ENGEO

Expect Excellence

Geotechnical Investigation - Stage 1

Yaldhurst Park

Yaldhurst

Christchurch

Submitted to:

Infinity Yaldhurst Limited
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Wanaka

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ACENZ

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ENGEO Document Control:

Report Title	Geotechnical Investigation - Stage 1 - Yaldhurst Park, Yaldhurst			
Project No.	15518.000.000	Doc ID	01	
Client	Infinity Yaldhurst Limited	Client Contact	Paul Croft (Infinity Yaldhurst Limited), Richard Graham (Graham Surveying)	
Distribution (PDF)	Richard Graham (Graham Surveying)			
Date	Revision Details/Status	WP	Author	Reviewer
09/11/2018	Final	JT	HF	DEB

1 Introduction

ENGEO Ltd was requested by Infinity Yaldhurst Limited to undertake a Geotechnical Investigation - Stage 1 for the proposed 191 lot subdivision as outlined in our proposal (ref: P2018.001.727, dated 5 October 2018).

The property at Yaldhurst Park is located south of Yaldhurst Road and is currently a partially developed subdivision. The purpose of this investigation was to comment on the suitability of the site for residential subdivision, and address the requirements of Section 106 of the Resource Management Act (RMA). To accomplish this, we have developed a geological model of the site, assessed the likely future land performance, and provided recommendations for subdivision works with preliminary geotechnical recommendations related to the design of foundations for typical timber framed residential dwellings.

Our overall scope for the site was to assess and provide geotechnical guidance related to the proposed development of 191 residential lots, diversion of the existing stream, and stormwater basin design. Infinity Yaldhurst Limited has asked to provide a specific assessment for Stage 1 of the works which includes geotechnical guidance related to the proposed development of 41 residential lots in Stage 1. Our assessment for the remaining 150 lots will be provided in a separate report.

Our scope of works for Stage 1 included the following:

- Complete a desktop study of relevant available geotechnical and geological publications, including the New Zealand Geotechnical Database.
- Visit the site and undertake a geotechnical site walkover.
- Organise and technically supervise the excavation up to 11 test and associated Scala Penetrometer and Shear Vane tests to a maximum depth of 3 m below ground level (or to native gravel) including geotechnical logging of the exposed soils, to assess the near surface material types and strength characteristics.
- Preparation of this report outlining our findings on the ground conditions and the suitability of the site for residential subdivision of Stage 1 (41 lots). This includes geotechnical advice on the likely foundation Technical Category, conceptual foundation recommendations for typical timber-framed residential dwellings, and an assessment of the likely Geohazards required by Section 106 of the RMA.

2 Site Description

The overall development which includes Stage 1 of Yaldhurst Park covers approximately 16.1 hectares including proposed parks, reserves, roads and existing waterways. (Figure 1)

Stage 1 (approximately 4.3 hectares) is bound by existing residential development south of the site, lifestyle blocks and farmland west of the site, and further proposed stages of development to the north and east of the site. Sir John McKenzie Ave, which was previously formed during prior subdivision development, intersects the subdivision.

The predominantly flat, to gently undulating site is currently partially developed land with stockpiled silt, fill and unknown material observed in area ‘1C’ on the eastern side of the proposed development (blue outline, Figure 1).

A stream, on the south-western corner of the site, is planned to be diverted during earthworks. Parks and areas of recreation are planned to run adjacent to the stream (blue solid outline, Figure 1). There are no significant mapped watercourses mapped within the vicinity of the proposed development area.

Figure 1: Site Location and Subdivision Plan

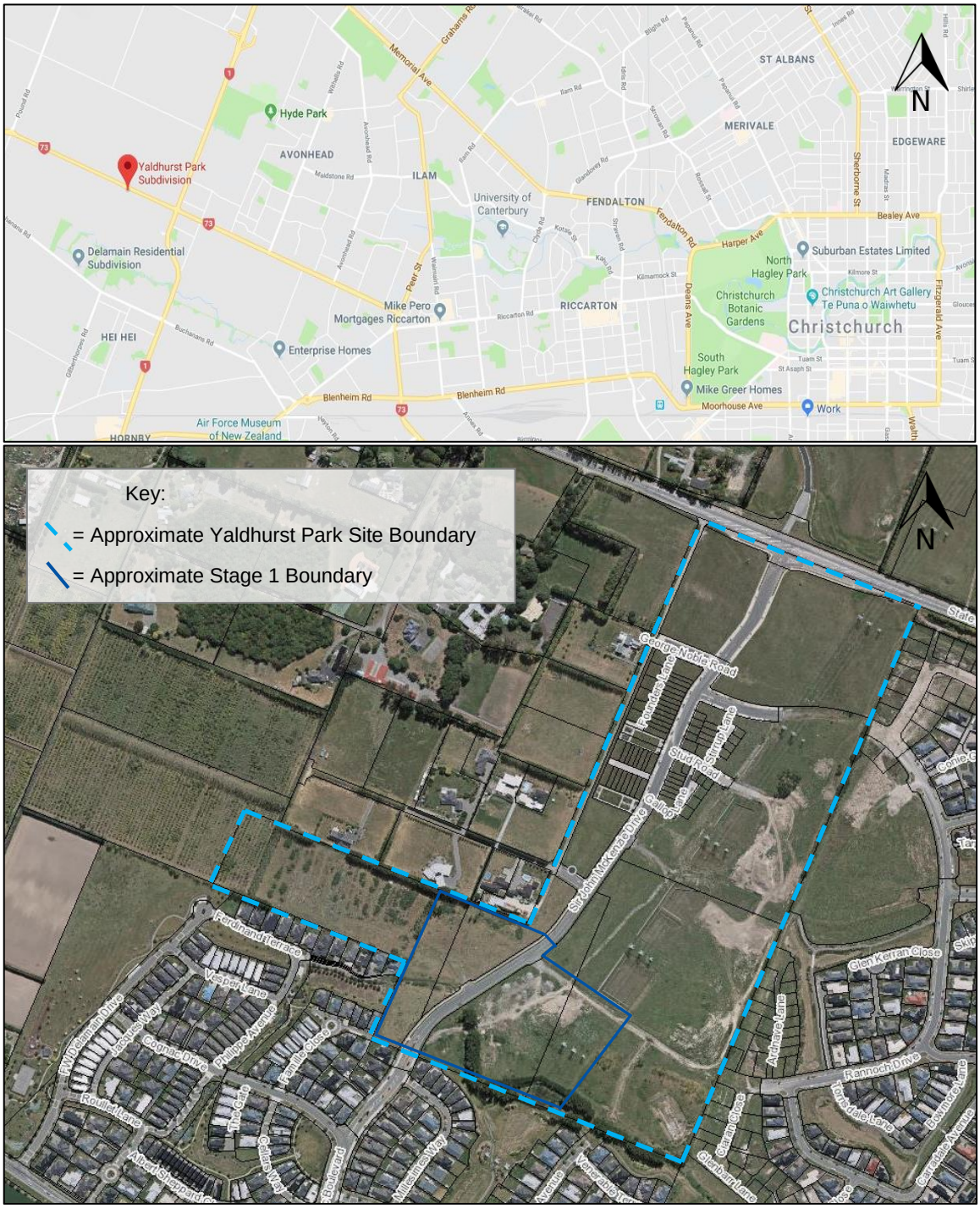


Image sourced from Canterbury Maps. Not to scale.

3 Development Proposal

Based on the Graham Surveying Limited Subdivision plan dated June 2018 (drawing number: GSL18036-CS-001) we understand that it is intended to subdivide stage 1 of the site into 41 residential lots with two areas of recreation (blue solid outline, Figure 2). Lot sizes vary between 395 m² to 1520 m². A stream with associated recreation and park areas intended for public use will be incorporated within the development footprint.

We anticipate that future earthworks at the site for the residential development in Stage 1 will be limited to minor cut and fill to form building platforms and access ways. We anticipate moderate cut and fill to divert and form the proposed new stream location and stormwater basins on the southern and eastern side of Stage 1.

Future buildings are anticipated to comprise conventional lightweight, timber framing and roof elements over a maximum of two-storeys.

Figure 2: Proposed Subdivision Development – Stage 1 (blue outline)

Image sourced from Graham Surveying proposed plans (Ref: GSL18036-CS-001 dated, 26 June 2018). Not to scale.

4 Published Geotechnical Information

4.1 Regional Geology

The site has been regionally mapped by by Brown and Weeber (1992) as being underlain by dominantly alluvial sand and silt overbank deposits (Figure 3) and by GNS (Forsyth et al., 2008) as being underlain by river alluvium.

Figure 3: Site Geology

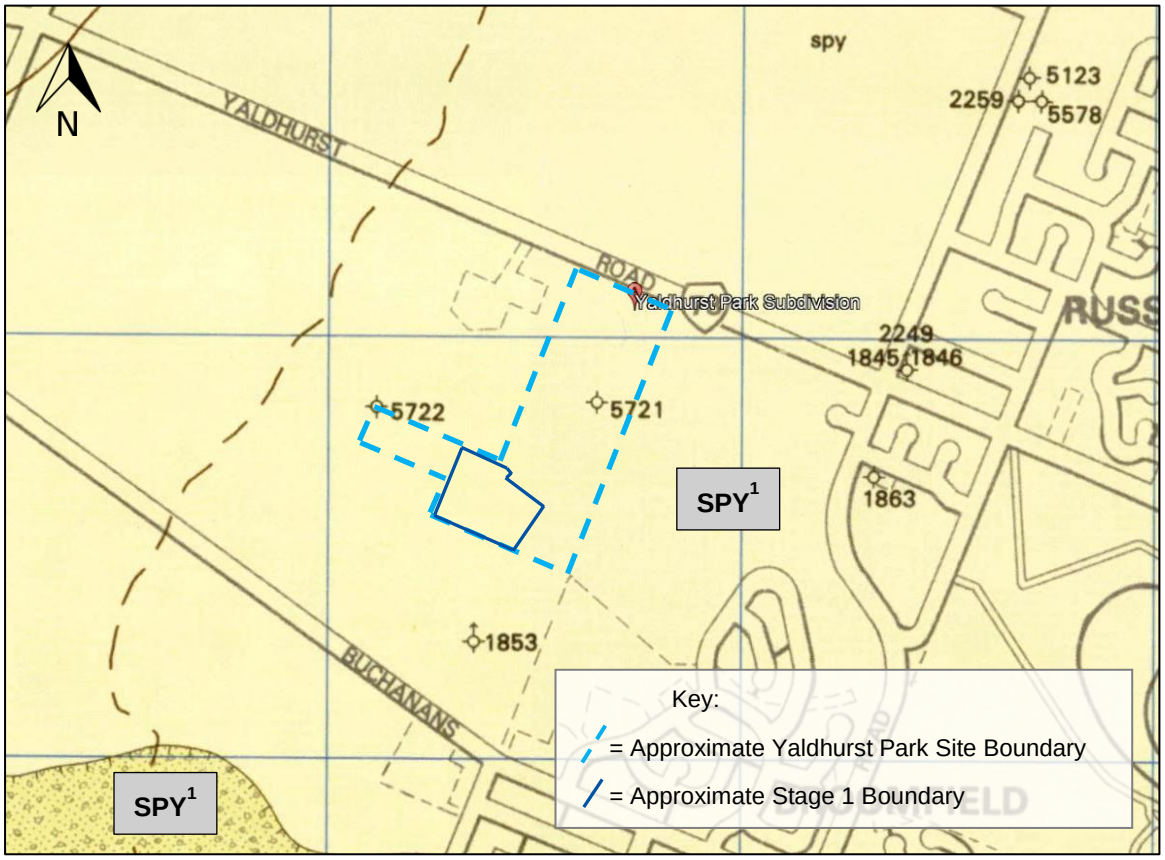


Image sourced from Google Earth with the Brown and Weeber (1992) map overlay sourced from the New Zealand Geotechnical Database (NZGD). Not to scale.

[1] SPY = Dominantly alluvial sand and silt overbank deposits

4.2 CERA Land Classification

The Canterbury Earthquake Recovery Authority (CERA, now disestablished) has categorised the site as 'N/A Urban Non-residential', meaning future development can proceed following normal consenting processes. While the site itself does not have a specific technical classification (TC) as it is not zoned residential, nearby residential sites are classified as TC1 where "future land damage from liquefaction is unlikely" and "shallow soil strength testing which is standard for all homes" is required (Figure 4).

Figure 4: MBIE Residential Technical Categories Overlay

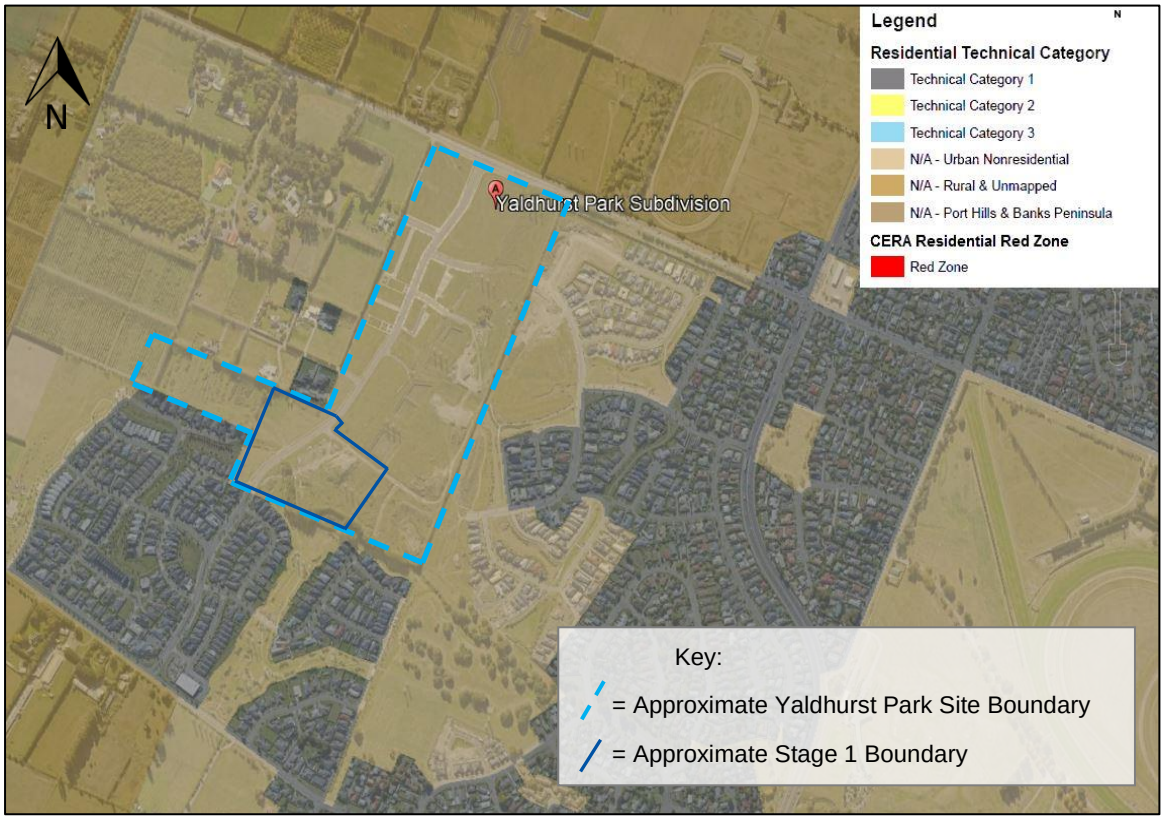


Image sourced from Google Earth with the MBIE Residential Technical Categories map overlay sourced from the New Zealand Geotechnical Database (NZGD). Not to scale.

4.3 New Zealand Geotechnical Database

Subsurface and Earthquake Specific Data

We have reviewed the NZGD and summarised the data relevant to this site in Tables 1 and 2.

Table 1: Summary of Near Site Investigations

CPT / Borehole Identifier	Position Relative to Site	Depth of Exploration (m)
BH_112631	100 m to the north	6.08
TP_93731	100 m to the north	2.7
TP_93730	100 m to the north	2.6
BH_72200	500 m to the south	5.27

Publicly available nearby test locations are shown in Figure 5.

Figure 5: Publicly Available Near-by Site Investigations

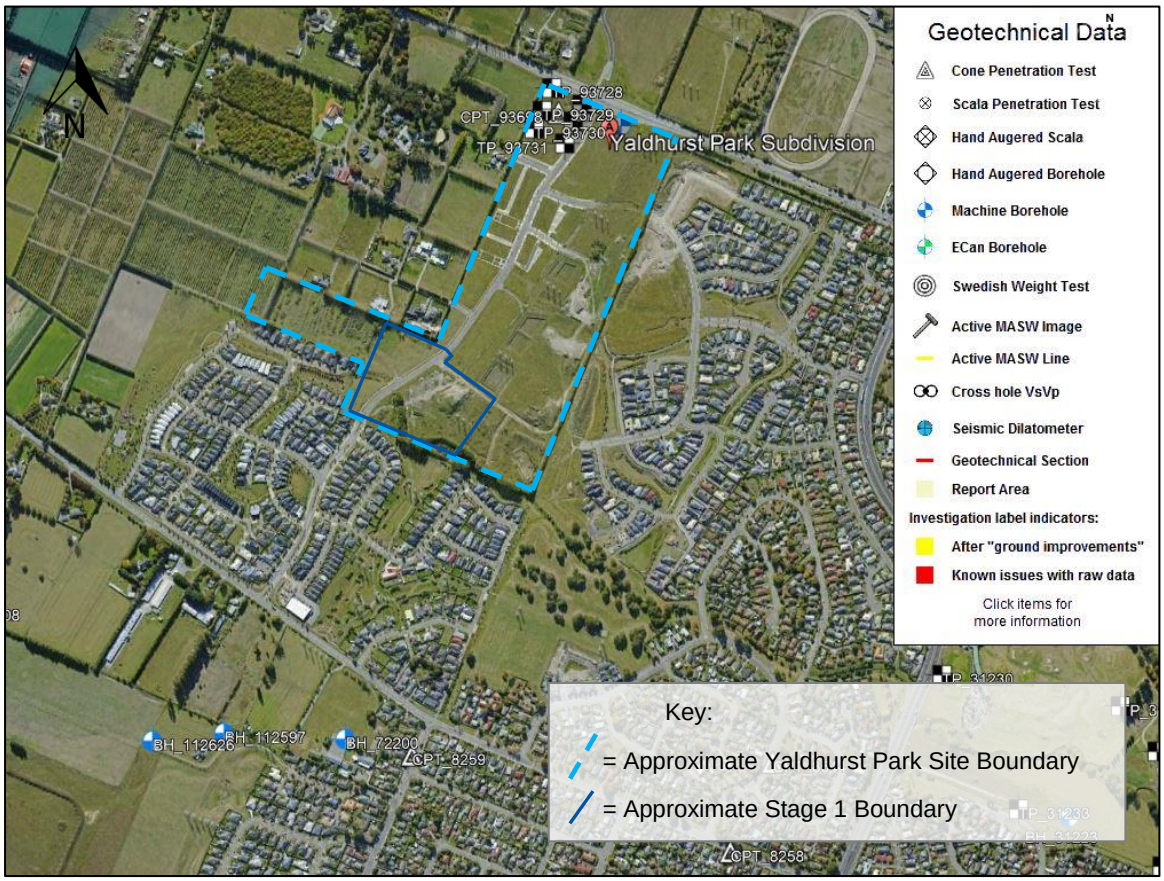


Image sourced from Google Earth with the Surrounding Investigation Data map overlay sourced from the New Zealand Geotechnical Database (NZGD). Not to scale.

Table 2: Summary of Earthquake Specific Data

	Events			
	4 Sept 2010 (Mw 7.1)	**22 Feb 2011 (Mw 6.2)**	**13 Jun 2011 (Mw 6.0)**	**23 Dec 2011 (Mw 5.9)**
Median PGA (g)	0.28	0.23	0.12	0.12
PGA Probable Range (g)1	0.17 to 0.41	0.13 to 0.35	0.07 to 0.19	0.07 to 0.19
PGA7.5 (g)2	0.25	0.16	0.08	0.08
170% of SLS	Sufficient	Not Sufficient	Not Sufficient	Not Sufficient
10th Percentile >SLS	Sufficient	Sufficient	Not Sufficient	Not Sufficient
Liquefaction and Lateral Spreading Observations (EQC)	No observed liquefaction ejecta (road observations)	No observed liquefaction ejecta (road observations)	No observed liquefaction ejecta (road observations)	No data available
Site Specific Aerial Photograph Liquefaction Interpretation3	No data available	No obvious evidence of liquefaction ejecta at the site or the surrounding area	No data available	No data available
Mapped Ground Cracks	No mapped cracks on site, or mapped within 150 m of the site.			

[1]Range for one standard deviation either side of the mean.

[2]Using Idriss and Boulanger (2008) magnitude scaling factor.

[3]Interpreted by ENGEO.

Groundwater

Groundwater has been regionally mapped by both GNS Science (GNS) and EQC to be greater than 6 m depth below the ground surface at the time of the 2010 - 2011 Canterbury earthquake sequence. The closest measurement well is approximately 1.5 km west and 1.5 km north of the site.

LiDAR and Ground Movement

EQC has prepared maps showing the change in surface elevation and horizontal deformation, as measured by a series of aerial LiDAR surveys. GNS has created a “dislocated tectonic contour model” which shows the tectonic uplift or subsidence on a regional level based on survey of discrete benchmarks on bedrock outcrops across the Canterbury region. Subtracting the tectonic component of vertical deformation from surveyed ground levels gives an indication of vertical deformation from soil subsidence.

LiDAR maps prepared for the EQC generally show a cumulative subsidence of approximately 0 to 100 mm across the site.

4.4 Historic Aerial Photography

We reviewed limited aerial photographs of the site dating back to 1941 and describe relevant observations below:

- Prior to 1941, the site appears to have been developed with a track for horse training and outside of the horse training track has been used for agricultural purposes. The stream locations observed in the 1941 aerial photography, appear to be in the same locations as present.
- Between 1941 and 1950, the size of the horse racing track increased (Figure 6).
- Between 1960 and 1970, a row of pylons had been constructed in the same location as the present location.
- Between 1980 and 1990, the site had been developed into an orchard (Figure 7).
- Between 2000 and 2011, the site had been cleared and the development begun for the existing subdivision.

Figure 6: 1950 Aerial Photography

Image sourced from Canterbury Maps with the 1950 aerial photo overlay. Not to scale.

Figure 7: 1990 Aerial Photography

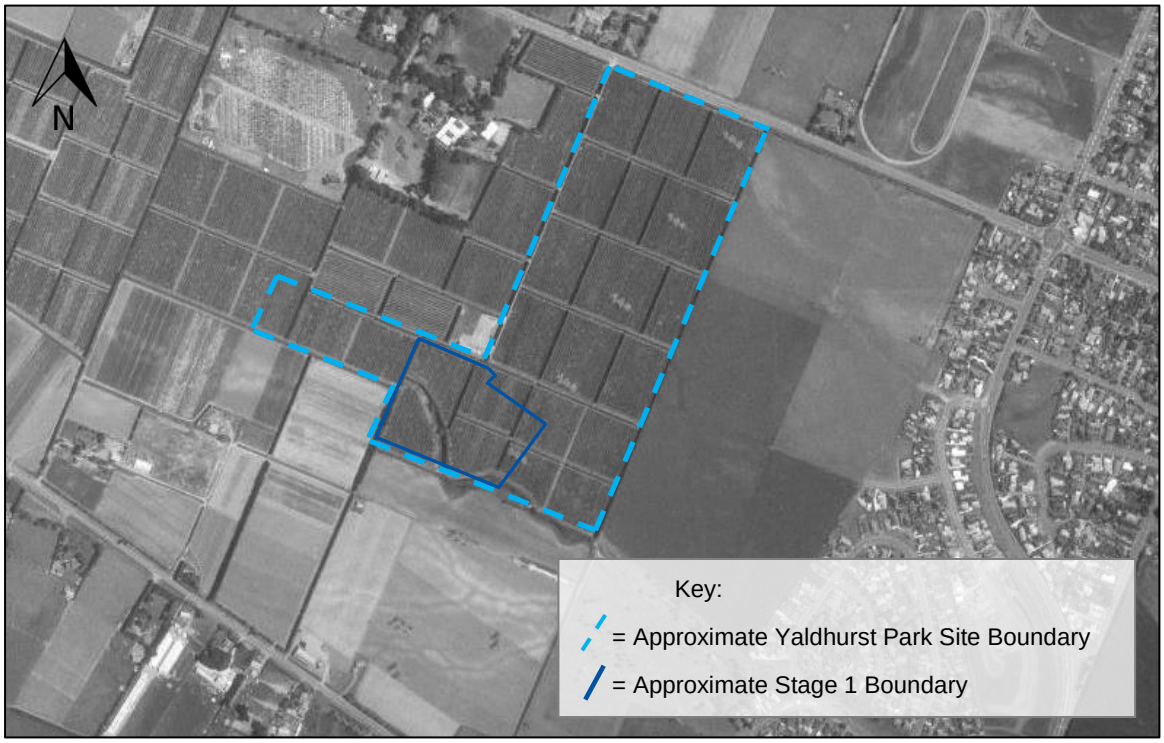


Image sourced from Canterbury Maps with the 1990 aerial photo overlay. Not to scale.

Figure 8: 2011 Aerial Photography

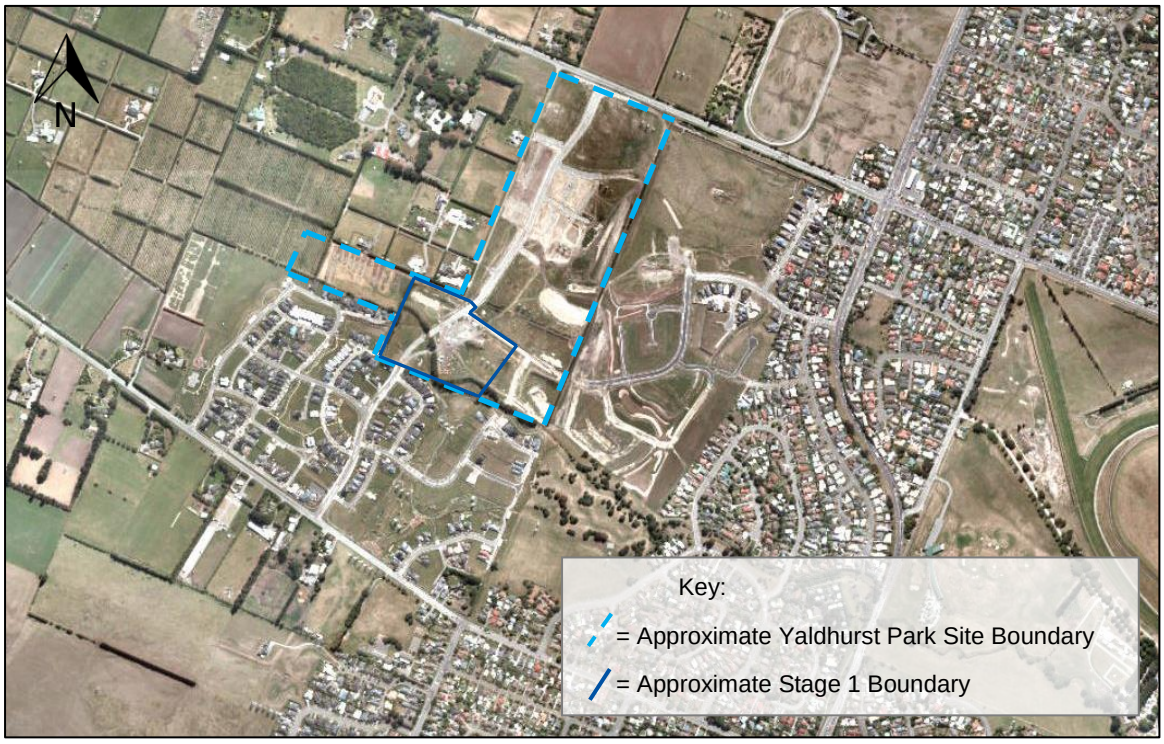


Image sourced from Canterbury Maps with the 2011 aerial photo overlay. Not to scale.

4.5 Minimum Floor Levels for Flood Mitigation

The Christchurch City Council (CCC) and CERA have released updated recommended floor levels for flood avoidance for properties in the Avon, Heathcote and Styx river catchments, as well as Sumner.

The site is located outside the “CCC City Plan – Flood Management Area”, and specific floor level recommendations are not provided by the Council. CCC should be contacted for specific floor level elevations related to the site, prior to finalised development.

5 Site Investigation

ENGEO visited the site on 24 October 2018 and made the following observations:

- Stage 1 of the subdivision is currently partially developed from the previous developer with some formed roads, partially formed roads, partially formed lots, public recreation areas and stormwater basins (Photo 1).
- A stream is running east to west on the southern side of stage 1 of the development and the base of the streambed is approximately 1.5 m below adjacent ground level (Photos 1 & 2). Approximately 200 mm to 400 mm of water was observed in the base of the stream at the time of our site visit. It was proposed by the client that the stream is planned to be diverted during the earthworks stage of development.
- A row of electrical tower pylons run through the proposed development with retention basins constructed adjacent to the pylons (Photo 3).
- In area 1C of Stage 1, a series of fill, silt and unknown material stockpiles were observed (Photo 4). Through discussions with the client, these stockpiles are to be removed or re-used (depending on soil type) during the proposed earthworks and development of the site.
- No obvious evidence of lateral stretch across the site was observed during our site visit, however, owing to the vegetation, stock piles, soft soil and machine activity on-site, minor ground cracks could have been concealed.
- No obvious signs of earthquake-induced land damage such as lateral spreading, sand boils or other features that we would associate with liquefaction, or fault rupture was observed at the time of our site visit.

Site photographs are presented in Figure 9.

Figure 9: Site Photographs

Photo 1: Stage 1 of Yaldhurst Park Subdivision development. Stream described above in the foreground (black arrow).

Photo 2: Stream observed on the south side of the stage 1 development.

Photo 3: Row of electrical tower pylons with adjacent stormwater retention basins observed. Silt and fill stockpiles observed in the foreground.

Photo 4: Silt, fill and unknown material stockpiles observed in section 1C of the proposed stage 1 development.

6 Subsurface Investigation

ENGEO completed a site investigation on 24 October 2018 to assess the shallow subsurface material types and strength characteristics within Stage 1 of the Yaldhurst Park Subdivision Development. The investigations comprised of 11 test pit investigations with associated Scala Penetrometer tests to assess the near surface soil types and strength characteristics. We also excavated a test pit in the location of the culvert where the stream is proposed to be relocated at the request of the client. The locations of all tests are shown in Figure 10 and our findings are detailed in the following sections.

Figure 10: Site Investigation Locations

The investigations revealed subsurface conditions across the site are consistent with the published geological mapping, as summarised in Table 3.

Table 3: Generalised Summary of Subsurface Conditions

Soil Type	Depth to top of layer (m)	Layer Thickness (m)	Density / Consistency	Comment
TOPSOIL / FILL	0.0	0.2 – 0.5	Firm to Stiff / Loose to Medium Dense	-
SILT / SAND	0.5	1.5 to 2.4	Stiff to Very Stiff / Loose to Dense	Varies between silt and sand depending on test pit location
GRAVEL	2.0 to 2.9	Unknown	Medium Dense to Very Dense (inferred)	-

Test pit locations are shown in Figure 10 and in the site plan presented in Appendix 1. Test pit logs, showing detailed soil descriptions are presented in Appendix 2.

6.1 ECan Boreholes

A review of five deep ECan borehole logs located onsite, M35/5721, M35/11334, M35/11335, M35/11336 and M35/11338 was conducted (Canterbury Maps). The location of these boreholes is presented in Figure 11 and includes well points that have no log data available. The logs from all five holes of interest are presented in Appendix 3 and indicate the site is underlain by gravel and sandy gravel with thin slit and clay layers to depths of at least 15 m below ground level.

6.2 ECan Groundwater

Groundwater is recorded in the surrounding ECan boreholes between approximately 13.9 m and 14.9 m depth.

Figure 11: Nearby ECan Borehole Locations

Image sourced from Canterbury Maps (November 2018). Not to scale.

6.3 Site Seismic Class

In accordance with NZS 1170.5:2004, site classification “Class D” applies to this particular site, defining it as a ‘deep soft soil site’.

7 Liquefaction Assessment

7.1 Canterbury Earthquake Sequence Ground Shaking

Bradley and Hughes (2012) have developed a contour map of the conditional median peak ground accelerations (PGA) interpolated from data measured at various recording stations during the 2010 - 2011 Canterbury earthquake sequence. The PGA contour map was created by combining the prediction from an empirical ground motion model of the fault rupture with the PGA recorded at strong motion sites. The conditional median PGA experienced at the site during the major Christchurch earthquake events using the published contour mapping are presented in Table 2.

Based on the model by Bradley and Hughes (2012), and earthquake magnitude scaling to M7.5, we can conclude, that the site, under the 10th percentile test, has undergone more than 170% of the serviceability limit state (SLS) level seismic event for the September 2010 and February 2011 earthquake event. According to Appendix D1 of the MBIE Guidance, the site can therefore be regarded as having been sufficiently tested for a SLS event.

7.2 Technical Classification - Stage 1 of Yaldhurst Park Development

Based on our site investigation and observations, and 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 low within Stage 1 of the Yaldhurst Park Subdivision.

We therefore consider that Stage 1 of the proposed subdivision to have Technical Category 1 (TC1) future land performance where by future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.

8 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 the land is likely to be subject to the following:

- Erosion, including surface and subsurface erosion, associated with water and wind.
- Falling debris, including rockfall that could impact the site from upslope sources.
- Subsidence, which involves the removal of underlying support by natural or artificial means.
- Slippage, which is defined as the downslope transfer of materials by sliding and / or flowage.
- Inundation, which may be sourced from streams, coastal processes or excess precipitation.

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 any of the above hazards and, as such, the site is considered suitable for subdivision from a geotechnical perspective.

9 Geotechnical Recommendations

9.1 Earthworks

For planning purposes, house footprints should be set back at least 10 m from any water course. 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 Earthfilling for Residential Development. In particular, any areas to receive fill should be stripped of any vegetation, topsoil, non-engineered fill, soft or organic soils prior to fill placement.

Fill may comprise clean natural sandy gravel, sandy 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 2:1 (horizontal to vertical) and higher than 600 mm should be retained or specifically designed 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.

Where the stream in planned to be diverted, directly effecting Lots 105 and 106, any soft, wet, and organic soils should be removed prior to placement of engineered fill. The engineered fill should be benched into the sides of the former stream bank and the differential fill thickness under specific building footprints should be less than 1.5 m. We will provide a subsequent document with specific earthworks recommendations for the proposed diversion of the stream.

All unretained batters of pond and stormwater drains constructed with the native silty, sandy, or 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.

9.2 Subdivision Roading

Vegetation, any organic or deleterious material, topsoil and non-engineered fill should be removed from under pavement areas 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. However, specific testing of the roadway subgrade should be accomplished to provide CBR values that can be utilised for the design of the roadways

9.3 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.

9.4 Foundations

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

An Ultimate Bearing Capacity of 200 kPa may be assumed for foundations bearing on native sandy or silty soils, or engineered fill, below any topsoil. We anticipate the bearing layer to be between 0.2 m to 0.5 m depth based on our subsurface investigations.

Lot specific testing should be accomplished as part of the design level geotechnical report and subgrade conditions should be confirmed during construction by a suitably qualified geotechnical professional.

10 References

Bradley, B. A. (2012). Conditional Peak Ground Accelerations in the Canterbury Earthquakes for Conventional Liquefaction Assessment. Technical Report prepared for the Department of Building and Housing.

Brown, L.J. & Weeber, J.H. (1992). Geology of the Christchurch Urban Area 1:250,000. CGD5122. Institute of Geological and Nuclear Sciences.

Canterbury Earthquake Recovery Authority. (2013). New Zealand Geotechnical Database. Retrieved November 2018, from https://canterburyrecovery.projectorbit.com/cgd

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, Earthquake Commission. (n.d.). Aftershocks. Retrieved 2018, from Geonet: www.geonet.org.nz/canterbury-quakes/aftershocks

Idriss and Boulanger. (2008). Soil Liquefaction during Earthquakes - EERI Monograph MNO12.

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.

11 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, Infinity Yaldhurst Limited, 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.

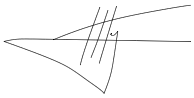
iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

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



Hamish Foy

Geotechnical Engineer

Report reviewed by

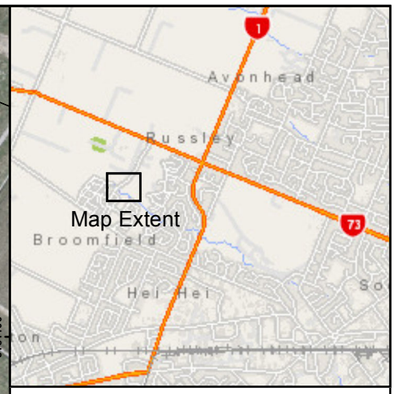
Don Bruggers, CMEngNZ (CPEng)

Principal Engineer

APPENDIX 1:

Test Pits

DATE PLOTTED: 09 November 2018 10:27:00 a.m. BY: rwilliams



Legend

- Test pit
- Culvert
- Stage 1 boundary
- Property title boundary

Aerial: LINZ and Eagle Technology, CC-BY-3.0-NZ.
Map image: Eagle Technology, CC-BY-3.0-NZ.
Development image: Graham Surveying
GSL18036-CS-001 Rev3

0 60
Metres

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

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Title:
Stage 1 Investigation

Client: Infinity Yaldhurst Limited		Figure No:
Project: Yaldhurst Park, Yaldhurst Road, Christchurch	Designed: HF Drawn: RW Checked: XX Date: Nov 18	1 Size: A3
Proj No: 15518.000.000	Scale: 1:1,200	Revision: A

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APPENDIX 2:

Yaldhurst Park Test Pit Logs

LOG OF TEST PIT TP12

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 2.2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.522865
Longitude : 172.523295

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	FILL		ML	SILT with minor fine sand and gravel; brown. Low plasticity [FILL].				F		
0.5	ALLUVIUM		ML	SILT with some sand; brownish grey. Low plasticity. Sand, fine to medium.			M	F - St		
1.0										
1.5			ML	Sandy SILT; brownish grey. Low plasticity. Sand, fine to medium.				St - VSt		
2.0			GW	Fine to coarse GRAVEL with some sand and minor cobbles; grey. Well graded, subrounded to rounded. Sand, fine to medium.				MD - D		
2.5				Depth of Excavation: 2.2 m Termination Condition: Target depth						
3.0										
3.5										

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

F = FILL

LOG OF TEST PIT TP13

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 3 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.522658
Longitude : 172.522731

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)
0.0	FILL		ML	SILT with minor fine sand and gravel; brown. Low plasticity [FILL].				F	
0.5	ALLUVIUM		ML	SILT with some sand; brownish grey. Low plasticity. Sand, fine to medium.				St	
1.0									
1.5			ML	Sandy SILT; brownish grey. Low plasticity. Sand, fine to medium.			M	St - VSt	
2.0									
2.5			GW	Fine to coarse GRAVEL with some sand and minor cobbles; grey. Well graded, subrounded to rounded. Sand, fine to medium.				MD - D	
3.0				Depth of Excavation: 3 m Termination Condition: Target depth					
3.5									

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

LOG OF TEST PIT TP14

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 2.8 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.52309
Longitude : 172.522098

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	FILL		GP	Medium to coarse GRAVEL with minor silt; dark brown. Poorly graded, subrounded to rounded [FILL].				L - MD		
0.5	ALLUVIUM		ML	SILT with minor sand; brownish grey. Low plasticity. Sand, fine to medium.			M	St - VSt		
1.0										
1.5				Sand becomes some from 1.4 m depth.						
2.0										
2.5										
3.0				Depth of Excavation: 2.8 m Termination Condition: Target depth						
3.5										

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

Difficult to excavate, increasing with depth. Located beneath stockpile

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP15

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 2.6 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.523072
Longitude : 172.522567

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	FILL		ML	SILT with some gravel and trace rootlets; brown. Low plasticity. Gravel, fine to coarse, sub rounded to rounded [FILL].			St			
0.5	ALLUVIUM		SM	Silty fine to medium SAND; brownish grey. Poorly graded.			MD			
1.5			ML	SILT with minor fine sand; brownish grey. Low plasticity.			St - VSt			
2.5				Depth of Excavation: 2.6 m Termination Condition: Target depth						

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

Difficult to excavate, increasing with depth. Located beneath stockpile

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP16

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 2.8 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.523367
Longitude : 172.522588

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	FILL		ML	SILT with some gravel and trace rootlets; brown. Low plasticity. Gravel, fine to coarse, sub rounded to rounded [FILL].				St		
0.5	ALLUVIUM		SM	Fine to medium SAND with minor silt; brownish grey. Poorly graded.			M	MD		
1.5			ML	SILT with trace fine sand; brownish grey. Low plasticity.				MD - D		
2.8				Depth of Excavation: 2.8 m Termination Condition: Target depth						

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP17

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 2.8 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.522327
Longitude : 172.522145

Depth (m)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	TS		ML	SILT with minor fine sand and trace rootlets; brown. Low plasticity [TOPSOIL].				St		
0.5	ALLUVIUM		ML	SILT with minor fine sand; brownish grey. Low plasticity.				St		
1.0										
1.5										
2.0			SP	Fine to medium SAND with minor silt; brownish grey. Poorly graded.				MD		
2.5			GW	Fine to coarse GRAVEL with some sand, minor cobbles; grey. Well graded, sub rounded - rounded. Sand, fine to coarse.				MD - D		
3.0				Depth of Excavation: 2.8 m Termination Condition: Target depth						
3.5										

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

TS = TOPSOIL

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP18

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 24/10/18
Max Test Pit Depth : 2.6 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.522631
Longitude : 172.521835

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	TS		ML	SILT with minor fine sand; brown. Low plasticity [TOPSOIL].				St		
0.5	ALLUVIUM		ML	SILT with some fine sand; brownish grey. Low plasticity.			M	St - VSt		
2.5			GW	Fine to coarse GRAVEL with some silt, minor cobbles and sand; grey. Well graded, sub rounded - rounded. Sand, fine to coarse.				MD - D		
3.0				Depth of Excavation: 2.6 m Termination Condition: Target depth						
3.5										

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

TS = TOPSOIL

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP19

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 25/10/18
Max Test Pit Depth : 3 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.522112
Longitude : 172.521431

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0 – 0.5	TOPSOIL		ML	SILT with minor fine sand; brown. Low plasticity [TOPSOIL].				St		
0.5 – 2.5	ALLUVIUM		ML	SILT with some fine sand; brownish grey. Low plasticity.			M	St - VSt		
2.5 – 3.0	ALLUVIUM		GW	Fine to coarse GRAVEL with some silt, minor cobbles and sand; grey. Well graded, sub rounded - rounded. Sand, fine to coarse.				MD - D		

Depth of Excavation: 3 m
Termination Condition: Target depth

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP20

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 25/10/18
Max Test Pit Depth : 1.4 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude :
Longitude :

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TOPSOIL		ML	SILT with minor fine sand; brown. Low plasticity [TOPSOIL].				F - St		
0.5	FILL		ML	SILT with some fine sand; brown with orange and grey speckles. Low Plasticity [FILL].				St - VSt		
1.0	ALLUVIUM		ML	SILT with minor fine sand; brownish grey. Low plasticity.			M	VSt		
1.5			GW	Fine to coarse GRAVEL with some silt, minor cobbles and sand; grey. Well graded, sub rounded - rounded. Sand, fine to coarse.				MD - D		
2.0				Depth of Excavation: 1.4 m Termination Condition: Target depth						
2.5										
3.0										
3.5										

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP40

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 26/10/18
Max Test Pit Depth : 2.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.522805
Longitude : 172.520894

Depth (m)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)
0.0	TS		ML	SILT with minor fine sand and trace rootlets; brown. Low plasticity [TOPSOIL].				St	
0.3	ALLUVIUM		ML	Sandy SILT; brownish grey. Low plasticity. Sand, fine to medium.				St	
0.5			SP	Fine to medium SAND with minor silt; brownish grey. Poorly graded.				MD	
1.2			ML	SILT with some sand; brownish grey. Low plasticity. Sand, fine to medium.			M	St - VSt	
2.9			GW	Fine to coarse GRAVEL with some sand, minor cobbles; grey. Well graded, sub rounded - rounded. Sand, fine to coarse.				MD - D	

Depth of Excavation: 2.9 m
Termination Condition: Target depth

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

TS = TOPSOIL

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

LOG OF TEST PIT TP41

Yaldhurst Park Subdivision
Yaldhurt Park Subdivision
Yaldhurst, Christchurch
15518.000.000

Client : Infinity Yaldhurst Limited
Date : 26/10/18
Max Test Pit Depth : 2.9 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No : NA
Logged By : HB
Reviewed By : HF
Latitude : -43.523295
Longitude : 172.520629

Depth (m)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	FILL		ML	SILT with minor fine sand and trace rootlets; brown. Low plasticity [TOPSOIL].				St		
0.5	ALLUVIUM		ML	SILT with minor fine sand; brownish grey. Low plasticity.				St		
1.0			ML	Sandy SILT; brownish grey. Low plasticity. Sand, fine to medium.				St - VSt		
2.0										
2.5			GW	Fine to coarse GRAVEL with some sand, minor cobbles; grey. Well graded, sub rounded - rounded. Sand, fine to coarse.				MD - D		
3.0				Depth of Excavation: 2.9 m Termination Condition: Target depth						
3.5										

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

Test Pit met target depth
Scala Penetrometer met target depth
Standing groundwater was not encountered

TS = TOPSOIL

GEOSCIENCE TEST PIT LOG YALDHURST PARK TEST PITS.GPJ NZ MASTER DATA TEMPLATE.GDT 9-11-18

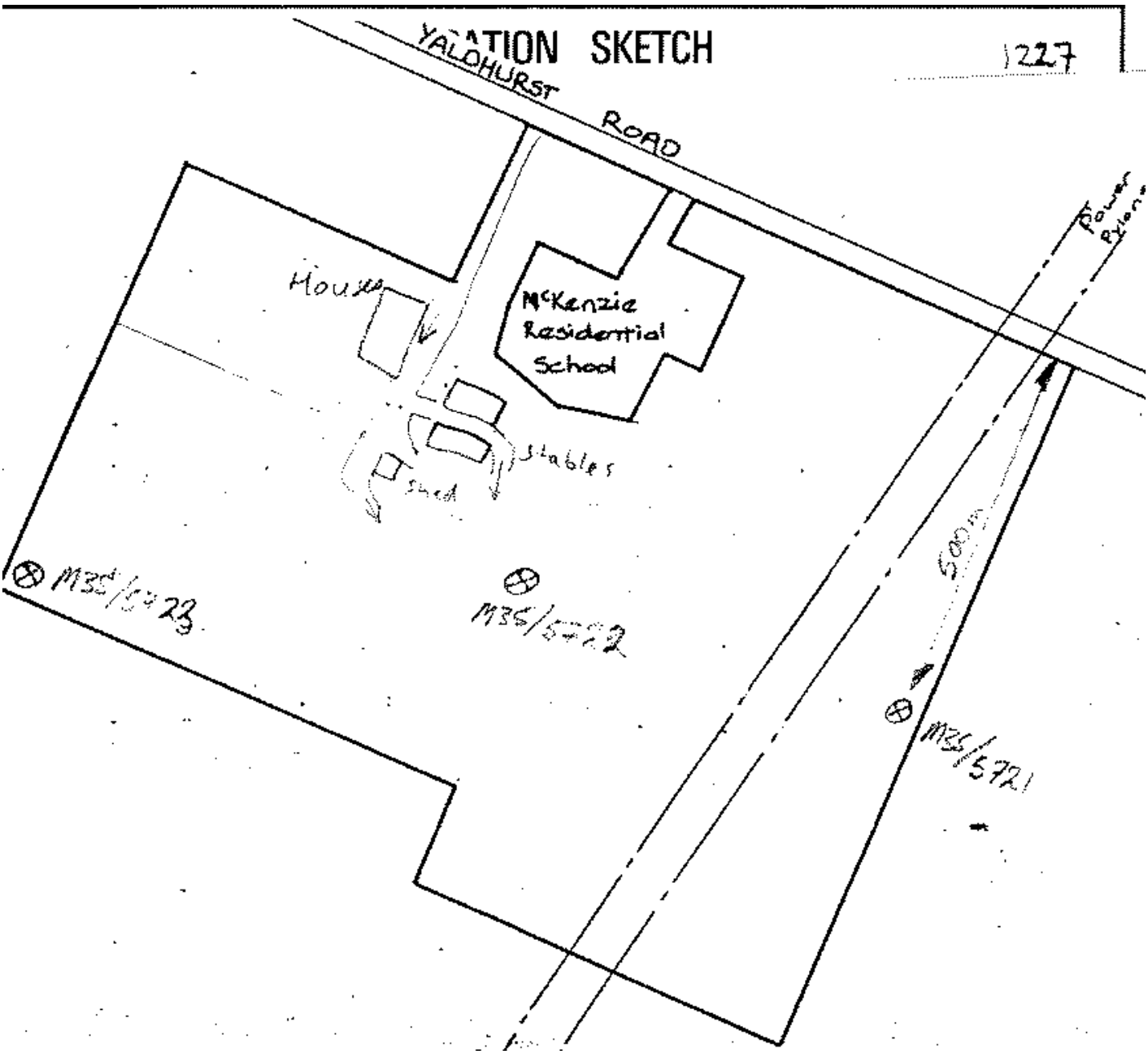
APPENDIX 3:

ECan Logs

Bore or Well No	M35/5721
Well Name	YALDHURST RD
Owner	HANKLEY HOLDINGS LTD

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Well Number	M35/5721	**File Number**	CO6C/02514
Owner	HANKLEY HOLDINGS LTD	**Well Status**	Not Used
Street/Road	YALDHURST RD	**NZTM Grid Reference**	BX23:61692-81277
Locality	YALDHURST	**NZTM X and Y**	1561692 - 5181277
Location Description	EAST OF PYLONS	**Location Accuracy**	50 - 300m
CWMS Zone	Christchurch - West Melton	**Use**	Irrigation,
Groundwater Allocation Zone	Christchurch/West Melton	**Water Level Monitoring**	--
Depth	33.30m	**Water Level Count**	0
Diameter	250mm	**Initial Water Level**	13.89m below MP
Measuring Point Description		**Highest Water Level**	
Measuring Point Elevation	31.20m above MSL (Lyttelton 1937)	**Lowest Water Level**	
Elevation Accuracy	< 2.5 m	**First reading**	
Ground Level	0.00m above MP	**Last reading**	
Strata Layers	14	**Calc Min 95%**	14.90m below MP
Aquifer Name	Riccarton Gravel	**Aquifer Tests**	0
Aquifer Type	Unknown	**Yield Drawdown Tests**	1
Drill Date	20 Jun 1988	**Max Tested Yield**	20 l/s
Driller	McMillan Drilling Ltd	**Drawdown at Max Tested Yield**	4 m
Drilling Method	Cable Tool	**Specific Capacity**	4.46 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	30.3	33.3				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
20 Jun 1988	1	20	263.963684	4.48	0

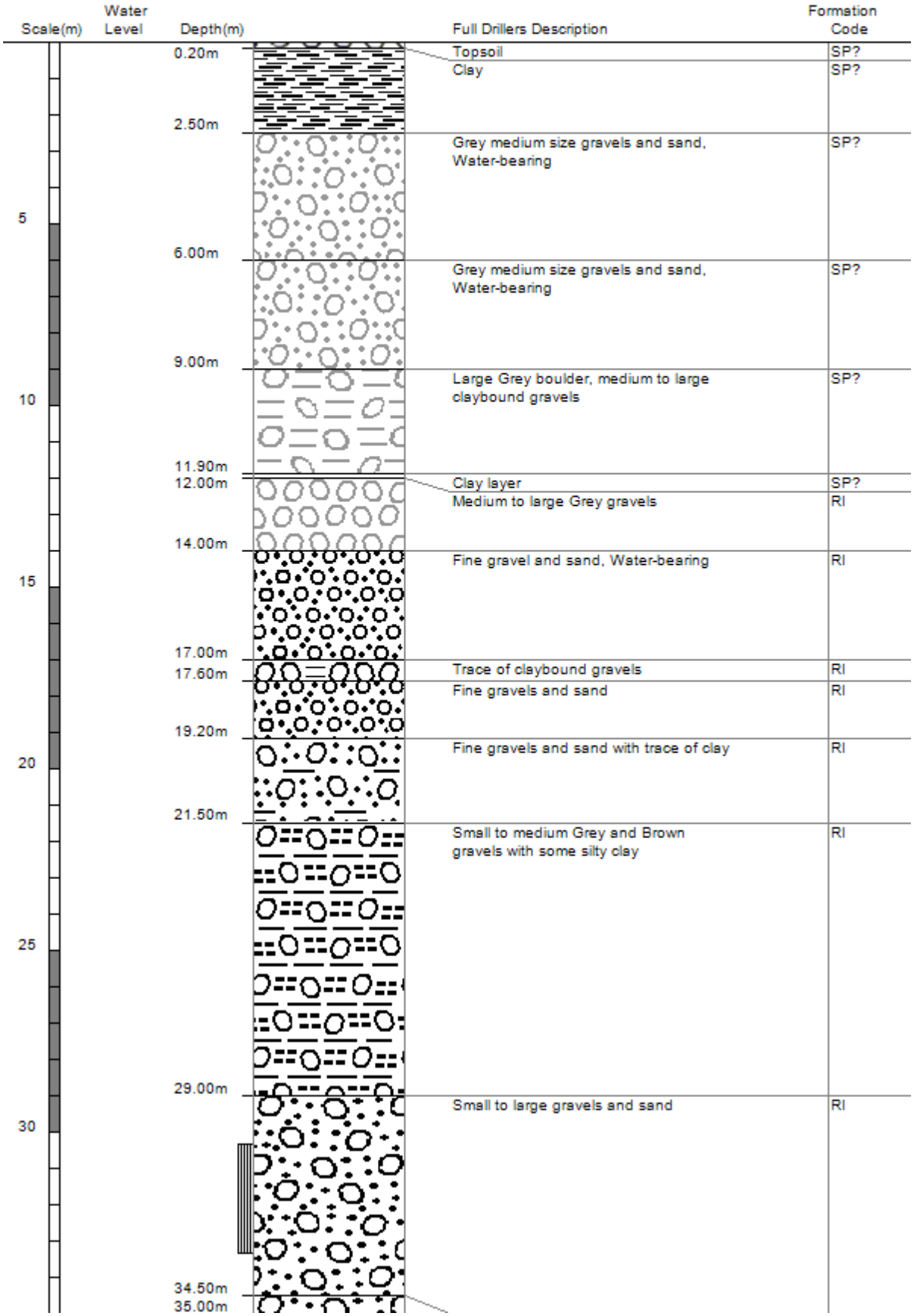
Comments

Comment Date	Comment
	ALSO M35/5722,5723

Bore Log

Borelog for well M35/5721

Grid Reference (NZTM): 1561693 mE, 5181277 mN
Location Accuracy: 50 - 300m
Ground Level Altitude: 31.2 m +MSD Accuracy: < 2.5 m
Driller: McMillan Drilling Ltd
Drill Method: Cable Tool
Borelog Depth: 35.0 m Drill Date: 20-Jun-1988



Bore or Well No	M35/11334
Well Name	Yaldhurst Road
Owner	Enterprise Homes

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Well Number	M35/11334	**File Number**	
Owner	Enterprise Homes	**Well Status**	Filled in
Street/Road	Yaldhurst Road	**NZTM Grid Reference**	BX23:61543-81327
Locality	Yaldhurst/Masham	**NZTM X and Y**	1561543 - 5181327
Location Description		**Location Accuracy**	10 - 50m
CWMS Zone	Christchurch - West Melton	**Use**	Geotechnical / Geological Investigation,
Groundwater Allocation Zone	Christchurch/West Melton	**Water Level Monitoring**	--
Depth	3.00m	**Water Level Count**	0
Diameter		**Initial Water Level**	
Measuring Point Description		**Highest Water Level**	
Measuring Point Elevation	32.00m 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 95%**	
Aquifer Name	Springston Formation	**Aquifer Tests**	0
Aquifer Type		**Yield Drawdown Tests**	0
Drill Date	18 Feb 2004	**Max Tested Yield**	
Driller		**Drawdown at Max Tested Yield**	
Drilling Method	Unknown	**Specific Capacity**	
Casing Material		**Last Updated**	04 Sep 2006
Pump Type		**Last Field Check**	
Water Use Data	No		

No screen data for this well

No step tests for this well

Comments

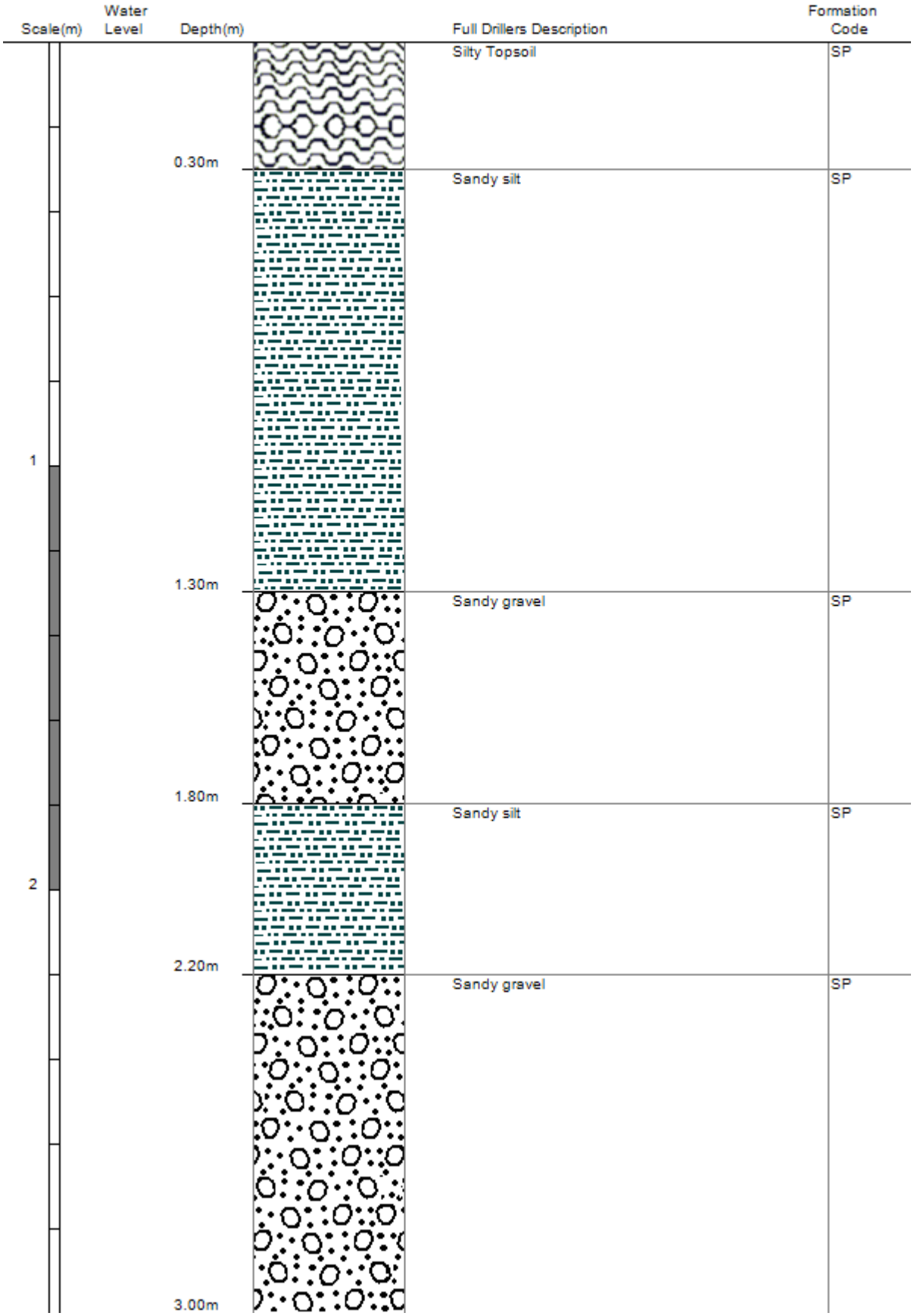
Comment Date	Comment
07 Apr 2006	Site investigation for proposed subdivision by Eliot Sinclair & Partners (Borelog 6 Yaldhurst/Masham RMA S293 Report)

Bore Log

Borelog for well M35/11334

Grid Reference (NZTM): 1561543 mE, 5181327 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 32.0 m +MSD Accuracy: < 2.5 m
Driller:
Drill Method:
Borelog Depth: 3.0 m Drill Date: 18-Feb-2004

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Bore or Well No	M35/11335
Well Name	Yaldhurst Road
Owner	Enterprise Homes

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Well Number	M35/11335	**File Number**	
Owner	Enterprise Homes	**Well Status**	Filled in
Street/Road	Yaldhurst Road	**NZTM Grid Reference**	BX23:61603-81097
Locality	Yaldhurst/Masham	**NZTM X and Y**	1561603 - 5181097
Location Description		**Location Accuracy**	10 - 50m
CWMS Zone	Christchurch - West Melton	**Use**	Geotechnical / Geological Investigation,
Groundwater Allocation Zone	Christchurch/West Melton	**Water Level Monitoring**	--
Depth	4.40m	**Water Level Count**	0
Diameter		**Initial Water Level**	
Measuring Point Description		**Highest Water Level**	
Measuring Point Elevation	31.00m 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 95%**	
Aquifer Name	Springston Formation	**Aquifer Tests**	0
Aquifer Type		**Yield Drawdown Tests**	0
Drill Date	18 Feb 2004	**Max Tested Yield**	
Driller		**Drawdown at Max Tested Yield**	
Drilling Method	Unknown	**Specific Capacity**	
Casing Material		**Last Updated**	04 Sep 2006
Pump Type		**Last Field Check**	
Water Use Data	No		

No screen data for this well

No step tests for this well

Comments

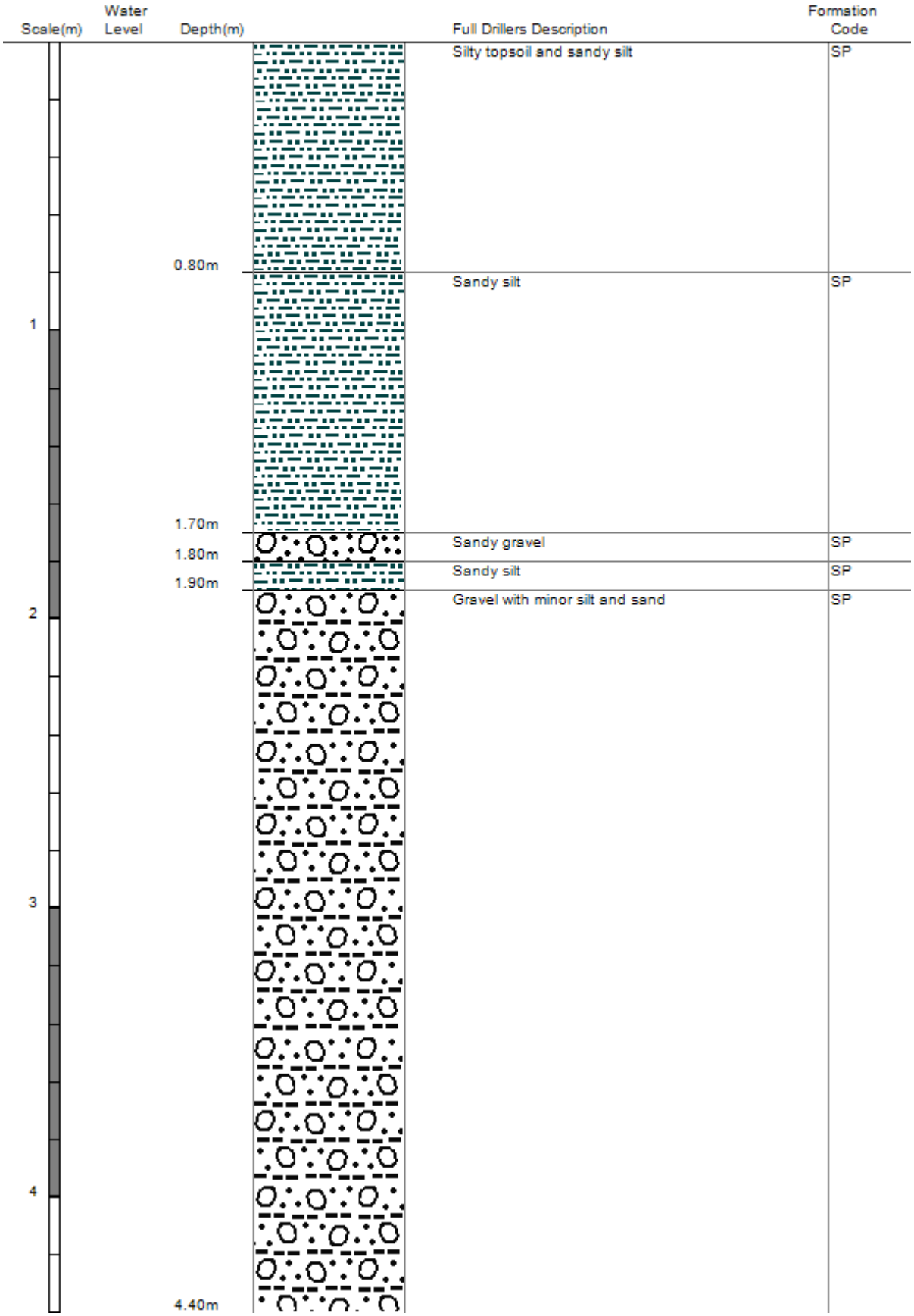
Comment Date	Comment
07 Apr 2006	Site investigation for proposed subdivision by Eliot Sinclair & Partners (Borelog 7 Yaldhurst/Masham RMA S293 Report)

Bore Log

Borelog for well M35/11335

Grid Reference (NZTM): 1561603 mE, 5181098 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 31.0 m +MSD Accuracy: < 2.5 m
Driller:
Drill Method:
Borelog Depth: 4.4 m Drill Date: 18-Feb-2004

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Bore or Well No	M35/11336
Well Name	Yaldhurst Road
Owner	Enterprise Homes

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Well Number	M35/11336	**File Number**	
Owner	Enterprise Homes	**Well Status**	Filled in
Street/Road	Yaldhurst Road	**NZTM Grid Reference**	BX23:61563-80997
Locality	Yaldhurst/Masham	**NZTM X and Y**	1561563 - 5180997
Location Description		**Location Accuracy**	10 - 50m
CWMS Zone	Christchurch - West Melton	**Use**	Geotechnical / Geological Investigation,
Groundwater Allocation Zone	Christchurch/West Melton	**Water Level Monitoring**	--
Depth	2.20m	**Water Level Count**	0
Diameter		**Initial Water Level**	
Measuring Point Description		**Highest Water Level**	
Measuring Point Elevation	31.00m above MSL (Lyttelton 1937)	**Lowest Water Level**	
Elevation Accuracy	< 2.5 m	**First reading**	
Ground Level	0.00m above MP	**Last reading**	
Strata Layers	3	**Calc Min 95%**	
Aquifer Name	Springston Formation	**Aquifer Tests**	0
Aquifer Type		**Yield Drawdown Tests**	0
Drill Date	18 Feb 2004	**Max Tested Yield**	
Driller		**Drawdown at Max Tested Yield**	
Drilling Method	Unknown	**Specific Capacity**	
Casing Material		**Last Updated**	04 Sep 2006
Pump Type		**Last Field Check**	
Water Use Data	No		

No screen data for this well

No step tests for this well

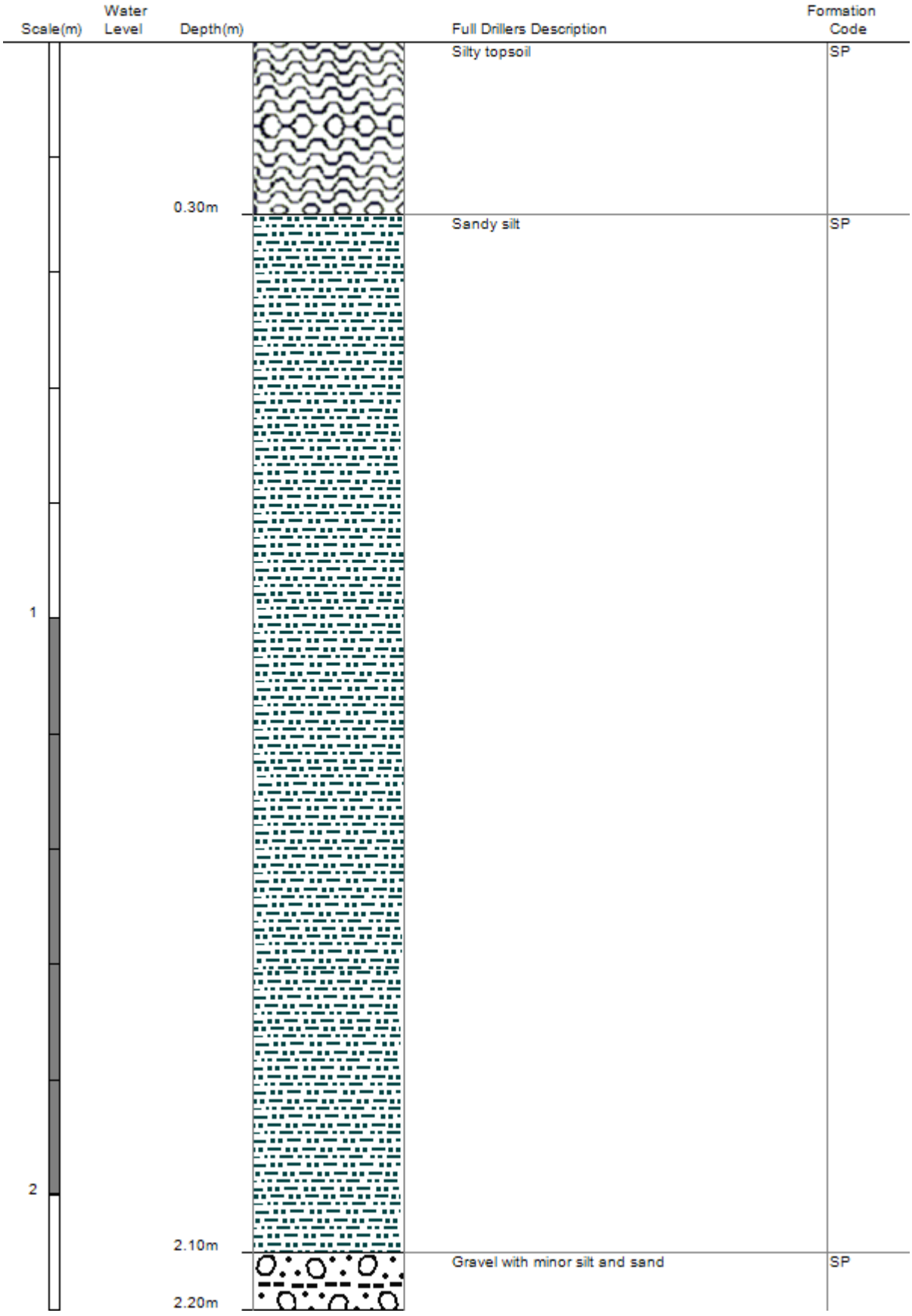
Comments

Comment Date	Comment
07 Apr 2006	Site investigation for proposed subdivision by Eliot Sinclair & Partners (Borelog 8 Yaldhurst/Masham RMA S293 Report)

Bore Log

Borelog for well M35/11336

Grid Reference (NZTM): 1561563 mE, 5180998 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 31.0 m +MSD Accuracy: < 2.5 m
Driller:
Drill Method:
Borelog Depth: 2.2 m Drill Date: 18-Feb-2004



Bore or Well No	M35/11338
Well Name	Buchanans Road
Owner	Burrow J

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Well Number	M35/11338	**File Number**	
Owner	Burrow J	**Well Status**	Filled in
Street/Road	Buchanans Road	**NZTM Grid Reference**	BX23:61413-80887
Locality	Yaldhurst/Masham	**NZTM X and Y**	1561413 - 5180887
Location Description		**Location Accuracy**	10 - 50m
CWMS Zone	Christchurch - West Melton	**Use**	Geotechnical / Geological Investigation,
Groundwater Allocation Zone	Christchurch/West Melton	**Water Level Monitoring**	--
Depth	5.50m	**Water Level Count**	0
Diameter		**Initial Water Level**	
Measuring Point Description		**Highest Water Level**	
Measuring Point Elevation	31.00m above MSL (Lyttelton 1937)	**Lowest Water Level**	
Elevation Accuracy	< 2.5 m	**First reading**	
Ground Level	0.00m above MP	**Last reading**	
Strata Layers	3	**Calc Min 95%**	
Aquifer Name	Springston Formation	**Aquifer Tests**	0
Aquifer Type		**Yield Drawdown Tests**	0
Drill Date	08 Mar 2004	**Max Tested Yield**	
Driller		**Drawdown at Max Tested Yield**	
Drilling Method	Unknown	**Specific Capacity**	
Casing Material		**Last Updated**	04 Sep 2006
Pump Type		**Last Field Check**	
Water Use Data	No		

No screen data for this well

No step tests for this well

Comments

Comment Date	Comment
07 Apr 2006	Site investigation for proposed subdivision by Eliot Sinclair & Partners (Borelog 10 Yaldhurst/Masham RMA S293 Report)

Bore Log

Borelog for well M35/11338

Grid Reference (NZTM): 1561413 mE, 5180888 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 31.0 m +MSD Accuracy: < 2.5 m
Driller:
Drill Method:
Borelog Depth: 5.5 m Drill Date: 08-Mar-2004

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha