BASELINEGROUP

Appendix 4: Geotechnical Report

Geotechnical Report

Hoskyns Road, Kirwee

Proposed Subdivision
Lot 1 DP 350121 (CT 205192)
and
Lot 2 DP 350121 (CT 205193)

Prepared for Bealey Developments Limited

May 2013

Davis Ogilvie
Professionals
Engineers • Surveyors • Planners

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Quality Assurance

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Client:	Bealey Developments Limited
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Davis Ogilvie

Disclaimer

This engineering report has been prepared at the specific instruction of Bealey Developments. It addresses geotechnical conditions onsite, provides estimates of liquefaction induced settlement and lateral spreading for the proposed 45 lot subdivision of Lot 1 DP 350121 and Lot 2 DP 350121 Certificate of Title 205192 and 205193 respectively.

Davis Ogilvie did not perform a complete assessment of all possible conditions or circumstances that may exist at the site. Conditions may exist which were undetectable given the limited investigation of the site. Variations in conditions may occur between investigatory locations, and there may be conditions onsite which have not been revealed by the investigation, which have not been taken into account in the report.

Davis Ogilvie's opinions are based upon information that existed at the time of the production of the document. Assessments made in this report are based on the conditions found onsite and published sources detailing the recommended investigation methodologies described. No warranty is included; either expressed or implied that the actual conditions will conform to the assessments contained in this report.

Davis Ogilvie has provided an opinion based on observations, site investigations, and analysis methodologies current at the time of reporting.

Only Bealey Developments, and the Local and Regional Territorial Authority are entitled to rely upon this engineering report. Davis Ogilvie & Partners Ltd accepts no liability to anyone other than The University of Canterbury and The Project Office in any way in relation to this report and the content of it and any direct or indirect effect this engineering report may have. Davis Ogilvie & Partners Ltd does not contemplate anyone else relying on this report or that it will be used for any other purpose.

Should anyone wish to discuss the content of this report with Davis Ogilvie & Partners Ltd, they are welcome to contact us on (03) 366 1653 or at 186 Hazeldean Road, Addington, Christchurch.

1.0 Introduction

Davis Ogilvie & Partners Ltd has been engaged by Bealey Developments Limited to provide advice on the suitability for subdivision of Lot 1 DP 350121 and Lot 2 DP350121 (CT 205192 and CT 205193) Hoskyns Road, Kirwee, into approximately 45 residential lots.

The purpose of the report is to detail the suitability of the proposed lots, and provide geotechnical constraints and design criteria. Geotechnical considerations for the lots other than those outlined above are not considered in this report.

The scope of works for the investigation included the following works:

- Desktop study
- Site walkover
- Ten Boreholes including Standard Penetration Testing (SPT)
- Geotechnical considerations reporting

2.0 Site Description

The proposed subdivision is located on Hoskyns Road, Kirwee. Legal description of the two lots that encompass the site is; Lot 1 DP 350121 and Lot 2 DP 350121 (CT 205192 and 205193, respectively). The site located approximately 500 metres north east of Kirwee, on rural land which is generally flat and is currently utilised for arable farming. The site is bounded by Hoskyns Road to the north, residential subdivisions to the west and rural land to the south and east.

Aerial photography and current property boundaries on the site are presented in Figure 1, and the proposed 45 residential lot scheme plan is provided in Appendix D.

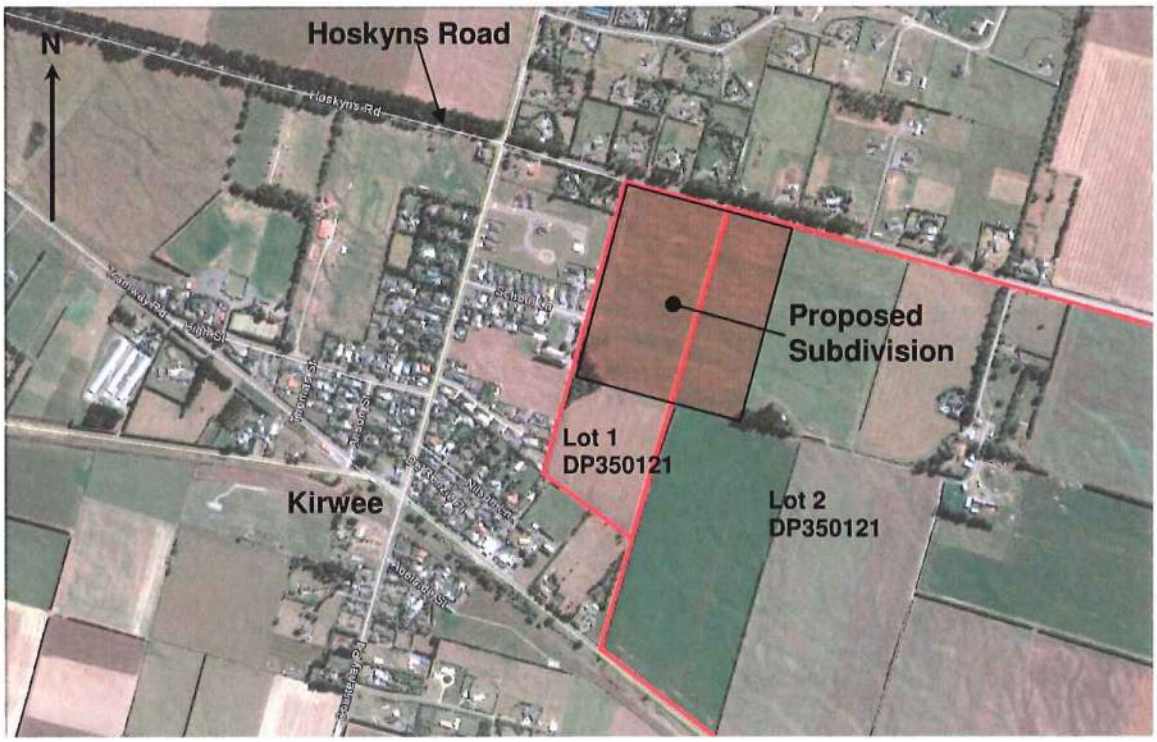

Figure 1 - Aerial Photography of the Proposed Subdivision

3.0 Desk Study

A desk study was conducted to provide background information on the site. This involved research of the published geology, Environment Canterbury (ECan) database, local authority information, groundwater information, and an assessment of recent seismic events in the area.

3.1 Published Geology & Ground Water

Published site geology from Geological and Nuclear Sciences (GNS) (Forsyth *et al* 2008[1]), indicates that the site is underlain by post glacial brownish-grey river alluvium (Q2a), derived from the late quaternary era.

A search of nearby Environment Canterbury (ECan) ground water monitoring wells found two recorded wells within 5 km of the proposed subdivision; L35/0163 and M35/0921, are located approximately 3 km west and 4 km east respectively. Monitoring well M35/0921 was geologically logged from surface and encountered well graded sandy gravel from ground level to a depth of 32.3 m Below Ground Level (BGL), this is underlain by cemented well graded sands and gravels to a target termination depth of 66.4 m BGL.

Well L35/0163 was not logged until 57.9 m BGL, however showed identical lithological units to M35/0921 at this depth; however M35/0921 was advanced to 83.8 m BGL and encountered Conglomerate at 61.3 m until target depth.

The upper lithological description of ECan monitoring well M35/0921, confirms the published geology.

Both wells L35/0163 and M35/0921 have had periodic historical monitoring, the earliest reading was taken during June 1952 from well L35/0163 and periodically monitored until present; groundwater fluctuated between 45.7 to 83.8 m BGL. Monitoring well M35/0921 had its first reading taken during September 1974 until its last reading during April 2004; static water levels fluctuated between 24.87 m to 55.3 m BGL during this period.

[1] Forsyth, P.J., Barrell, D.J.A., Jongens, R. (2008) (compilers), Geology of the Christchurch Area, Institute of Geological and Nuclear Sciences 1:250 000 geological map 16. 1 sheet. Lower Hutt, New Zealand. GNS Science. ISBN 987-0-478-19649-8

3.2 Regional Seismicity

The nearest known active faults listed in the NZS1170.5:2004 which are regarded as *major* are the Alpine, Kakapo and Hope Fault. The recently active Port Hills and the Greendale Faults, as well as a number of smaller reverse and strike-slip faults (the Porters Pass/Amberley Fault Zone, Springbank Fault and the Hororata Fault[2]), were identified. Table 1 summarises the proximities of faults near to the proposed subdivision on Hoskyns Road.

Table 1 Active Faults and Proximity to site

Fault Name	Distance from Fault (km)
Alpine	110
Kakapo	80
Hope	130
Port Hills	35
Greendale	15
Porters Pass	45
Amberley	55
Springbank	25
Hororata	20

As a result of the Christchurch Earthquake series the site has been subject to earthquake loading, with the greatest peak ground acceleration occurred during the September 2010 when the Greendale Fault ruptured at surface. Review of the peak ground acceleration (PGA) data from the GNS monitoring site at the Darfield High School and Rolleston School showed PGAs of 0.65 – 1.29 g during this event.

[2] Environment Canterbury (2009), Earthquake Hazard Assessment for Waimakariri District. Report No. R09/32.

4.0 Site Investigation

The site investigation comprised a site walkover and ten boreholes with Standard Penetration Testing (SPT) carried out at 1.5 m depth intervals. A Geotechnical Site layout plan is presented in Appendix A of this report.

4.1 Site Walkover

An initial site walkover was carried out during the deep ground testing (boreholes investigation) in June 2012. The walkover included inspection of the lots for the surface expression of liquefaction and/or lateral spreading by means of inspection of the ground for bulging, sand ejection, fissuring and cracking.

No surface expression of liquefaction, lateral spreading or other earthquake-induced land damage was observed onsite, nor has it been reported as a result of the recent Canterbury earthquakes.

4.2 Borehole Investigation

Ashburton Contracting Limited (ACL) were contracted to advance ten Boreholes (BH) across the site at locations presented in appended geotechnical site location plan presented in Appendix A of this report. The boreholes were advanced using a sonic drill rig, with continuous sampling capabilities. Standard penetration testing (SPT) was carried out 1.5 m centres during the drilling process to provide relative density of the underlying soils.

The initial target depths for all ten boreholes was 15.0 m Below Ground Level (BGL) however as boreholes BH01, BH02, BH07 and BH09 were advanced to their target depth of 15.0 m BGL it was deemed impractical to advance the remaining boreholes to 15.0 m as it could be concluded with good confidence that the site was underlain by laterally and vertically consistent lithogical units of competent sand and gravel. Therefore the remaining six boreholes had a reduced target depth of 10.0m BGL. The borehole logs are presented in Appendix B of this report, an indicative soil profile is presented in Table 2.

Table 2 Indicative Soil Profile

Depth (m)	Description	N_{50} Values	Relative Density
0.0 – 0.2	TOPSOIL	N/A	N/A
0.2 – 15.0	GRAVEL and SAND	21 - >50	Medium dense – Very dense

4.3 Liquefaction Discussion

The site walkover has confirmed that there is no surface expression of liquefaction observed as a consequence of the Canterbury Earthquake series that commenced during September 2010.

Natural ground water was not encountered during the advancement of the boreholes, this is consistent with ECan ground water monitoring wells in the area, as outlined in Section 3.1 of this report.

The 2012 Environment Canterbury (ECan) technical report on the liquefaction hazard in Canterbury compiled by GNS Science[3] provides useful information on the liquefaction hazard at the proposed subdivision. Figure 3 illustrates the 2012 ECan Liquefaction Hazard map, with a focus on the proposed subdivision area. The ECan Hazard Map generally indicates two distinct zones with regards to Liquefaction Assessment; it is either "needed" or "damage from liquefaction is unlikely," although the proposed subdivision lies approximately 3km west of the western limits of the hazard map it can be concluded that the land beneath the proposed subdivision is "unlikely" to liquefy.

Liquefiable soils are typically deposits of saturated loose sand and silt. The onsite boreholes and SPT testing have identified that the site is underlain by medium dense typically very dense well graded gravels with minor beds of well graded medium dense to very dense sand and therefore not deemed to be susceptible to liquefaction, as the soils are not only dry (natural water level as identified in ECan monitoring well M35/0921 at minimum depth of 24.87 m BGL) but are also too coarse to liquefy, this is consistent with the findings during the site walkover with no surface expression of liquefaction found on site.

[3] Brackley, H.L. (compiler). 2012. Review of liquefaction hazard information in eastern Canterbury, including Christchurch City and parts of Selwyn, Waimakariri and Hurunui Districts, GNS Science Consultancy Report 2012/218. 99p. Environment Canterbury report number R12/83.

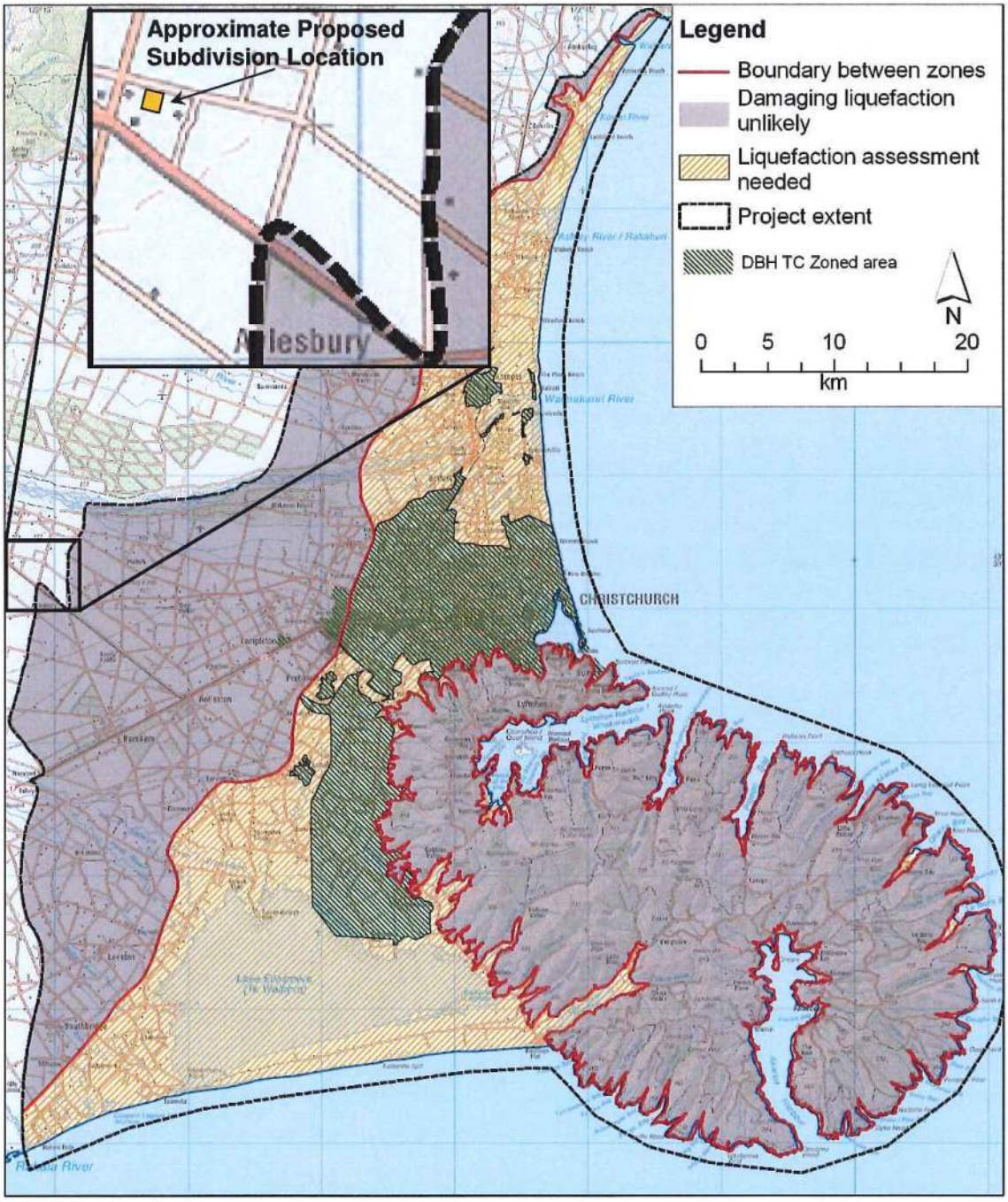

Figure 3 - ECan Liquefaction Assessment Area Map. Brackley, H.L. (compiler), 2012.

5.0 Typical Foundations Investigations

Intrusive site investigations' including Standard Penetration Testing (SPT) has revealed that the site is underlain by medium dense to very dense well graded sands and gravels to a minimum depth of 15.0 m below ground level, surrounding ECan water monitoring wells have concluded that these granular deposits are consistent to considerable depth. It is the professional opinion of Davis Ogilvie that the site can be categorised as equivalent to Technical Category 1. The ground conditions on the site can be defined as "Good Ground" as per NZS3604:2011.

Shallow investigation in accordance with New Zealand Standard NZS3604:2011 is deemed appropriate for house foundation design at building consent stage.

6.0 Section 106 RMA Discussion

Section 106 of the Resource Management Act (RMA) requires a process of addressing the potential for material damage from erosion, falling debris, subsidence, slippage, and inundation for the proposed lots. These aspects are addressed in the following section.

6.1 Erosion

The proposed lots are flat, and are stable against erosion. Erosion was not noted during site visits and is deemed to not be of concern at the site.

6.2 Falling Debris and Slippage

As the proposed lots are located on flat ground with no elevated areas bordering the site elevated. No mechanism for rock falls or land slides exist. Therefore the site has no potential to be affected by falling debris or slippage.

6.3 Subsidence

As the underlying soils are dense and dry sands and gravels the site is deemed to be non-liquefiable where no settlement due to liquefaction is expected during Ultimate Limit State (ULS) and Serviceability Limit State (SLS) seismic events.

It is therefore of our opinion the site is suitable for residential development. Shallow investigation of the building sites at the building consent stage in accordance with the New Zealand standard NZS 3606:2011 is deemed appropriate for foundation design at the proposed lots.

6.4 Inundation

It is believed that the site is not prone to inundation. The site is not located within a flood management area, as specified by the Selwyn District Council. A flood hazard assessment requested from Environment Canterbury indicates that the site is "outside any recorded flood plains", regarded as flood ponding areas. As per the appended letter from Nick Griffiths on behalf of Environment Canterbury.

6.5 Section 106 General Comment

It is believed that the site is generally fit for subdivision and building development under Section 106 of the RMA. Further investigation using Scala Penetrometer testing and hand augers may be required at building consent stage to confirm the underlying geology and appropriate design criteria for the house sites, however it is of our opinion that standard foundation testing requirements as outlined in NZS 3604:2011 shall be appropriate for development of the proposed lots. A statement of professional opinion on the suitability of land for subdivision is presented in Appendix C of this report.

7.0 Conclusions

It is recommended that the site is suitable for residential subdivision. No visual effects of lateral spreading, or liquefaction from the Canterbury earth quake sequence September 2010 earthquake to present have been observed. No liquefaction induced settlement or lateral spreading is expected in ULS or SLS seismic events due to the underlying geology comprising unsaturated well graded, dense arenaceous (sand) and rudaceous (larger than sand) materials.

It is recommended that the lots are typical of Technical Category 1 (TC) classification.

Minimum Ground water levels in the area are in the order of -24.8 m below ground level based on nearby ECan monitoring wells L35/0163 and M35/0921. Ground water levels on site are in excess of 15.0 m below ground level, as no natural ground water was encountered during the drilling of boreholes BH01 – BH10.

It is in the professional opinion of Davis Ogilvie & Partners Ltd (not to be construed as a guarantee) that the aforementioned site is suitable for residential development and construction.

Davis Ogilvie

APPENDIX A

Layout Plan

contractor to locate all existing services & verify all dimensions before commencing work

issue	date	reason	approved
A	08/12	Geotechnical Report Diagram	ED
B	04/13	Geotechnical Report Diagram	ED

CAD ref: 130404.bvb.geotech Test Location Plan

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Christchurch, New Zealand
P.O. Box 589 Christchurch 8140
OFFICES ALSO IN:
Nelson - Timaru - Greymouth

Geotechnical Test Location Plan

Bealey Developments, 1651 - 1737 Hoskyns Road, Kirwee

design	drawn	QA check	dwg	issue
SM	BVB	ED	401	B
scale @ A3	date	file		
1:2500	04/13	29250		

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APPENDIX B

Borehole Logs

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Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH01
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 15.30
Orientation (°): 0
Inclination (°): 90

MaterialXX	MaterialX	Material	Description	Weathering (SW / MW / HW / CW)	Graphic Log	Depth	TCR (%)	SPT N-value (Uncorrected)	Sample	Backfill & Installation
	M1		Firm dark brown silty CLAY. Moist. Some trace medium gravel.			0.50				
			Soft mottled brown/dark brown silty CLAY.			1.00	87			
			Grey silty slightly sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke.			1.50				
			Very dense grey brown sandy GRAVEL with some rare cobbles Sand is fine to coarse. Gravel is subrounded fine to medium occasionally coarse.			2.00	90		8, 12 / 27, 32, 34, 15 N = 50 300mm penetration	
						2.50				
			Dense grey brown silty sandy GRAVEL with some rare cobbles Sand is fine to coarse. Gravel is subrounded fine to medium occasionally coarse.			3.00				
						3.50	92		8, 12 / 13, 6, 7, 7 N = 33 300mm penetration	
			Very dense brown sandy GRAVEL with some rare cobbles. Sand is fine to coarse. Gravel is fine to coarse subrounded of greywacke.			4.00				
			Very dense grey brown slightly sandy GRAVEL with some rare cobbles. Sand is fine to coarse. Gravel is fine to coarse subrounded of greywacke.			4.50				
						5.00	92		6, 10 / 14, 9, 8, 7 N = 47 300mm penetration	
			Very dense brown sandy GRAVEL with some rare cobbles. Sand is fine to coarse. Gravel is fine to medium subrounded of greywacke.			5.50				
						6.00				
						6.50	95		4, 15 / 15, 15, 12, 14 N = 50 300mm penetration	
						7.00				
						7.50				
			Dense brown clayey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine subrounded of greywacke.			8.00	100		17, 18 / 11, 9, 6, 7 N = 33 300mm penetration	
						8.50				
						9.00				
						9.50	100		8, 15 / 14, 15, 16, 20 N = 50 300mm penetration	
						10.00				
						10.50				
			Very dense grey silty sandy GRAVEL with some rare cobbles. Sand is fine to coarse. Gravel is fine subrounded to subangular fine to coarse of greywacke.			11.00	95		50, 0 / 50 N = 50 75mm penetration	
						11.50				
			Very dense brown clayey GRAVEL. Gravel is fine subangular of greywacke.			12.00				
			Very dense brown sandy GRAVEL. Sand is fine to coarse. Gravel is fine to medium occasionally coarse subrounded of greywacke.			12.50	96		10, 32 / 31, 26, 25, 45 N = 50 300mm penetration	
			Very dense brown clayey GRAVEL. Gravel is fine to medium subrounded of greywacke.			13.00				
						13.50				
			Very dense grey well cemented clayey GRAVEL with some rare cobbles.			14.00			21, 30 / 47, 20, 28, 32 N = 50 300mm penetration	
			Very dense grey clayey GRAVEL with some rare cobbles. Gravel is fine to coarse subrounded of greywacke.			14.50	92			
						15.00			3, 7 / 33, 36, 30, 22 N = 50 300mm penetration	Bentonite

EOH: 15.3 m

Logger	Start Date	Remarks	Hole Depth (m): 15.30
BVB	-		Cluster: -
Driller	End Date		-
-	-		

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Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM | **Datum:** -

Hole: BH02
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 15.73
Orientation (°): 0
Inclination (°): 90

Material XX	Material X	Material	Description	Weathering (SW, MW, HW, CW)	Graphic Log	Depth	TCR (%)	SPT N-value (Uncorrected)	Sample	Backfill & Installation
			Light brown gravelly SILT. with abundant rootlets. Gravel is subrounded fine of greywacke.			0.50				
			Brown silty sandy GRAVEL. Sand is fine to coarse. gravel is subangular fine to medium of greywacke.			1.00	95			
			Very dense grey silty sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			1.50				
						2.00			3, 7 / 23, 50 N = 50 150mm penetration	
			Medium dense grey slightly silty sandy GRAVEL with many cored cobbles. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of greywacke.			2.50	92			
						3.00				
			From 3.5 m - Moist			3.50			6, 7 / 6, 6, 5, 4 N = 21 300mm penetration	
						4.00	98			
						4.50				
			Dense grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			5.00			5, 10 / 10, 10, 12, 10 N = 42 300mm penetration	
			From 5.05 m - Wet			5.50	97			
			From 5.2 - 6.1 m - Becoming slightly clayey			6.00				
						6.50			7, 19 / 24, 20, 24, 30 N = 47 300mm penetration	
						7.00	96			
						7.50				
			Dense becoming very dense grey silty sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			8.00			8, 10 / 9, 9, 11, 18 N = 47 300mm penetration	
						8.50	100			
						9.00				
						9.50			6, 10 / 14, 18, 24, 24 N = 50 300mm penetration	
						10.00	100			
						10.50				
						11.00			8, 15 / 20, 27, 14, 9 N = 50 300mm penetration	
			Soft light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine of greywacke. Possibly driller induced.			11.50	92			
			Very dense grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			12.00				
						12.50			2, 7 / 20, 22, 21, 18 N = 50 300mm penetration	
						13.00	96			
						13.50				
						14.00			23, 35 / 50 N = 50 75mm penetration	
						14.50	98			
						15.00				
						15.50	99		13, 31 / 20, 25, 23, 15 N = 50 300mm penetration	

Bentonite

EOH: 15.73 m

Logger	Start Date	Remarks	Hole Depth (m): 15.73
DW	-		Cluster: -
Driller	**End Date**		-
-	-		

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Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH03
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 11.16
Orientation (°): 0
Inclination (°): 90

Material XX	Material X	Material	Description	Weathering (SW MW HW CW)	Graphic Log	Depth	TCR (%) (25 50 75)	SPT N-value (Uncorrected) (10 20 30 40 50)	Sample	Backfill & Installation
			Brown sandy gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke. Rare rootlets.			0.50	95			
			Very dense grey brown slightly silty sandy GRAVEL with abundant cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			1.00				
			From 2.4 - 3.0 m - Very dry			1.50				
						2.00	96		10, 16 / 22, 30, 29, 23 N = 50 300mm penetration	
						2.50				
						3.00				
			Dense brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is rounded to subangular fine to coarse of greywacke.			3.50	98		12, 11 / 7, 10, 15, 20 N = 42 300mm penetration	
						4.00				
						4.50				
			At 5.3 m - Large cored cobble			5.00	97		6, 11 / 12, 10, 9, 8 N = 39 300mm penetration	
						5.50				
						6.00				
			Very dense grey very silty sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			6.50	98		25, 30 / 31, 37, 50 N = 51 225mm penetration	Bentonite
			At 7.3 m - Large cored cobble			7.00				
						7.50				
						8.00	100		5, 10 / 12, 14, 30, 18 N = 50 300mm penetration	
						8.50				
						9.00				
						9.50	95		4, 20 / 29, 40, 41, 33 N = 50 300mm penetration	
						10.00				
						10.50				
						11.00	100		12, 16 / 39, 21, 25, 24 N = 50 300mm penetration	

EOH: 11.16 m

Logger	Start Date	Remarks	Hole Depth (m): 11.16
DW	-		Cluster: -
Driller	**End Date**		-
-	-		

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Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH04
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 10.30
Orientation (°): 0
Inclination (°): 90

Material XX	Material X	Material	Description	Weathering (SW MW HW CW)	Graphic Log	Depth	TCR (%) (25 50 75)	SPT N-value (Uncorrected) (10 20 30 40 50)	Sample	Backfill & Installation
			Soft dark brown silty CLAY with some rare decomposing rootlets and organic matter.			0.50				
			Brown clayey GRAVEL with some rare cobbles. Gravel is subrounded fine to coarse of greywacke.			1.00	99			
			Brown grey sandy GRAVEL with some iron staining. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke.			1.50				
			Dense brown slightly silty sandy GRAVEL some rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			2.00	95		10, 9 / 8, 7, 7, 8 N = 30 300mm penetration	
			Dense brown clayey sandy GRAVEL with some rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			2.50				
			Very dense brown clayey SAND with rare fine to coarse gravel and cobbles. Sand is fine to coarse.			3.00				
			Very dense brown clayey sandy GRAVEL with some rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke.			3.50	98		7, 13 / 10, 12, 9, 5 N = 36 300mm penetration	
						4.00				
						4.50			36 / 50 N = 50 75mm penetration	
						5.00	97			
						5.50				
			Very dense brown slight clayey sandy GRAVEL with some cobbles. Sand is medium to coarse. gravel is subrounded fine to coarse of greywacke.			6.00				
						6.50			5, 6 / 6, 18, 24, 22 N = 50 300mm penetration	
						7.00	100			
						7.50				
						8.00			43 / 50 N = 50 75mm penetration	
						8.50	100			
						9.00				
			Very dense light brown clayey sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine of greywacke.			9.50	95		5, 2 / 12, 12, 10, 12 N = 46 300mm penetration	
			Very dense brown grey clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			10.00			13, 24 / 50 N = 50 75mm penetration	
			EOH: 10.3 m							

Bentonite

Logger	Start Date	Remarks	Hole Depth (m): 10.30
BVB	-		Cluster: -
Driller	End Date		-
-	-		

Davis Ogilvie
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Engineers & Surveyors Planners
186 Hazeldean Road Chch
Freephone (0800) 999 333
Email: admin@do.co.nz

Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH05
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 11.16
Orientation (°): 0
Inclination (°): 90

Description	Depth	TCR (%)	SPT N-value (Uncorrected)	Sample
Brown slightly sandy SILT. Sand is fine. Rare rootlets.	0.00			
Light brown sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine of greywacke.	0.50	98		
Medium dense grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.	1.00			
	1.50			6, 7 / 5, 7, 6, 9 N = 27 300mm penetration
	2.00	98		
Dense becoming very dense Grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to medium occasionally coarse of greywacke	2.50			
	3.00			14, 8 / 13, 12, 12, 8 N = 45 300mm penetration
	3.50	97		
	4.00			
	4.50			6, 10 / 9, 12, 11, 18 N = 50 300mm penetration
	5.00	96		
	5.50			
	6.00			8, 13 / 16, 18, 22, 20 N = 50 300mm penetration
	6.50	100		
	7.00			
Grey brown very silty sandy GRAVEL with rare cored cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.	7.50			
	8.00			20, 28 / 20, 16, 11, 14 N = 50 300mm penetration
	8.50	100		
	9.00			
	9.50			14, 11 / 14, 26, 17, 11 N = 50 300mm penetration
	10.00	100		
	10.50			
	11.00	98		7, 15 / 10, 12, 15, 16 N = 50 300mm penetration

EOH: 11.16 m

Logger	Start Date	Remarks	Hole Depth (m): 11.16
DW	-		Cluster: -
Driller	End Date		-
-	-		

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Email: admin@do.co.nz

Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH06
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 10.55
Orientation (°): 0
Inclination (°): 90

Material	Description	Weathering (SW / MW / HW / CW)	Graphic Log	Depth	TCR (%)	SPT N-value (Uncorrected)	Sample	Backfill & Installation
	Firm brown sandy gravelly CLAY with light brown partings of silt. Sand is fine to coarse. Gravel is subangular to rounded fine of greywacke.			0.50				
	Grey sandy gravelly greywacke COBBLES. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of greywacke.			1.00	100			
	Grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is rounded to subangular fine to coarse of greywacke.			1.50				
	Dense to very dense grey silty sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke. From 2.44 m - Gravel becoming fine to coarse			2.00	95		8, 15 / 12, 13, 11, 17 N = 50 300mm penetration	
				2.50				
				3.00				
				3.50	98		9, 14 / 36, 9, 11, 18 N = 50 300mm penetration	
	At 4.08 m - Thin bed of clayey sandy gravel			4.00				
				4.50				
	Dense to very dense grey brown silty sandy GRAVEL with abundant cored cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke.			5.00	97		7, 15 / 9, 9, 8, 7 N = 33 300mm penetration	
				5.50				
				6.00				
				6.50	99		6, 13 / 11, 14, 19, 6 N = 50 300mm penetration	
				7.00				
				7.50				
	Very dense grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to medium of greywacke.			8.00	99		7, 11 / 11, 8, 9, 15 N = 42 300mm penetration	
				8.50				
				9.00				
	From 9.14 m - Gravel becoming fine to coarse with many cored greywacke cobbles. Rare iron staining			9.50			11, 12 / 44, 25, 32, 50 N = 50 300mm penetration	
				10.00	100			
				10.50			3, 10 / 23, 21, 20, 27 N = 50 300mm penetration	

EOH: 10.55 m

Logger	Start Date	Remarks	Hole Depth (m): 10.55
DW	-		Cluster: -
Driller	End Date		-
-	-		Page 1 of 1

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186 Hazeldean Road Chch
Freephone (0800) 999 333
Email: admin@do.co.nz

Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM | **Datum:** -

Hole: BH07
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 15.70
Orientation (°): 0
Inclination (°): 90

Material XX	Material X	Material	Description	Weathering (SW / MW / HW / CW)	Graphic Log	Depth	TCR (%) (25 / 50 / 75)	SPT N-value (Uncorrected) (10 / 20 / 30 / 40 / 50)	Sample	Backfill & Installation
			Soft dark brown silty slightly sandy CLAY with some rootlets. Sand is			0.50				
			Soft brown silty slightly sandy CLAY. Sand is medium to coarse.			1.00	100			
			Brown sandy GRAVEL. Sand is fine to coarse. Gravel is subangular fine to coarse of greywacke.			1.50				
			Dense grey silty GRAVEL. Gravel is subangular fine to medium of			2.00			11, 10 / 9, 7, 10, 11 N = 37 300mm penetration	
			Dense orange sandy GRAVEL with some rare cobbles. Heavily iron stained. Sand is fine to coarse. Gravel is subrounded fine to coarse of			2.50	95			
			Very dense brown silty sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			3.00				
			Very dense brown silty sandy GRAVEL with rare cobbles. Sand is medium to coarse. Gravel is subrounded fine to coarse of greywacke.			3.50			8, 10 / 11, 12, 13, 8 N = 44 300mm penetration	
						4.00	98			
			Very dense brown clayey sandy GRAVEL. Sand is fine to coarse. gravel is subrounded fine to medium of greywacke			4.50				
						5.00			10, 15 / 22, 28, 35, 40 N = 50 300mm penetration	
						5.50	97			
			Very dense brown clayey sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			6.00				
						6.50			15, 43 / 32, 33, 25, 22 N = 50 300mm penetration	
						7.00	99			
						7.50				
			Very dense brown clayey sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke.			8.00			9, 16 / 30, 50 N = 50 150mm penetration	
						8.50	95			
						9.00				
			Very dense brown slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to medium of greywacke.			9.50			15, 15 / 15, 17, 23, 13 N = 50 300mm penetration	
						10.00	96			
						10.50				
						11.00			6, 10 / 17, 12, 12, 12 N = 50 300mm penetration	
						11.50	100			
						12.00				
						12.50			11, 29 / 25, 27, 23, 20 N = 50 300mm penetration	
						13.00	100			
						13.50				
						14.00			, 30 / 25, 50 N = 50 150mm penetration	
						14.50	100			
						15.00				
						15.50	99		17, 36 / 16, 17, 19, 20 N = 50 300mm penetration	

EOH: 15.7 m

Logger	Start Date	Remarks	Hole Depth (m): 15.70
BVB	-		Cluster: -
Driller	End Date		-
-	-		

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Email: admin@do.co.nz

Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH08
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 10.55
Orientation (°): 0
Inclination (°): 90

Material	Description	Weathering (SW MW HW CW)	Graphic Log	Depth	TCR (%)	SPT N-value (Uncorrected)	Sample	Backfill & Installation
	Firm dark brown CLAY with abundant partings of light brown silt. Abundant rootlets throughout			0.50				
	Light brown sandy gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to occasionally medium of			1.00	95			
	Grey silty sandy GRAVEL. Sand if fine to coarse. gravel is angular to subrounded fine to medium of			1.50				
	Dense becoming very dense grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel angular to subrounded fine to coarse of greywacke.			2.00	98		5, 11 / 11, 10, 12, 13 N = 46 300mm penetration	
				2.50				
				3.00				
				3.50	97		6, 9 / 8, 11, 15, 19 N = 50 300mm penetration	
				4.00				
	Very dense grey silty sandy GRAVEL partly cemented. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of greywacke			4.50				
	Very dense grey brown silty sandy GRAVEL with abundant cobbles. Sand is fine to coarse. gravel is subangular to subrounded fine to coarse of greywacke			5.00	99		7, 12 / 12, 13, 14, 41 N = 50 300mm penetration	Bentonite
				5.50				
				6.00				
	Very dense brown silty sandy GRAVEL Sand is fine to coarse. Gravel is subrounded fine occasionally medium of greywacke.			6.50	95		9, 15 / 17, 17, 19, 15 N = 50 300mm penetration	
	Very dense grey brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to medium occasionally coarse of greywacke			7.00				
				7.50				
				8.00	98		7, 17 / 21, 14, 18, 25 N = 50 300mm penetration	
				8.50				
				9.00				
				9.50	99		5, 11 / 14, 16, 21, 25 N = 50 300mm penetration	
				10.00				
				10.50			5, 5 / 15, 15, 12, 20 N = 50 300mm penetration	

EOH: 10.55 m

Logger	Start Date	Remarks	Hole Depth (m): 10.55
DW	-		Cluster: -
Driller	**End Date**		-
-	-		

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Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH09
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 15.20
Orientation (°): 0
Inclination (°): 90

Material XX	Material X	Material	Description	Weathering (SW, MW, HW, CW)	Graphic Log	Depth	TCR (%)	SPT N-value (Uncorrected)	Sample	Backfill & Installation
			Soft dark brown clayey slightly sandy SILT with some rootlets and decaying organic matter. Sand is coarse.			0.50	100			
			Brown sandy slightly gravelly SILT. Sand is medium to coarse. Gravel is subrounded fine to greywacke.			1.00				
			Brown clayey silty slightly sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			1.50				
			Medium dense becoming dense brown sandy GRAVEL with rare cobbles. Sand is fine to coarse. gravel is subrounded fine to coarse of greywacke			2.00	95		10, 13 / 8, 6, 7, 7 N = 28 300mm penetration	
			Medium dense becoming very dense brown clayey slightly sandy GRAVEL with rare cobbles. Sand is medium to coarse. Gravel is subrounded fine to coarse of greywacke.			2.50				
						3.00				
						3.50	98		8, 16 / 23, 12, 8, 6 N = 49 300mm penetration	
						4.00				
						4.50				
						5.00	99		17, 10 / 19, 27, 22, 1 N = 50 300mm penetration	
						5.50				
			Very dense brown slightly clayey sandy GRAVEL. Sand is medium to coarse. Gravel is rounded fine to medium of greywacke.			6.00				
			Very dense brown clayey slightly sandy GRAVEL well cemented. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			6.50	99		16, 8 / 9, 10, 12, 16 N = 47 300mm penetration	
			Very dense brown silty sandy GRAVEL. Sand is medium to coarse. Gravel is subangular fine to coarse of greywacke			7.00				
			Very dense brown clayey slightly sandy GRAVEL. Sand is medium to coarse. Gravel is subrounded fine to coarse of greywacke.			7.50				
						8.00	97		9, 15 / 20, 21, 31, 11 N = 50 300mm penetration	
						8.50				
			Very dense brown slightly clayey sandy GRAVEL with rare cobbles. Sand is medium to coarse. Gravel is subrounded fine to coarse for			9.00				
			Very dense brown slightly clayey slightly sandy GRAVEL. Sand is medium to coarse. Gravel is subrounded fine to coarse of greywacke.			9.50	100		17, 17 / 15, 14, 15, 15 N = 50 300mm penetration	
						10.00				
						10.50				
						11.00	100		4, 16 / 18, 13, 13, 10 N = 50 300mm penetration	
						11.50				
			From 12.0 m - Becoming sandy			12.00				
			From 12.6 m - becomes clayey and well cemented			12.50	95		12, 18 / 24, 30, 40, 30 N = 50 300mm penetration	
						13.00				
						13.50				
						14.00	95		8, 7 / 8, 7, 8, 30 N = 50 300mm penetration	
						14.50				
						15.00	98			

EOH: 15.2 m

Logger	Start Date	Remarks	Hole Depth (m): 15.20
BVB	-		Cluster: -
Driller	**End Date**		-
-	-		

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Freephone (0800) 999 333
Email: admin@do.co.nz

Client: Bealey Developments Limited
Project: Bealey Developments, Hoskyns Road. Kirwee

Location: Hoskyns Road. Kirwee. Christchurch
Description: Proposed subdivision of Lot 1 DP 55412 and Lot 4 DP 13291 into 42 residential lots.

Grid: NZTM **Datum:** -

Hole: BH10
North (m): -
East (m): -
Elevation (m): -
Hole Depth (m): 11.20
Orientation (°): 0
Inclination (°): 90

Material XX	Material X	Material	Description	Weathering (SW MW HW CW)	Graphic Log	Depth	TCR (%) (25 50 75)	SPT N-value (Uncorrected) (10 20 30 40 50)	Sample	Backfill & Installation
			Soft dark brown silty CLAY.			0.50				
			Brown clayey sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of			1.00	100			
			Dense brown sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			1.50				
						2.00	95		7, 10 / 11, 15, 8, 10 N = 44 300mm penetration	
						2.50				
						3.00				
			Dense becoming very dense brown slightly clayey silty sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			3.50	98		6, 7 / 6, 8, 8, 10 N = 32 300mm penetration	
						4.00				
						4.50				
			Very dense brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			5.00	97		11, 22 / 45, 29, 23, 50 N = 50 300mm penetration	
						5.50				
						6.00				
						6.50	99		5, 11 / 13, 50 N = 50 150mm penetration	
						7.00				
						7.50				
						8.00	99		7, 21 / 31, 20, 22, 27 N = 50 300mm penetration	
						8.50				
			Very dense brown clayey GRAVEL with rare cobbles. Gravel is subrounded fine to coarse of greywacke.			9.00				
						9.50	99		8, 13 / 9, 20, 7, 5 N = 41 300mm penetration	
						10.00				
						10.50				
			Very dense brown clayey sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse of greywacke.			11.00	100		8, 22 / 26, 28, 20, 30 N = 50 300mm penetration	

EOH: 11.2 m

Logger	Start Date	Remarks	Hole Depth (m): 11.20
BVB	-		Cluster: -
Driller	End Date		-
-	-		

Davis Ogilvie

APPENDIX C

Professional Opinion of Suitability Statement

Part 4: Geotechnical Requirements, APPENDIX I. Christchurch City Council Infrastructure Design Standard.

Statement of Professional Opinion on the Suitability of Land for Building Construction

ISSUED BY: Elliot Duke Engineer BE(Hons), MIPENZ, CPENG (Senior Civil and Environmental)

TO: Bealey Developments Ltd

TO BE SUPPLIED TO: Selwyn District Council

IN RESPECT OF: Subdivision of Lot 1 DP 350121 and Lot 2 DP 350121

AT: 1651, 1653, 1655, 1735, 1737 Hoskyns Road ,Kirwee

I Elliot Duke, on behalf of Davis Ogilvie and Partners hereby confirm that:

1. I am a suitably qualified and experienced geotechnical engineer and was retained by the owner / developer as the geotechnical engineer on the above development.

2. The original ground not affected by filling and the filled ground are suitable for the construction of a development / subdivision and are not subject to erosion, subsidence in accordance with the provisions of Section 106 of the Resource Management Act 1991 provided that:

    a. Additional testing is required prior to building consent in accordance with NZS3604:2011.

3. This professional opinion is furnished to the territorial authority and the owner / developer for their purposes alone, on the express condition that it will not be relied upon by any other person and does not remove the necessity the normal inspection of foundation conditions at the time of erection of any building.

4. This certificate shall be read in conjunction with my/the geotechnical report referred to in Clause 2 above, and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

5. The geotechnical engineering insurance firm issuing this statement holds a current policy of professional indemnity insurance of no less than $ 2,000,000

Date : 28/3/2013

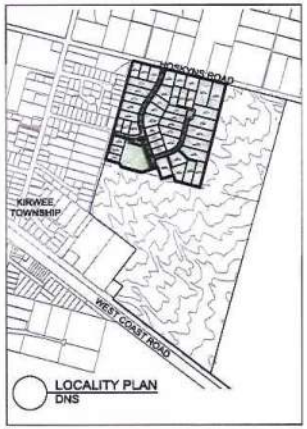
Elliot Duke
Senior Civil and Environmental Engineer
BE (Hons), MIPENZ (Civil and Environmental), CPENG

Davis Ogilvie

APPENDIX D

McDougal Park Subdivision Plan (Morgan and Pollard 28/05/2013 001A Preliminary)

Mc DOUGAL PARK



KEY FEATURES

1. HOSKYNS ROAD ENTRANCE FEATURE (PRIMARY)
2. SCHOOL LANE ENTRANCE FEATURE (SECONDARY)
3. CAR PARK
4. SPORTS FIELDS
5. OFF ROAD CYCLE/PEDESTRIAN LINK
6. LINK TO FUTURE STAGES

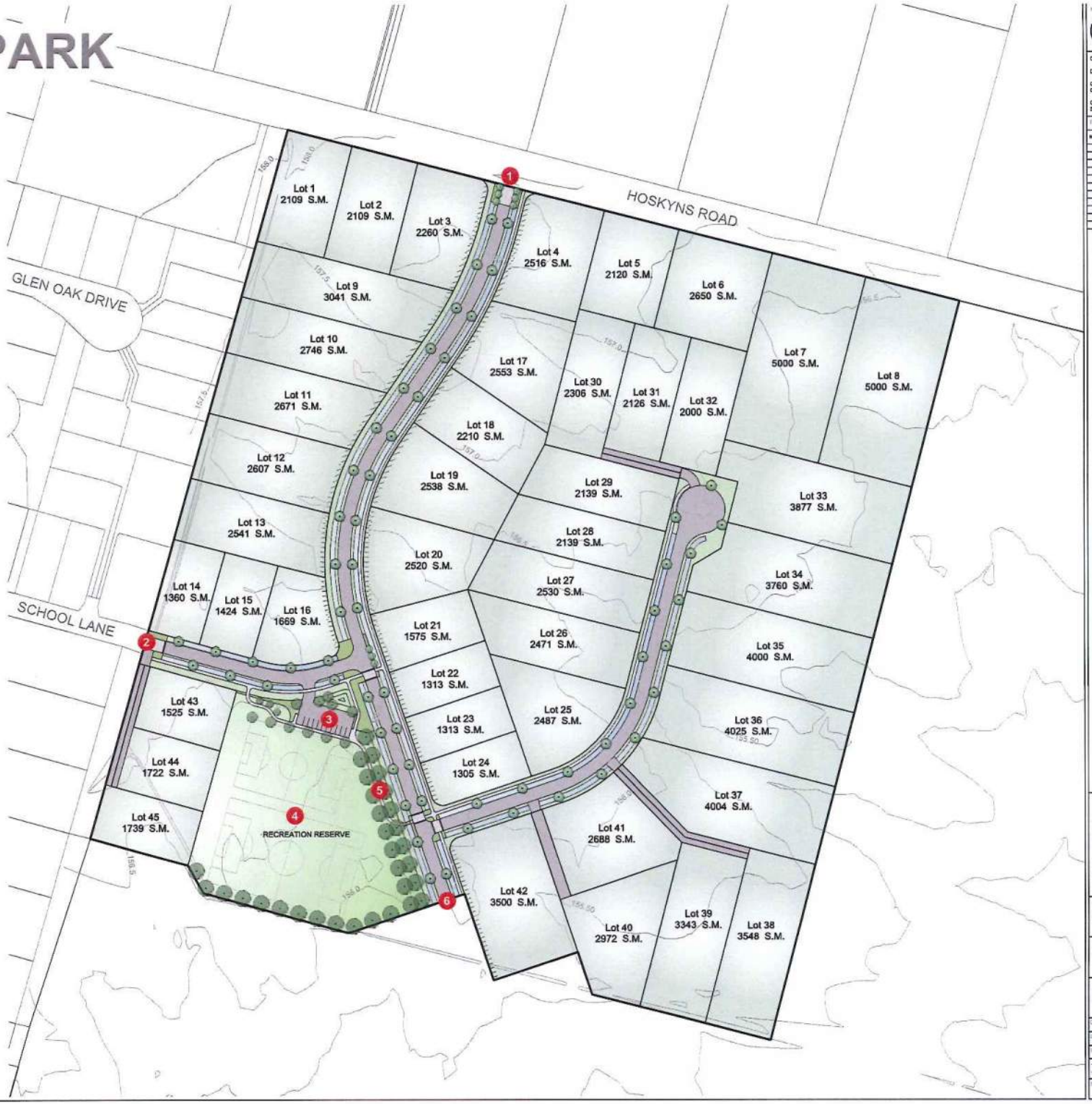
LEGEND

SURFACES
- SECTIONS
- RESERVE
- ROAD RESERVE
- 2.5m WIDE GRASS SWALE WITH SOAKPITS
- LANDSCAPE EASEMENT
- STAGE BOUNDARY

HARDSCAPE
- ROAD
- ROAD FEATURE PAVING
- FOOTPATH

SOFTSCAPE
- SHRUB BED
- COLUMNAR STREET TREE
- STREET TREE
- RESERVE SPECIMEN TREE
- NATIVE SPECIMEN TREE

General Notes
1. REFER TO ENGINEER PLANS FOR DETAILS OF SWALE AND SOAKPIT SPACING



NORTH

REVISIONS:

No:	Remark:	Date:

morgan+pollard
Landscape Architecture
Morgan + Pollard - Landscape Architecture
240 Hoskyns Junction Road, Christchurch 8025
P: 03 977 5332 - F 03 977 5331
www.morgan-pollard.co.nz

CLIENT: BEALEY DEVELOPMENTS

PROJECT: Mc DOUGAL PARK

DWG TITLE: STAGE 1 & 2 PLAN

DESIGNED BY:	CC	SCALE @ A1:	1:1000
DRAWN BY:	CC	DATE:	28/05/2013
APPROVED BY:	RP		
JOB NO:	14338	DWG NO:	001
REVISION:	A		
ISSUED FOR:	PRELIMINARY		

LOCATION PLAN
DNS

LEGEND

SURFACES
- SECTIONS
- RESERVE
- ROAD RESERVE
- 2.5m WIDE GRASS SWALE WITH SOAK PITS
- LANDSCAPE EASEMENT
- STAGE BOUNDARY

HARDSCAPE
- ROAD
- ROAD FEATURE PAVING
- FOOTPATH

SOFTSCAPE
- SHRUB BED
- COLUMNAR STREET TREE
- STREET TREE
- RESERVE SPECIMEN TREE
- NATIVE SPECIMEN TREE

SCHOOL LANE

Lot 14
1360 S.M.

Lot 15
1424 S.M.

Lot 16
1669 S.M.

2520 S.M.

Lot 27
2530 S.

Lot 21
1575 S.M.

Lot 26
2471 S.M.

Lot 22
1313 S.M.

Lot 23
1313 S.M.

Lot 25
2487 S.M

Lot 24
1305 S.M.

Lot 43
1525 S.M.

Lot 44
1722 S.M.

Lot 45
1739 S.M.

Lot 42
3500 S.M.

CAR PARK

RECREATION RESERVE

2.5m WIDE GRASS SWALES WITH SOAKPITS SPACED AS PER ENGINEER PLANS

ACCENT PAVING TO MARK SUBDIVISION ENTRANCE

2.5m WIDE GRASS SWALES WITH SOAKPITS SPACED AS PER ENGINEER PLANS

TREES IN SWALE

POST AND CABLE FENCE TO PERIPHERY OF RESERVE

FEATURE TREES AS FOCAL POINT (COLUMNAR)

ACCENT PAVING AT CROSSING

PARALLELED STREET TREES ON CENTRAL ROAD

1.5m HIGH COUNTOURED MOUND TO PROVIDE VISUAL BUFFER TO CARPARK

AVENUE OF LARGE SPECIMEN TREES

FOOTBRIDGE OVER SWALE

ACCENT PAVING AT CROSSINGS

TREES IN SWALE

2.5m WIDE GRASS SWALES WITH SOAKPITS SPACED AS PER ENGINEER PLANS

CONNECTION TO FUTURE STAGES

PERIMETER TREES FOR SHADE AND SHELTER

159.5

156.0

PRECEDENT IMAGES

ACCENT VEHICULAR PAVING AT ENTRANCES AND PEDESTRIAN CROSSINGS

PEDESTRIAN BRIDGE OVER SWALE

TREE LINED PATHS

LONG VISTAS

COMMUNITY RECREATIONAL FACILITIES

NORTH

REVISIONS:

No:	Revision:	Date:

morgan+pollard
Landscape Architecture
Morgan + Pollard - Landscape Architecture
340 Mcleans Junction Road, Christchurch 8023
P: 03 977 5332 - F: 03 977 5331
www.morgan-pollard.co.nz

CLIENT:
BEALEY DEVELOPMENTS

PROJECT:
Mc DOUGAL PARK

DRG TITLE:
RESERVE PLAN

DESIGNED BY:	CC	SCALE @ A1: 1:400
DRAWN BY:	CC	DATE:
REVIEWED BY:	RP	28/05/2013
JOB NO:	DWG NO:	REVISION:
14338	002	A

ISSUED FOR: **PRELIMINARY**

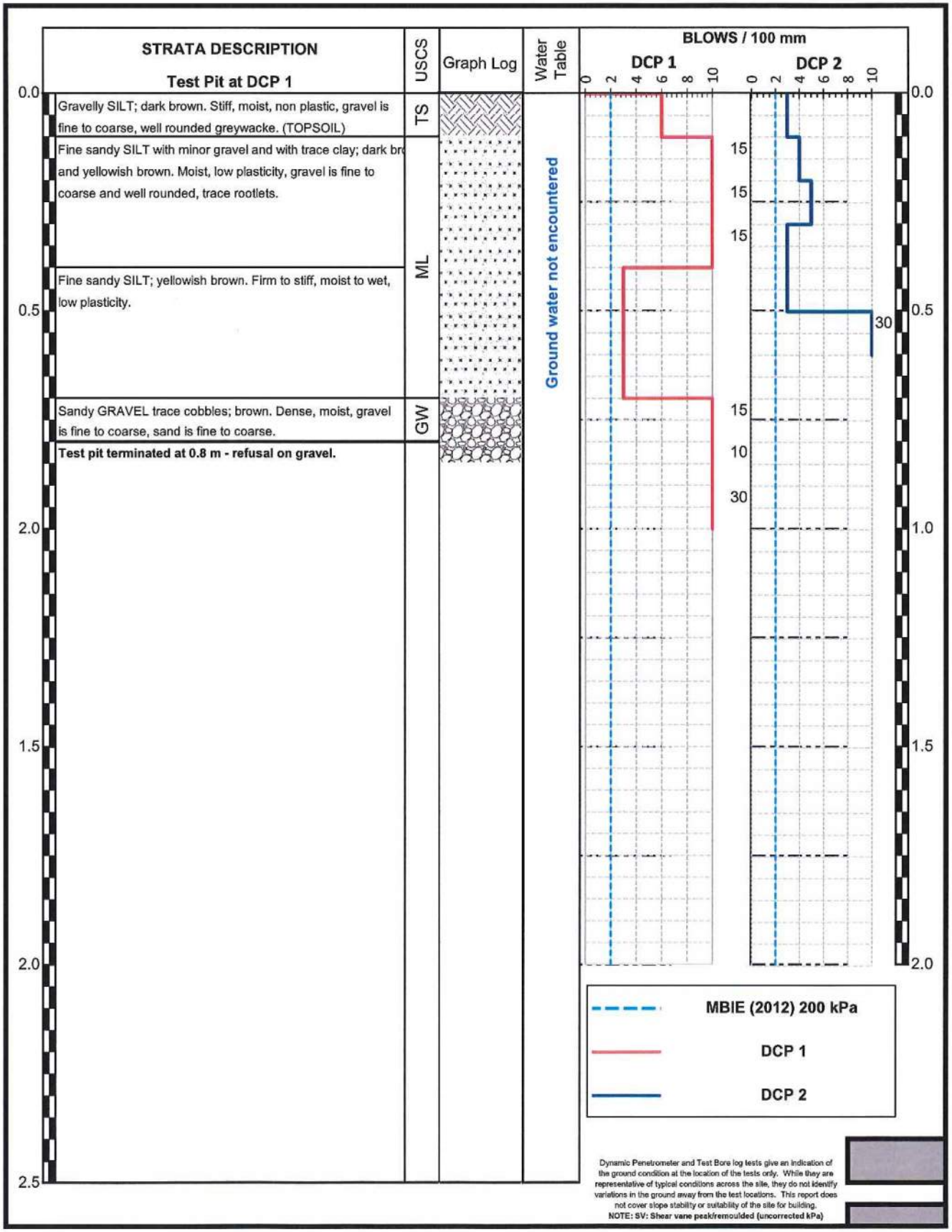
DAVIS OGILVIE
ENGINEERS / SURVEYORS / PLANNERS
11 Deans Ave, Addington // P O Box 589, Christchurch 8140
T. 0800 999 333 // E. admin@do.co.nz // www.do.co.nz

Job No. XXXXXX

DCP 1,2+TP

BORE LOG/SCALA PENETROMETER RESULTS

Project:	4 Austen Place, Rolleston, Canterbury (Lot 2 DP 460063)	Date:	8/08/2014
Client:	Rotary Club of Hornby Charitable Trust	Time:	10:00 a.m.
Test Location:	Refer to attached Geotechnical Site Plan (600A)	Field Staff:	KT+AB
Notes:	Shallow Investigation	Equipment:	SP+HA



Dynamic Penetrometer and Test Bore log tests give an indication of the ground condition at the location of the tests only. While they are representative of typical conditions across the site, they do not identify variations in the ground away from the test locations. This report does not cover slope stability or suitability of the site for building.
NOTE: SV: Shear vane peak/remoulded (uncorrected kPa)

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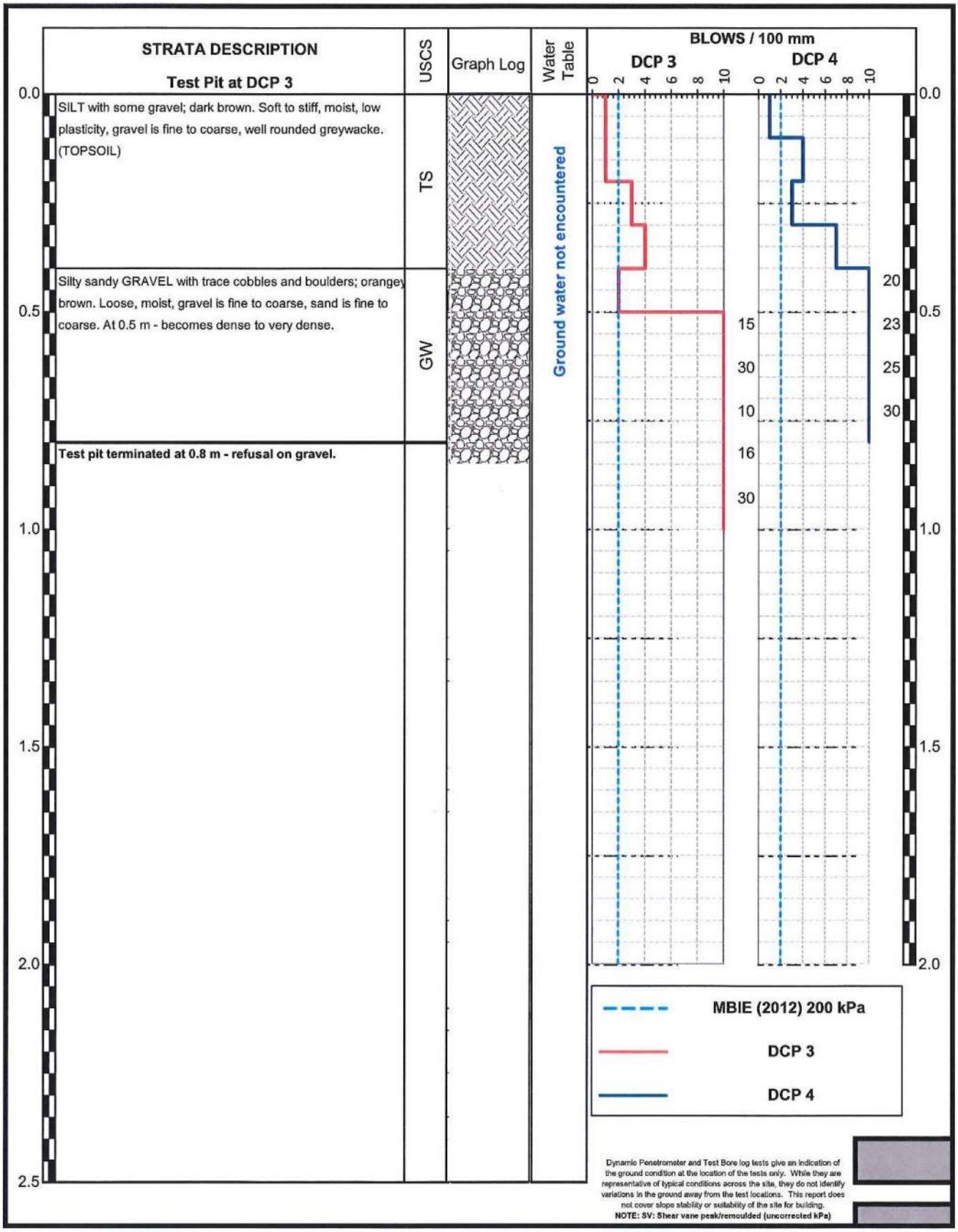
Job No: XXXXXX
DCP 3,4+TP

BORE LOG/SCALA PENETROMETER RESULTS

Project:	4 Austen Place, Rolleston, Canterbury (Lot 2 DP 460063)	Date:	8/08/2014
Client:	Rotary Club of Hornby Charitable Trust	Time:	10:00 a.m.
Test Location:	Refer to attached Geotechnical Site Plan (600A)	Field Staff:	KT+AB
Notes:	Shallow Investigation	Equipment:	SP+HA



Dynamic Penetrometer and Test Bore log tests give an indication of the ground condition at the location of the tests only. While they are representative of typical conditions across the site, they do not identify variations in the ground away from the test locations. This report does not cover slope stability or suitability of the site for building.
NOTE: SV: Shear vane peak/remoulded (uncorrected kPa)