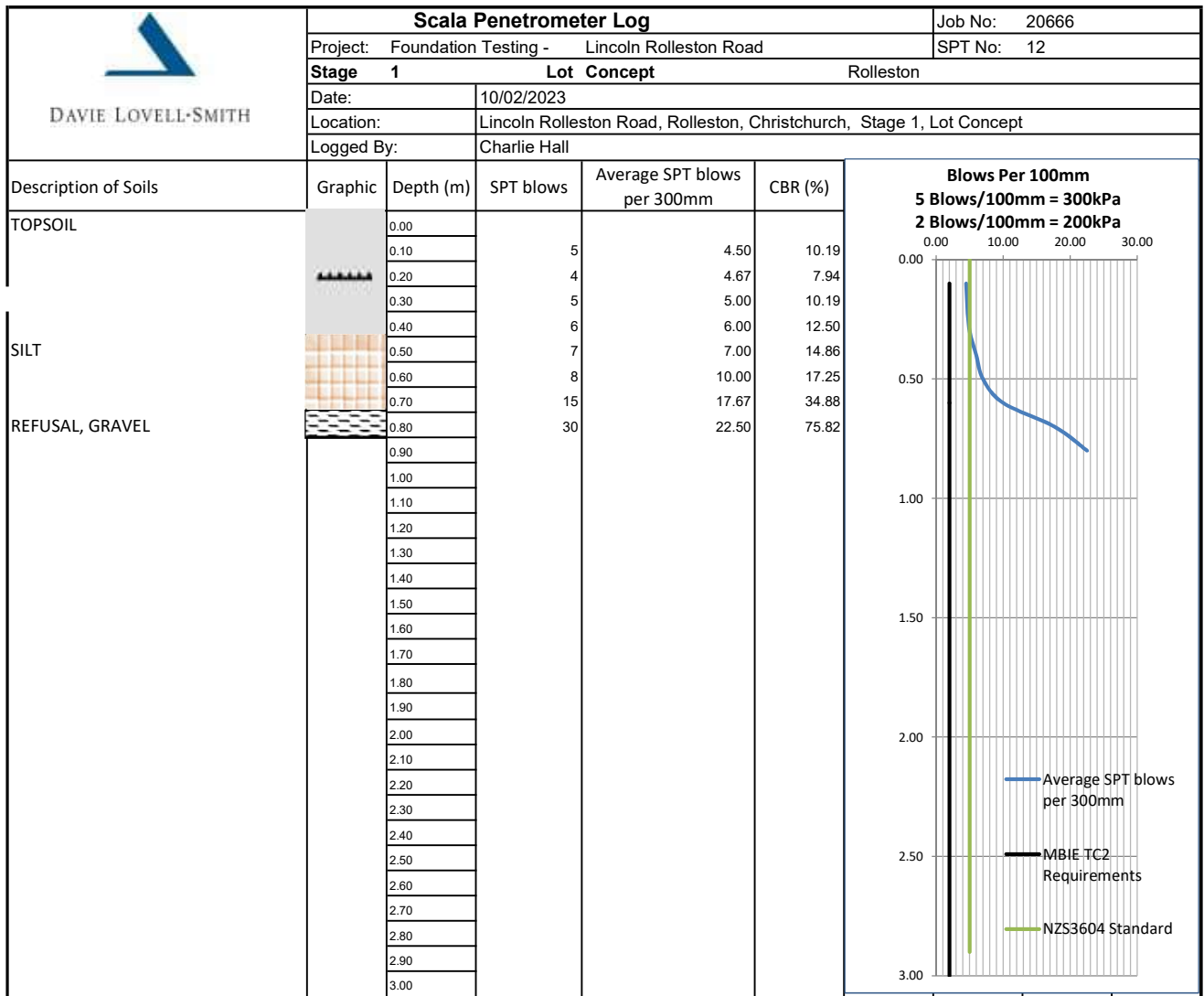


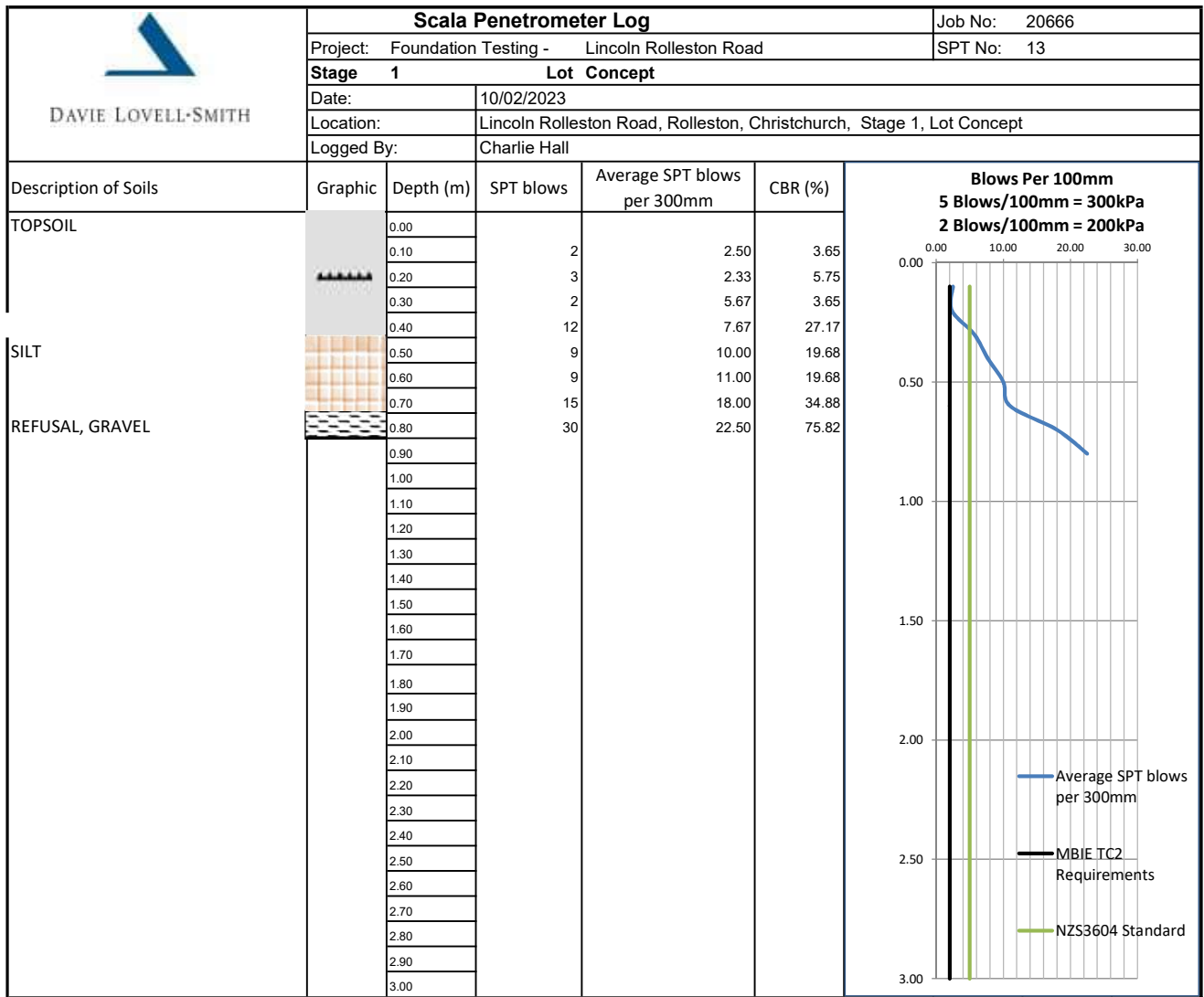


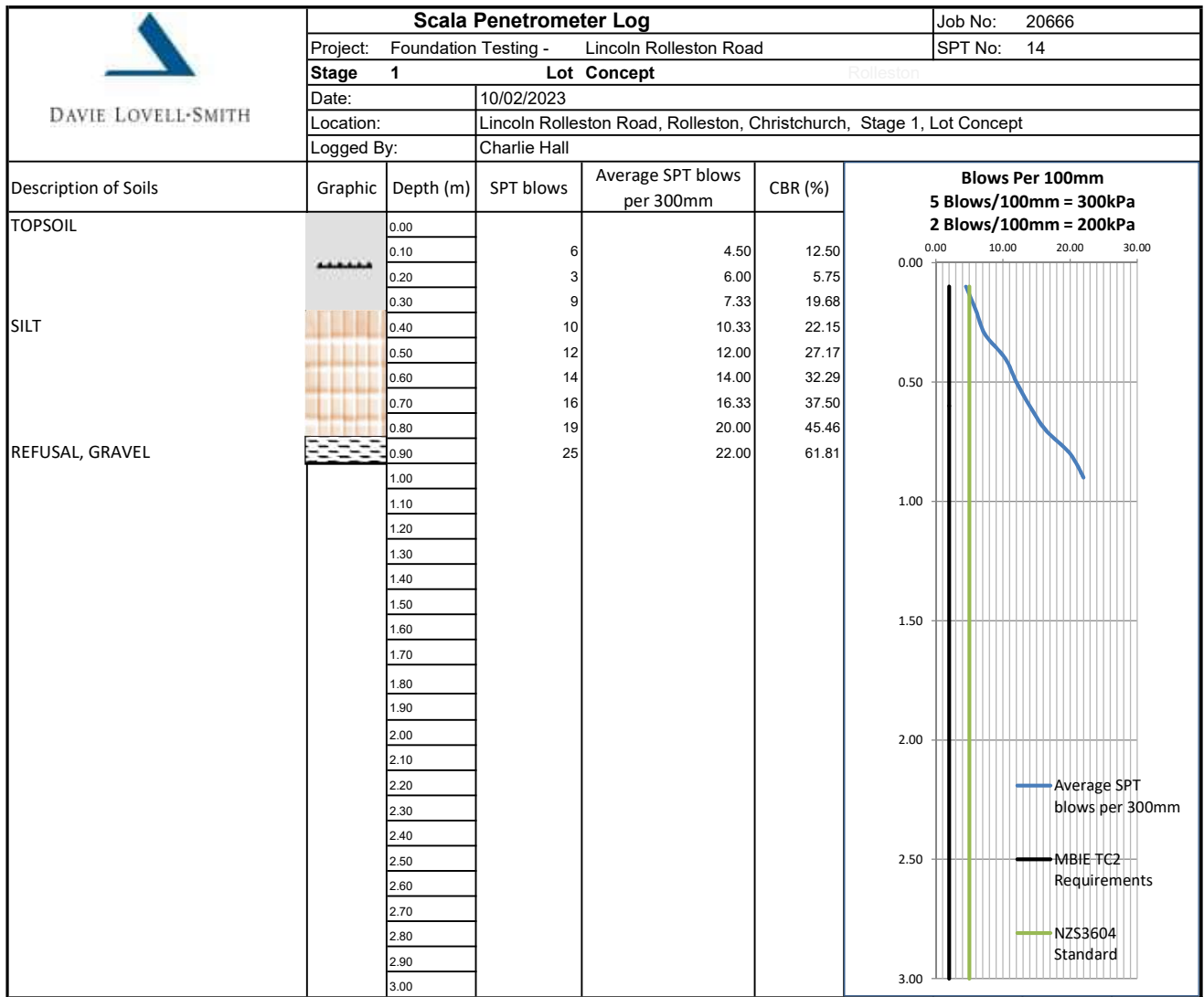


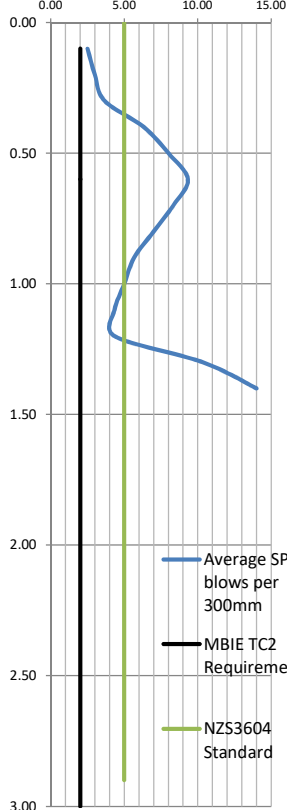










 DAVIE LOVELL-SMITH	Scala Penetrometer Log					Job No: 20666
	Project: Foundation Testing - Lincoln Rolleston Road					SPT No: 15
	Stage 1	Lot Concept Rolleston				
	Date:	10/02/2023				
	Location:	Lincoln Rolleston Road, Rolleston, Christchurch, Stage 1, Lot Concept				
Logged By:	Charlie Hall					
Description of Soils	Graphic	Depth (m)	SPT blows	Average SPT blows per 300mm	CBR (%)	Blows Per 100mm 5 Blows/100mm = 300kPa 2 Blows/100mm = 200kPa  Average SPT blows per 300mm MBIE TC2 Requirements NZS3604 Standard
TOPSOIL		0.00				
		0.10	3	2.50	5.75	
SILT		0.20	2	3.00	3.65	
		0.30	4	3.67	7.94	
		0.40	5	6.33	10.19	
		0.50	10	8.00	22.15	
		0.60	9	9.33	19.68	
		0.70	9	8.33	19.68	
		0.80	7	7.00	14.86	
		0.90	5	5.67	10.19	
		1.00	5	5.00	10.19	
		1.10	5	4.33	10.19	
		1.20	3	4.33	5.75	
		1.30	5	10.33	10.19	
REFUSAL, GRAVEL		1.40	23	14.00	56.30	
		1.50				
		1.60				
		1.70				
		1.80				
		1.90				
		2.00				
		2.10				
		2.20				
		2.30				
		2.40				
		2.50				
		2.60				
		2.70				
		2.80				
		2.90				
		3.00				

