



ENGEO

Geotechnical Investigation

870 Selwyn Road
Springston

Submitted to:

Hughes Developments Ltd
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Merivale
Christchurch 8014

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1 Introduction

ENGEO Ltd was requested by Hughes Developments Ltd to undertake a geotechnical investigation of the property at 870 Selwyn Road, Springston, as outlined in our variation proposal (ref: P2020.001.804_01).

The purpose of this assessment is to develop a conceptual geological model of the site, assess the likely future land performance, comment on the suitability of the site for residential subdivision, address the requirements of Section 106 of the Resource Management Act (RMA), and provide recommendations for subdivision works and foundations for typical timber framed residential dwellings.

Our scope of works included the following:

- Completion of a desktop study of relevant available geotechnical and geological publications, including the NZ Geotechnical and Environment Canterbury Databases.
- Undertaking a geotechnical site walkover.
- Undertaking 10 hand auger boreholes with associated Scala penetrometer tests to assess the near surface material types and strength characteristics.
- Organising and observing the excavation of 9 test pits, including geotechnical logging of the exposed soils.
- Preparation of this report outlining our findings on the ground conditions and comment on the suitability of the site for residential subdivision, including the provision of the likely foundation Technical Category, conceptual foundation recommendations for typical timber framed residential dwellings, and discuss likely geohazards as required by Section 106 of the RMA.

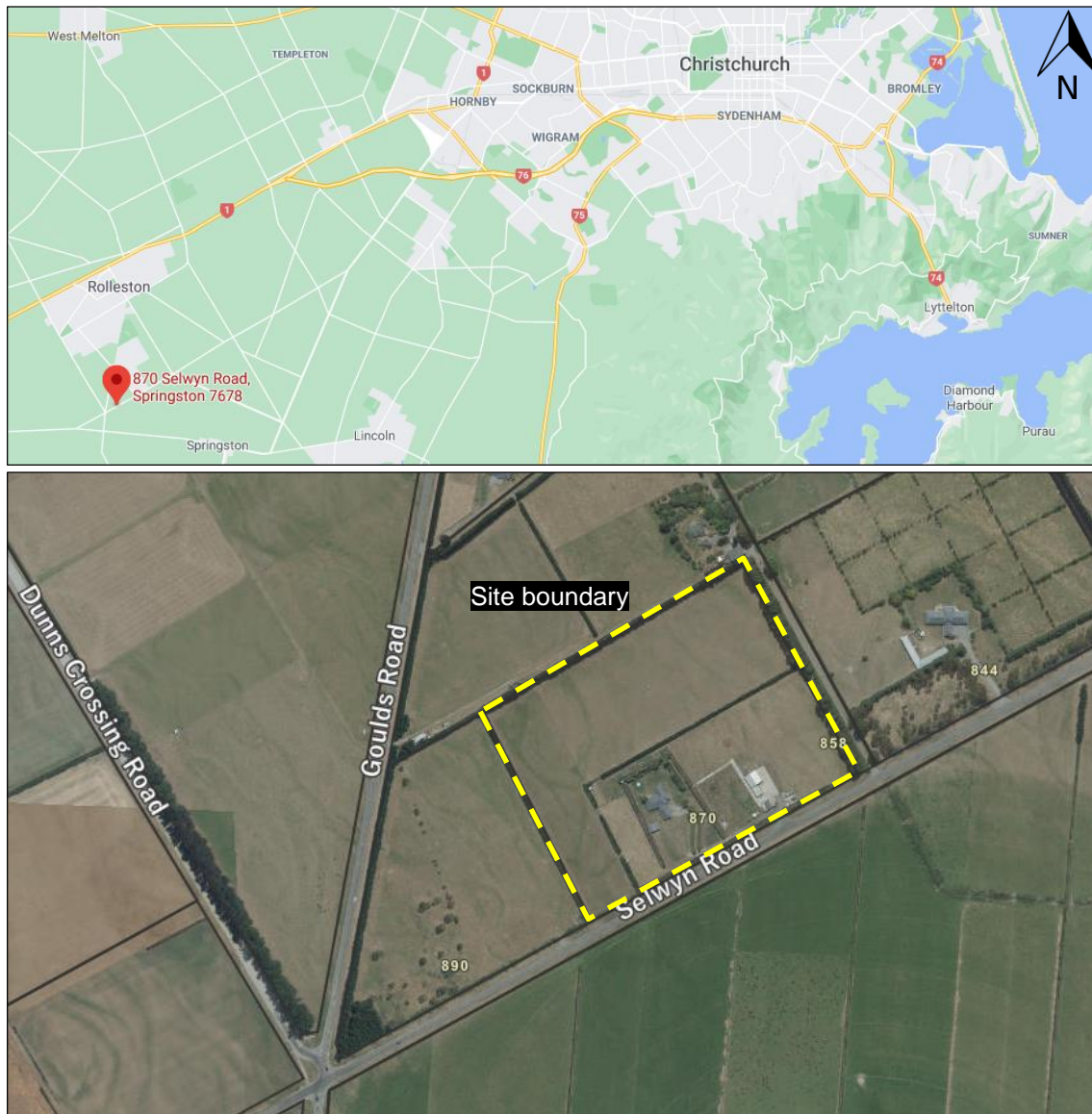
Our scope of works does not include specific geotechnical design of foundation or retaining solutions.

2 Site Description

The site comprises of one property with a total area of four hectares and the following legal description (Canterbury Maps):

- LOT 2 DP 75821 LOT 2 DP 355996 BLK III BLK VII LEESTON SD

The site is located approximately 4 km south of Rolleston town centre and is bound on all sides by rural properties (Figure 1).

Figure 1: Site Location Plan

Images sourced from Google Maps and Canterbury Maps. Not to scale.

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, 2019) and observed during our site walkover conducted on 11 January 2021, undulating and depressed ground can be attributed to paleo-channels, which traverse the site in a general northwest to southeast direction (Figure 2). 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. Inferred paleo-channels have been mapped to give an indication of areas with potential channel in-fill (Appendix 1).

Figure 2: Historical Aerial Photo – 1940 - 1944



Image sourced from Canterbury Maps. Not to scale.

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 proximal or distal 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 north / northwest of the site and trends roughly east-west with a surface rupture length of approximately 28 km (GNS, 2015), while the Port Hills Fault remains unmapped as the fault did not rupture at the surface. Movement on the Port Hills Fault is believed to have extended to within 1 km to 2 km below 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 Site Investigation

Site investigations to assess the shallow subsurface material types and strength characteristics were undertaken by ENGEO on 13 January 2020. Nine test pits and ten hand auger investigations with associated Scala penetrometer tests were completed to a maximum depth of 2.2 m below ground level.

The investigations revealed subsurface conditions across the site are consistent with the published geological mapping, as summarised in Table 1. Hand auger and test pit logs are attached as Appendix 2.

Table 1: Summary of Subsurface Investigations

Soil Type	Depth to Top of Layer (m)	General Layer Thickness (m)	Density / Consistency	Additional Comments
TOPSOIL	0.0	0.1 – 0.4	-	-
SAND	0.3	0.1 – 0.3	Medium Dense to Dense	Not observed in all locations
Sandy GRAVEL	0.3 – 0.6	Greater than 1.7	Medium Dense to Dense	Tightly packed and consistent across the site

3.5 ECan Boreholes

A review of five, deep ECan borehole logs was conducted. The first (M36/4220), is located on-site, and appears to be a water well providing the properties irrigation and domestic supply. The other boreholes are located to the east (M36/5254), north (M36/4221) and west (M36/4387) of the site.

Well logs from the four holes of interest are attached as Appendix 3 and summarised in Table 2.

Table 2: Generalised Summary of ECan Boreholes

ECan Borehole	Total Depth (m)	Water Level Below Ground Level (m)	Location relative to the site	Generalised Borelog as Logged by Driller
M36/4220	21.3	5.8	On-site, near the south-western boundary	0.5 m of topsoil underlain by sandy and claybound gravels to 21.3 m depth.
M36/4221	21.44	6.6	50 m north	0.5 m of topsoil underlain by sandy and claybound gravels to 21.44 m depth. Layer of sand recorded from 8.0 to 9.0 m depth.
M36/4387	35.59	5.56	300 m west	0.3 m of topsoil underlain by sandy and claybound gravels to 35.59 m depth.
M36/5254	36.0	6.0	150 m east	0.3 m of topsoil underlain by a layer of clay to 1 m depth. Sandy and claybound gravels continue to 36.0 m depth.

Figure 3: Nearby ECan Borehole Locations



Aerial photograph sourced from Canterbury Maps. Not to scale.

3.6 Groundwater

Groundwater is recorded in the surrounding ECan boreholes at approximately 5 to 7 m depth.

3.7 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 Liquefaction Analysis

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 RMA Section 106 Requirements and Suitability to Subdivide

Section 106 of the Resource Management Act 1991 states a consent authority may refuse to grant a subdivision consent, or may grant a consent subject to specific consent conditions if it considers that:

- There is a significant risk from natural hazards.
- Sufficient provision has not been made for legal or physical access to each allotment to be created by the subdivision.

An assessment of the risk from natural hazards as required by the RMA includes the following:

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

We have assessed the risk of natural hazards at the site in accordance with Section 106 of the Resource Management Act (RMA) and considered the risk to the site from rockfall, inundation (debris), slope stability, subsidence, flooding and tsunamis. Based on our observations and the nature of the site, its performance during the CES, and the site's distance from the nearest significant watercourse, we consider it is unlikely for the site to be subject to natural hazards such as rockfall, inundation (debris), slope stability, subsidence, flooding and tsunamis. As such, the site is considered suitable for subdivision from a geotechnical perspective.

6 Geotechnical Recommendations

6.1 Earthworks

Earthworks carried out for the subdivision shall be in accordance with NZS 4404:2010, Land Development and Subdivision Infrastructure and NZS 4431:1989, Code of Practice for Earth filling for Residential Development. In particular, any areas to receive fill should be stripped of all vegetation, topsoil, non-engineered fill, soft or organic soils prior to fill placement.

Fill may comprise clean native (site won) sandy gravel or silty soils, or clean imported soils and / or granular fill, compacted to achieve no less than 95% of maximum dry density. Fill faces steeper than 1V:1H and higher than 600 mm should be retained and referred back to ENGEO. Although unlikely, where any springs or groundwater seeps are encountered, they should be intercepted with suitable drainage and discharged to a Council approved outlet.

All unretained batters of pond and stormwater drains constructed with the native sandy gravel material should be at an inclination no steeper than 1V:3H, with protection schemes in place to control erosion of the formed batters within the waterways.

A comprehensive earthworks specification should be provided to the earthworks contractor prior to starting excavations and an inspection / testing regime agreed, along with a robust erosion and sediment control plan.

6.2 Subdivision Roding

Vegetation, any organic or deleterious material, topsoil and non-engineered fill under pavement areas should be removed from the site prior to aggregate placement. Based on our observations during testing, we consider the native ground below the topsoil at the site should provide an adequate subgrade for the proposed pavement areas.

6.3 Stormwater Control

Concentrated stormwater flows from all impermeable areas must be collected and carried in sealed pipes to the Council system or an alternative disposal point subject to approval from Council. Uncontrolled stormwater must not be allowed to saturate the ground as this will potentially affect future foundation performance both statically and during future seismic activity.

6.4 Foundations

Foundations for future proposed residential dwellings within the subdivision may comprise shallow pad, strip, or slab foundations designed in accordance with the provisions of NZS 3604 Timber Framed Buildings.

Site specific testing will be required for Building Consent, to confirm the bearing materials and capacity. For preliminary design, we anticipate that a geotechnical Ultimate Bearing Capacity of 300 kPa may be assumed for foundations bearing on native sandy gravel or engineered fill, below any topsoil. All topsoil shall be stripped from within building footprints. We anticipate building pad excavations to be typically 0.3 m depth based on our subsurface investigations.

6.5 Additional Considerations

The following should also be considered in further stages of the development:

- Development of an earthworks specification addressing site grading.
- Review of the geotechnical aspects of the site grading and foundation plans.
- Geotechnical observations and testing during construction.
- Lot specific geotechnical reports.

7 References

- Canterbury Maps, Groundwater. Retrieved January 2021, from <http://canterburymaps.govt.nz/Viewer>.
- Canterbury Maps, Historic Aerial Imagery. Retrieved January 2021, from <https://apps.canterburymaps.govt.nz/CanterburyHistoricAerialImagery>.
- 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.
- GNS Science (2015). New Zealand Active Faults Database. Retrieved August 2020, from <http://data.gns.cri.nz/af>.
- Pettinga J.R., Yetton M.D., Van Dissen R.J., & Downes G. (2001). Earthquake Source Identification and Characterisation for the Canterbury Region, South Island, New Zealand. Bulletin of the New Zealand Society for Earthquake Engineering, Vol 34, No. 4, pp 282-317.
- Selwyn District Council, Property Search, retrieved January 2021, from <https://www.selwyn.govt.nz/my-property/rates/search-properties>.
- Standards Association of New Zealand (1989). NZS 4431:1989. Code of Practice for Earthfilling for Residential Development.
- Standards Association of New Zealand (2004). NZS 1170.5:2004. Structural Design Actions Part 5: Earthquake Actions – New Zealand.
- Standards Association of New Zealand (2010). NZS 3604:2010. Timber Framed Buildings.
- Standards Association of New Zealand (2010). NZS 4404:2010. Land Development and Subdivision Infrastructure.
- The Ministry of Business, Innovation, and Employment (2016). New Zealand Geotechnical Database. Retrieved January 2021, from <https://www.nzgd.org.nz>.

8 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, Hughes Developments 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



Dai Kiddle

Geotechnical Engineer



Jed Watts

Engineering Geologist

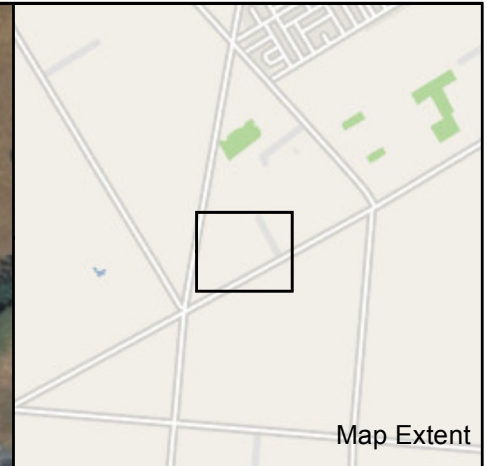
Report reviewed by



Greg Martin, CMEngNZ (PEngGeol)

Principal Engineering Geologist

APPENDIX 1: Paleo Channels



Legend

- Site Boundary
- Hand Auger Locations
- Test Pit Locations
- Flow paths

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

0 25 50 75
Metres

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

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Title: Geotechnical Site Location Plan		Figure No:
Client: XX		1
Project: 870 Selwyn Road	Designed: RS	Size: A3
	Drawn: RS	
	Checked: DRAFT	
Date: Jan 21	Scale: 1:1,500	Revision: A
Proj No: 12903.000.001		

APPENDIX 2: Test Pit and Hand Auger Logs



LOG OF TEST PIT TP01

Geotechnical Investigation
870 Selwyn Road
Rolleston, Christchurch
12903.000.000

Client : Hughs Development Ltd. Shear Vane No : N/A
Date : 13/01/2021 Logged By : DD
Max Test Pit Depth : 2.4 m Reviewed By : JRW
Digger Type/Size : Bucket Excavator Latitude : -43.630761
Bucket Type/Size : 400 Longitude : 172.384034

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
												2	4	6	8	10	12	
0.0 - 0.3	TS			SP	Silty fine SAND with minor fine to coarse gravel and trace rootlets; Light brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]					N/A								
0.3 - 0.5					Sandy fine to coarse GRAVEL with trace rootlets and cobbles; brown. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				D	Tightly packed								
0.5 - 0.8										Loosely packed								
0.8 - 0.9					From 0.8 m to 0.9 m depth becomes fine to coarse GRAVEL with trace rootlets; brown. gravel is sub angular to sub rounded. Well graded.													
0.9 - 2.4				GW	From 0.9 m depth cobbles become minor.				M	Tightly packed								
2.4 - 2.5					Depth of Excavation: 2.4 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

Test pit met target depth at 2.4 m.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered

TS = Topsoil
N/A = Not Assessed



LOG OF TEST PIT TP02

Geotechnical Investigation
 870 Selwyn Road
 Rolleston, Christchurch
 12903.000.000

Client : Hughs Development Ltd. **Shear Vane No :** N/A
Date : 13/01/2021 **Logged By :** DD
Max Test Pit Depth : 2.2 m **Reviewed By :** JRW
Digger Type/Size : Bucket Excavator **Latitude :** -43.630537
Bucket Type/Size : 400 **Longitude :** 172.383019

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
												2	4	6	8	10	12	
0.0 - 0.3	TS			SP	Fine SAND with some silt, trace fine to coarse gravel and rootlets; brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]					N/A								
0.3 - 2.2	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				M	Tightly packed								
					Depth of Excavation: 2.2 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

Test pit met target depth at 2.2 m.
 Scala Penetrometer met practical refusal at 0.3 m depth.
 Standing groundwater was not encountered

TS = Topsoil
 N/A = Not Assessed



LOG OF TEST PIT TP03

Geotechnical Investigation
 870 Selwyn Road
 Rolleston, Christchurch
 12903.000.000

Client : Hughs Development Ltd. **Shear Vane No** : N/A
Date : 13/01/2021 **Logged By** : DD
Max Test Pit Depth : 2.2 m **Reviewed By** : JRW
Digger Type/Size : Bucket Excavator **Latitude** : -43.63081
Bucket Type/Size : 400 **Longitude** : 172.382397

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
												2	4	6	8	10	12	
0.0 - 0.2	TS			SP	Silty fine SAND with minor fine to coarse gravel and trace rootlets; Light brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]				D	N/A								
0.2 - 0.6					Sandy fine to coarse GRAVEL with minor cobbles and rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded. Rootlets become trace from 0.6 m depth.													
0.6 - 2.2	ALLUVIUM			GW	From 1 m to 1.1 m depth becomes fine to coarse GRAVEL with trace rootlets; brown. Gravel is sub angular to sub rounded. Well graded. Rootlets not observed from 2.0 m depth.				M	Tightly packed								
					Depth of Excavation: 2.2 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

Test pit met target depth at 2.2 m.
 Scala Penetrometer met practical refusal at 0.2 m depth.
 Standing groundwater was not encountered

TS = Topsoil
 N/A = Not Assessed



LOG OF TEST PIT TP04

Geotechnical Investigation
870 Selwyn Road
Rolleston, Christchurch
12903.000.000

Client : Hughs Development Ltd. Shear Vane No : N/A
Date : 13/01/2021 Logged By : DD
Max Test Pit Depth : 2.2 m Reviewed By : JRW
Digger Type/Size : Bucket Excavator Latitude : -43.631559
Bucket Type/Size : 400 Longitude : 172.381918

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
												2	4	6	8	10	12	
0.0 - 0.1	TS			SP	Fine SAND with some silt, trace fine to coarse gravel and rootlets; brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]					N/A								
0.1 - 2.2	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				M	Tightly packed								
					Depth of Excavation: 2.2 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

Test pit met target depth at 2.2 m.
Scala Penetrometer met practical refusal at 0.5 m depth.
Standing groundwater was not encountered

TS = Topsoil
N/A = Not Assessed



LOG OF TEST PIT TP05

Geotechnical Investigation
 870 Selwyn Road
 Rolleston, Christchurch
 12903.000.000

Client : Hughs Development Ltd. **Shear Vane No :** N/A
Date : 13/01/2021 **Logged By :** DD
Max Test Pit Depth : 2.1 m **Reviewed By :** JRW
Digger Type/Size : Bucket Excavator **Latitude :** -43.631312
Bucket Type/Size : 400 **Longitude :** 172.381017

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer					
		Easier	Harder									Blows per 100mm					
												2	4	6	8	10	12
0.0 - 0.5	TS			SP	Fine SAND with some silt, trace fine to coarse gravel and rootlets; brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]					N/A							
0.5 - 0.7				SP	Fine to coarse SAND with minor silt. trace rootlets and fine gravel; yellow. Well graded.				D	D							
0.7 - 2.1	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				M	Tightly packed							
Depth of Excavation: 2.1 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

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

TS = Topsoil
 N/A = Not Assessed



LOG OF TEST PIT TP07

Geotechnical Investigation
 870 Selwyn Road
 Rolleston, Christchurch
 12903.000.000

Client : Hughs Development Ltd. **Shear Vane No :** N/A
Date : 13/01/2021 **Logged By :** DD
Max Test Pit Depth : 2 m **Reviewed By :** JRW
Digger Type/Size : Bucket Excavator **Latitude :** -43.630266
Bucket Type/Size : 400 **Longitude :** 172.382015

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer					
		Easier	Harder									Blows per 100mm					
												2	4	6	8	10	12
0.0 - 0.4	TS			SP	Fine SAND with some silt, trace fine to coarse gravel and rootlets; brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]				D	N/A							
0.4 - 1.3	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				M	Tightly packed							
1.3 - 2.0					Rootlets not observed from 1.3 m depth.							W					
2.0 - 2.5	Depth of Excavation: 2 m Termination Condition: Target depth																

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

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

TS = Topsoil
 N/A = Not Assessed



LOG OF TEST PIT TP08

Geotechnical Investigation
 870 Selwyn Road
 Rolleston, Christchurch
 12903.000.000

Client : Hughs Development Ltd. **Shear Vane No** : N/A
Date : 13/01/2021 **Logged By** : DD
Max Test Pit Depth : 2.1 m **Reviewed By** : JRW
Digger Type/Size : Bucket Excavator **Latitude** : -43.629525
Bucket Type/Size : 400 **Longitude** : 172.382263

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
												2	4	6	8	10	12	
0.0	TS			SP	Fine SAND with some silt, trace fine to coarse gravel and rootlets; brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]					N/A								
0.4				GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				D	Tightly packed								
0.75				SW	Fine to coarse SAND with trace rootlets; brown. Well graded. From 0.75 m to 1 m becomes silty fine SAND; yellow. Poorly graded.					MD								
1.2				GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				M	Tightly packed								
					Depth of Excavation: 2.1 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

Test pit met target depth at 2.1 m.
 Scala Penetrometer met practical refusal at 0.4 m depth.
 Standing groundwater was not encountered

TS = Topsoil
 N/A = Not Assessed



LOG OF TEST PIT TP09

Geotechnical Investigation
870 Selwyn Road
Rolleston, Christchurch
12903.000.000

Client : Hughs Development Ltd. Shear Vane No : N/A
Date : 13/01/2021 Logged By : DD
Max Test Pit Depth : 2 m Reviewed By : JRW
Digger Type/Size : Bucket Excavator Latitude : -43.629788
Bucket Type/Size : 400 Longitude : 172.383272

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer							
		Easier	Harder									Blows per 100mm							
	TS			SP	Fine SAND with some silt, trace fine to coarse gravel and rootlets; brown. Gravel subangular to rounded. Poorly graded. [TOPSOIL]					N/A		2	4	6	8	10	12		
0.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles and trace rootlets; brown. Sand is fine to coarse. Gravel is subangular to subrounded. Cobbles are sub rounded to rounded. Well graded.				D	Tightly packed									
1.0					Rootlets not observed from 0.9 m depth.				M										
2.0	Depth of Excavation: 2 m Termination Condition: Target depth																		
2.5																			

GEOTECH TEST PIT LOG - 870 SELWYN ROAD TP.GPJ - NZ MASTER DATA TEMPLATE.GDT 21/1/21

Test pit met target depth at 2 m.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered

TS = Topsoil
N/A = Not Assessed



LOG OF AUGER HA01

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
Client Ref. : N/A Logged By : DKi
Date : 13/01/2021 Reviewed By : JRW
Hole Depth : 0.25 m Latitude : -43.630285
Hole Diameter : 50 mm Longitude : 172.383665

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].				D	N/A								
			Trace fine to medium gravel encountered from 0.22 m depth. Gravels are sub-angular to rounded.													
			End of Hole Depth: 0.25 m Termination Condition: Practical refusal													
0.5																

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.25 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered

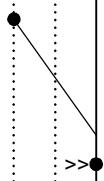


LOG OF AUGER HA02

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.1 m Latitude : -43.631275
 Hole Diameter : 50 mm Longitude : 172.38281

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].				D	N/A								
	End of Hole Depth: 0.1 m Termination Condition: Practical refusal															
0.5																



GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.1 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.2 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA03

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.3 m Latitude : -43.631146
 Hole Diameter : 50 mm Longitude : 172.381632

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	<p>Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].</p> <p>Trace fine to medium gravel encountered from 0.25 m depth. Gravels are sub-angular to rounded.</p>				D	N/A								
0.5			<p>End of Hole Depth: 0.3 m Termination Condition: Practical refusal</p>													

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT 21/1/21

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



LOG OF AUGER HA04

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.3 m Latitude : -43.631769
 Hole Diameter : 50 mm Longitude : 172.381358

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].				D	N/A								
	End of Hole Depth: 0.3 m Termination Condition: Practical refusal															
0.5																

GEOTECH HAND AUGER : 870 SELWYN ROAD HA.GPJ NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.3 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.4 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA05

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.65 m Latitude : -43.630844
 Hole Diameter : 50 mm Longitude : 172.380676

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].					N/A								
0.5	ALLUVIUM	SW	Fine to coarse SAND with minor silt and trace fine gravel; light brown. Well graded. Gravels sub-angular to rounded.				D	MD - D								
End of Hole Depth: 0.65 m Termination Condition: Practical refusal																
																>>

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.65 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.8 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA06

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd
Client Ref. : N/A
Date : 13/01/2021
Hole Depth : 0.6 m
Hole Diameter : 50 mm

Shear Vane No : N/A
Logged By : DKi
Reviewed By : JRW
Latitude : -43.629972
Longitude : 172.380878

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].					N/A								
0.5	ALLUVIUM	SW	Fine to coarse SAND with minor silt and trace fine to medium gravel; light brown. Well graded. Gravels sub-angular to rounded.				D	MD - D								
End of Hole Depth: 0.6 m Termination Condition: Practical refusal																

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT - 21/1/21

Hand auger met practical refusal at 0.6 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.9 m depth.
Standing groundwater was not encountered



LOG OF AUGER HA07

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
Client Ref. : N/A Logged By : DKi
Date : 13/01/2021 Reviewed By : JRW
Hole Depth : 0.45 m Latitude : -43.630465
Hole Diameter : 50 mm Longitude : 172.381419

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].					N/A								
	ALLUVIUM	SW	Fine to coarse SAND with minor silt and trace fine to medium gravel; light brown. Well graded. Gravels sub-angular to rounded.					MD								
0.5	End of Hole Depth: 0.45 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.45 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.6 m depth.
Standing groundwater was not encountered



LOG OF AUGER HA08

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.4 m Latitude : -43.629759
 Hole Diameter : 50 mm Longitude : 172.381634

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].					N/A								
	ALLUVIUM	SW	Fine to coarse SAND with minor silt; light brown. Well graded.					MD - D								
0.5	End of Hole Depth: 0.4 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER : 870 SELWYN ROAD HA.GPJ NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.4 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.4 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA09

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.2 m Latitude : -43.630003
 Hole Diameter : 50 mm Longitude : 172.382646

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/Remoulded	Scala Penetrometer							
										Blows per 100mm							
										2	4	6	8	10	12		
	TOPSOIL	SP	Fine to medium SAND with some silt, trace fine to medium gravel and rootlets; brown. Poorly graded. Gravels are sub-angular to rounded [TOPSOIL].				D	N/A									
End of Hole Depth: 0.2 m Termination Condition: Practical refusal																	
0.5																	

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ - NZ DATA TEMPLATE 2.GDT 21/1/21

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 HA10

Geotechnical Investigation
870 Selwyn Road
Rolleston
12903.000.008

Client : Hughes Developments Ltd Shear Vane No : N/A
 Client Ref. : N/A Logged By : DKi
 Date : 13/01/2021 Reviewed By : JRW
 Hole Depth : 0.4 m Latitude : -43.629282
 Hole Diameter : 50 mm Longitude : 172.382925

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/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].					N/A								
	ALLUVIUM	SW	Fine to coarse SAND with minor silt; light brown. Well graded.					MD								
0.5	End of Hole Depth: 0.4 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER - 870 SELWYN ROAD HA.GPJ NZ DATA TEMPLATE 2.GDT 21/1/21

Hand auger met practical refusal at 0.4 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.7 m depth.
 Standing groundwater was not encountered

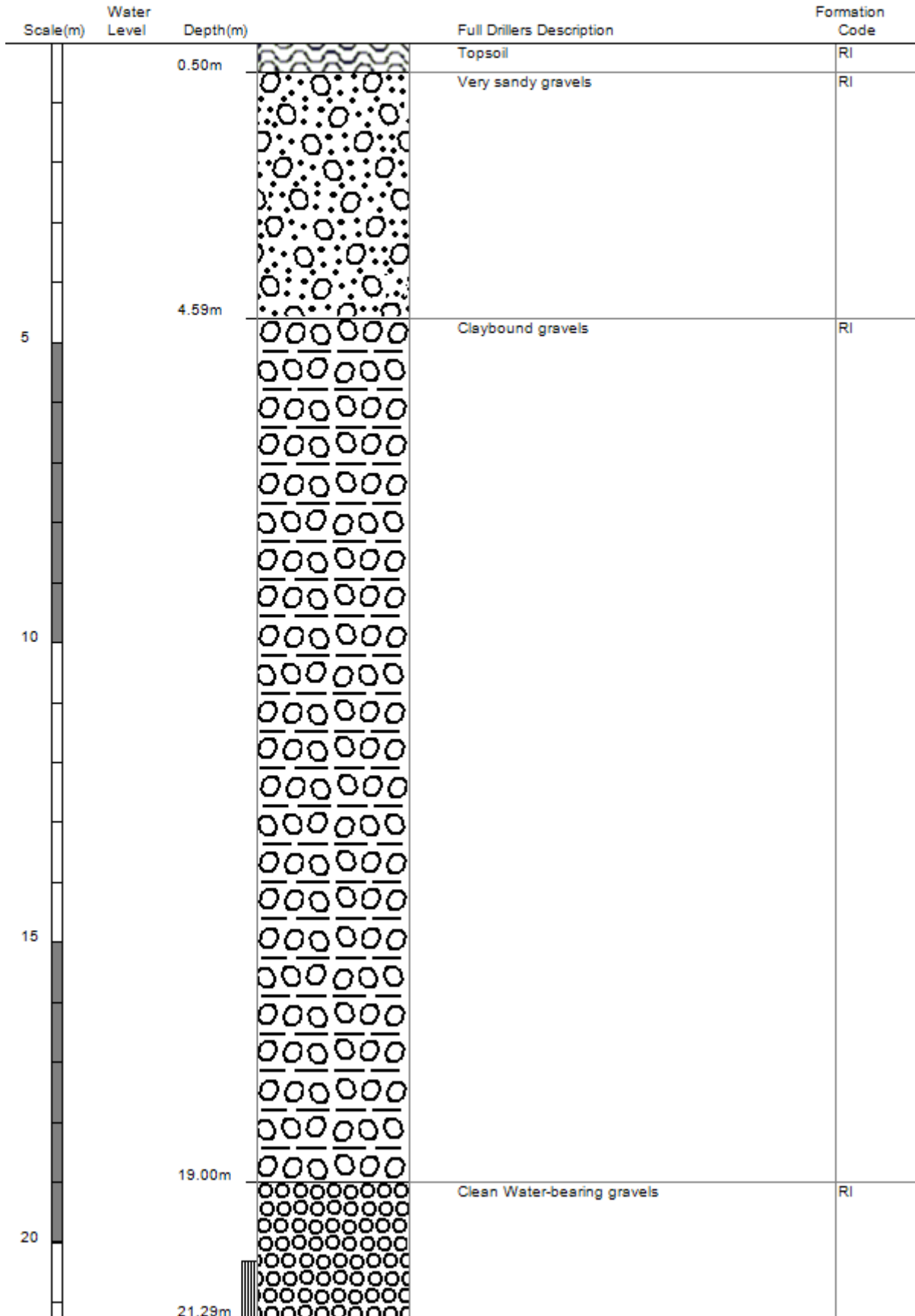
APPENDIX 3: ECan Wells



Bore or Well No	M36/4220		
Well Name	SELWYN RD		
Owner	Mr G B Shadwell		
Well Number	M36/4220	File Number	CO6C/13726
Owner	Mr G B Shadwell	Well Status	Active (exist, present)
Street/Road	SELWYN RD	NZTM Grid Reference	BX23:50117-68868
Locality	ROLLESTON	NZTM X and Y	1550117 - 5168868
Location Description		Location Accuracy	2 - 15m
CWMS Zone	Selwyn - Waihora	Use	Irrigation,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	21.30m	Water Level Count	0
Diameter	150mm	Initial Water Level	5.80m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	34.29m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	4	Calc Min 80%	8.81m below MP (Estimated)
Aquifer Name	Riccarton Gravel	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	1
Drill Date	05 Feb 1991	Max Tested Yield	6 l/s
Driller	Weedons WellDrilling	Drawdown at Max Tested Yield	13 m
Drilling Method	Rotary/Percussion	Specific Capacity	0.44 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type	Unknown	Last Field Check	20 Oct 2010
Water Use Data	No		

Borelog for well M36/4220

Grid Reference (NZTM): 1550118 mE, 5168868 mN
 Location Accuracy: 2 - 15m
 Ground Level Altitude: 34.3 m +MSD Accuracy: < 2.5 m
 Driller: Weedons WellDrilling
 Drill Method: Rotary/Percussion
 Borelog Depth: 21.3 m Drill Date: 05-Feb-1991





Bore or Well No	M36/4221		
Well Name	Cnr GOULDS RD and SELWYN RDS		
Owner	Mr & Ms R J & S E Silcock & Russell		
Well Number	M36/4221	File Number	CO6C/01718
Owner	Mr & Ms R J & S E Silcock & Russell	Well Status	Active (exist, present)
Street/Road	Cnr GOULDS RD and SELWYN RDS	NZTM Grid Reference	BX23:50160-69165
Locality	ROLLESTON	NZTM X and Y	1550160 - 5169165
Location Description	SEE M36/4220	Location Accuracy	2 - 15m
CWMS Zone	Selwyn - Waihora	Use	Irrigation,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	21.44m	Water Level Count	0
Diameter	150mm	Initial Water Level	6.60m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	35.47m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	7	Calc Min 80%	9.07m below MP (Estimated)
Aquifer Name	Riccarton Gravel	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	2
Drill Date	04 Feb 1991	Max Tested Yield	6 l/s
Driller	Weedons WellDrilling	Drawdown at Max Tested Yield	11 m
Drilling Method	Rotary/Percussion	Specific Capacity	0.51 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type	Unknown	Last Field Check	
Water Use Data	No		

Screens

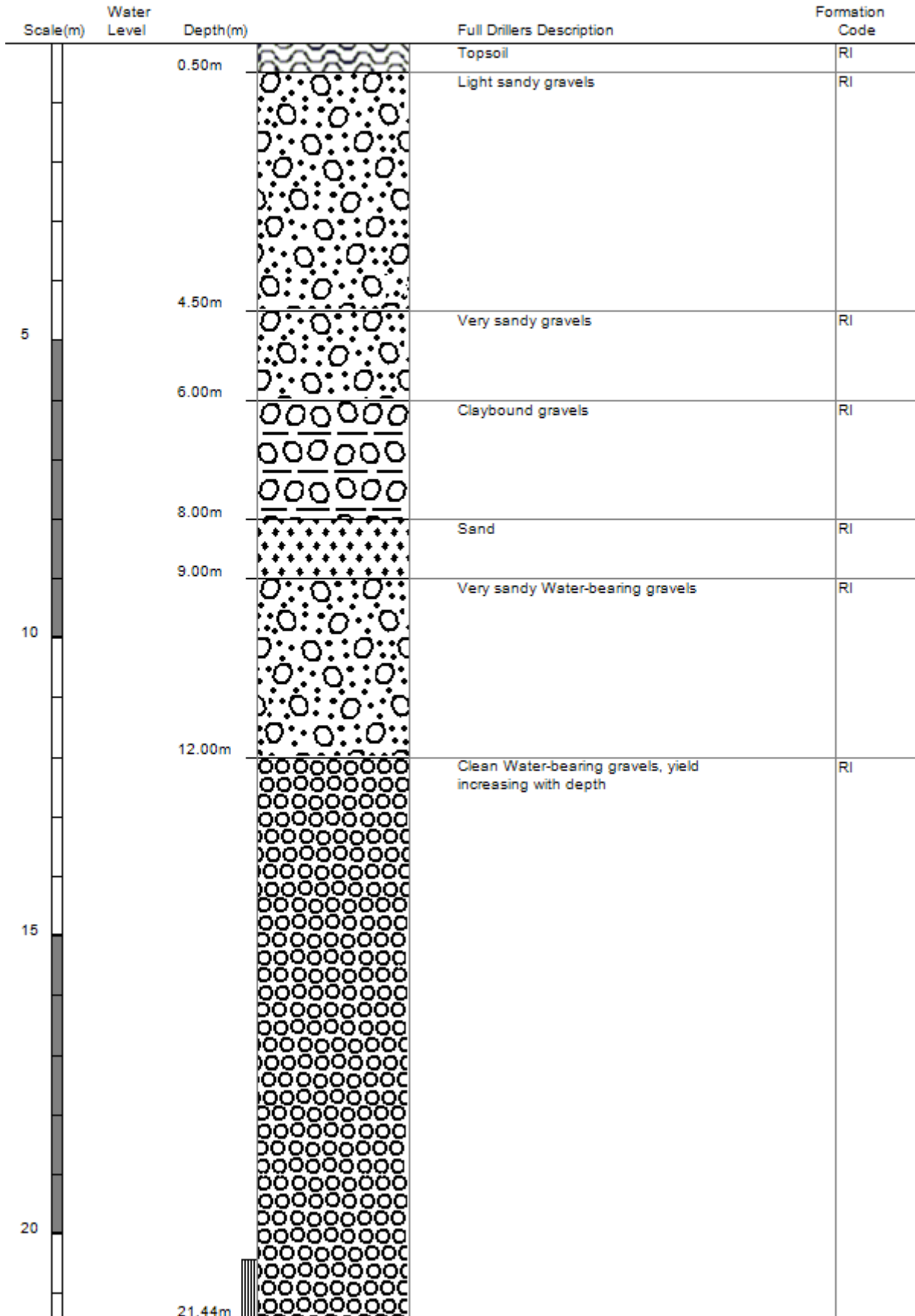
Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	20.4	21.4				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
04 Feb 1991	1	5.8	76.54947	11.35	3

Borelog for well M36/4221

Grid Reference (NZTM): 1550161 mE, 5169165 mN
 Location Accuracy: 2 - 15m
 Ground Level Altitude: 35.5 m +MSD Accuracy: < 2.5 m
 Driller: Weedons WellDrilling
 Drill Method: Rotary/Percussion
 Borelog Depth: 21.4 m Drill Date: 04-Feb-1991

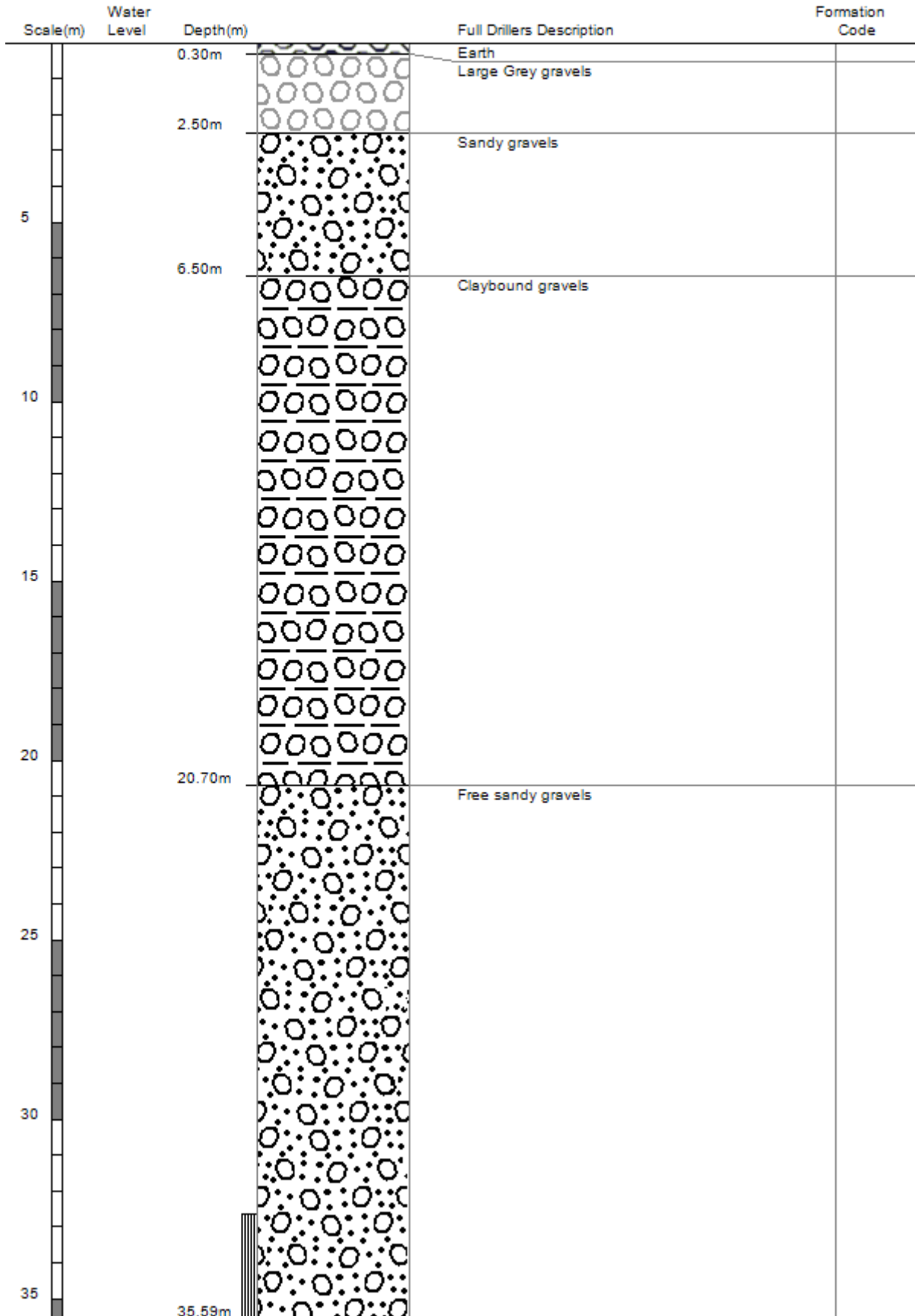




Bore or Well No	M36/4387		
Well Name	DUNNS CROSSING RD		
Owner	Mr & Mrs I G & D C Robertson		
Well Number	M36/4387	File Number	CO6C/02792
Owner	Mr & Mrs I G & D C Robertson	Well Status	Active (exist, present)
Street/Road	DUNNS CROSSING RD	NZTM Grid Reference	BX23:49703-68988
Locality	ROLLESTON	NZTM X and Y	1549703 - 5168988
Location Description		Location Accuracy	2 - 15m
CWMS Zone	Selwyn - Waihora	Use	Domestic Supply,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	35.60m	Water Level Count	0
Diameter	200mm	Initial Water Level	5.65m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	36.46m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	5	Calc Min 80%	8.87m below MP (Estimated)
Aquifer Name		Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	2
Drill Date	11 Oct 1991	Max Tested Yield	18 l/s
Driller	McMillan Drilling Ltd	Drawdown at Max Tested Yield	10 m
Drilling Method	Rotary/Percussion	Specific Capacity	1.64 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type	Unknown	Last Field Check	
Water Use Data	Yes		

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





Bore or Well No	M36/5254		
Well Name	SELWYN ROAD		
Owner	Mr D B Irvine		
Well Number	M36/5254	File Number	CO6C/12625
Owner	Mr D B Irvine	Well Status	Active (exist, present)
Street/Road	SELWYN ROAD	NZTM Grid Reference	BX23:50467-69031
Locality	SPRINGSTON	NZTM X and Y	1550467 - 5169031
Location Description	100M FROM PROP LOT2 ETERN BOUND, 20M RD	Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Irrigation,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	36.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	6.00m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	34.35m above MSL (Lytelton 1937)	Lowest Water Level	
Elevation Accuracy	< 2.5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	6	Calc Min 80%	8.99m below MP (Estimated)
Aquifer Name	Bromley Formation	Aquifer Tests	0
Aquifer Type	Unknown	Yield Drawdown Tests	1
Drill Date	01 Dec 1996	Max Tested Yield	8 l/s
Driller	East Coast Drilling	Drawdown at Max Tested Yield	5 m
Drilling Method	Rotary Rig	Specific Capacity	1.65 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	34	36				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
01 Dec 1996	1	8.25	108.885017	5	2

Borelog for well M36/5254

Grid Reference (NZTM): 1550468 mE, 5169031 mN
 Location Accuracy: 50 - 300m
 Ground Level Altitude: 34.4 m +MSD Accuracy: < 2.5 m
 Driller: East Coast Drilling
 Drill Method: Rotary Rig
 Borelog Depth: 36.0 m Drill Date: 01-Dec-1996

