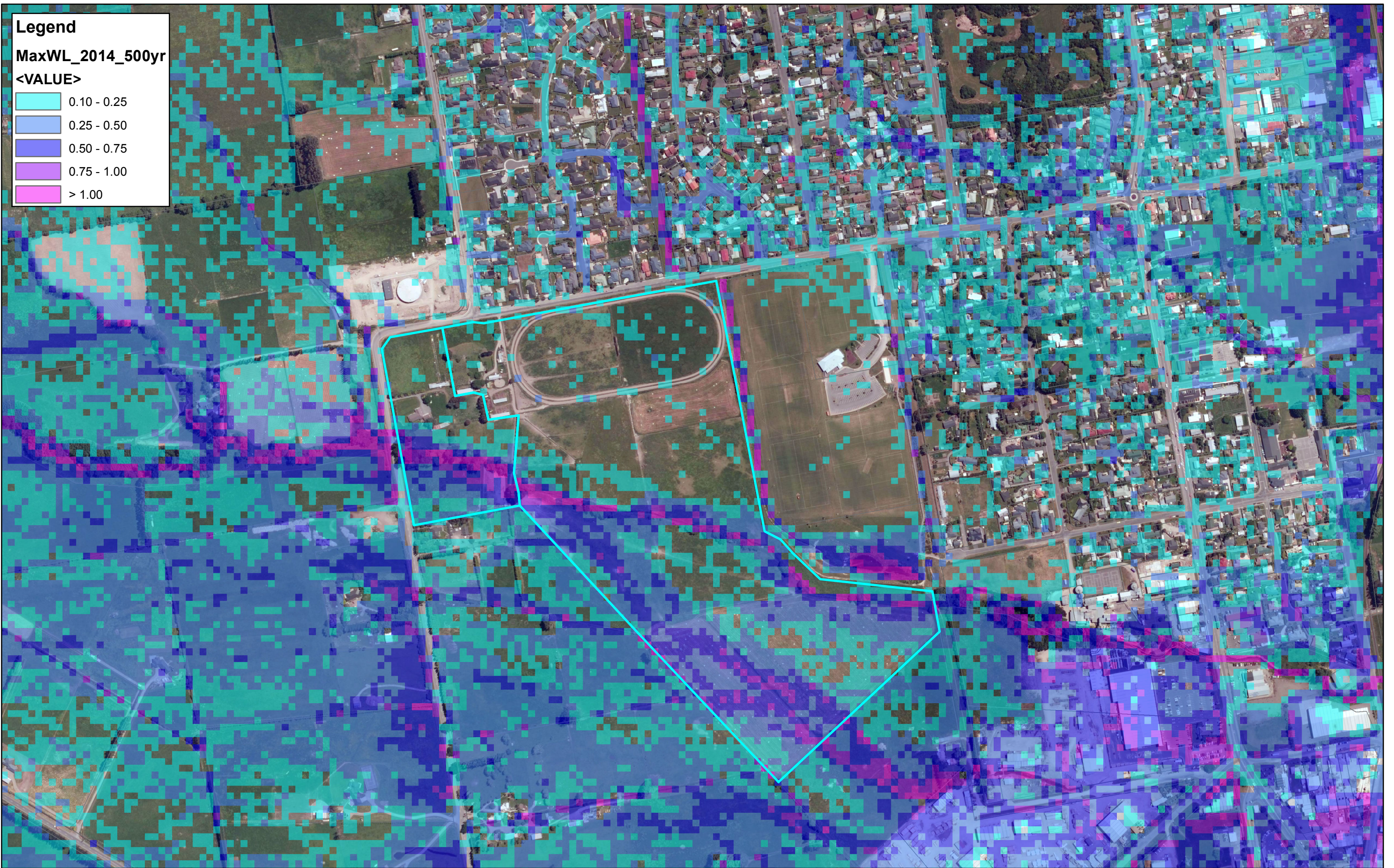


Appendix D : JUNE EVENT RAINFALL DATA FOR RANGIORA

WDC Storm Analysis - Estimated Annual Recurrence Interval

Rangiora

NZMG

Easting: 2476621

Northing: 5767215

Period Analysed: 9/06/2014 (start date)

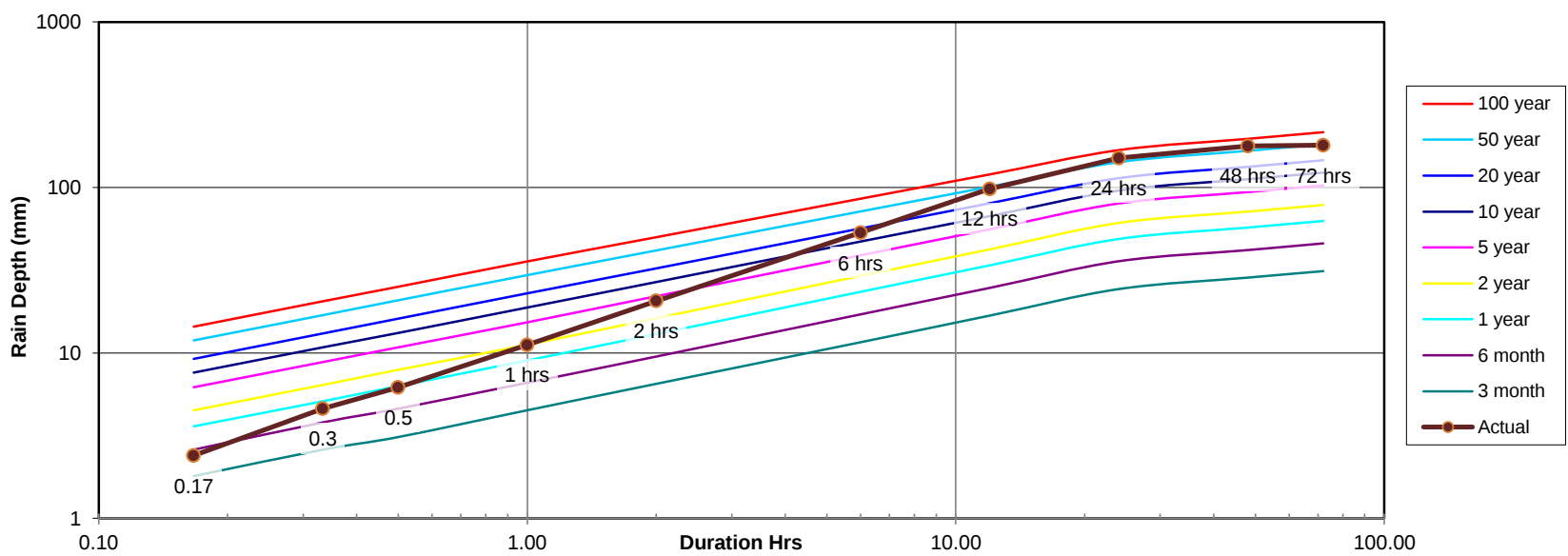
11/06/2014 (end date)

Event Duration: 52.667 hours

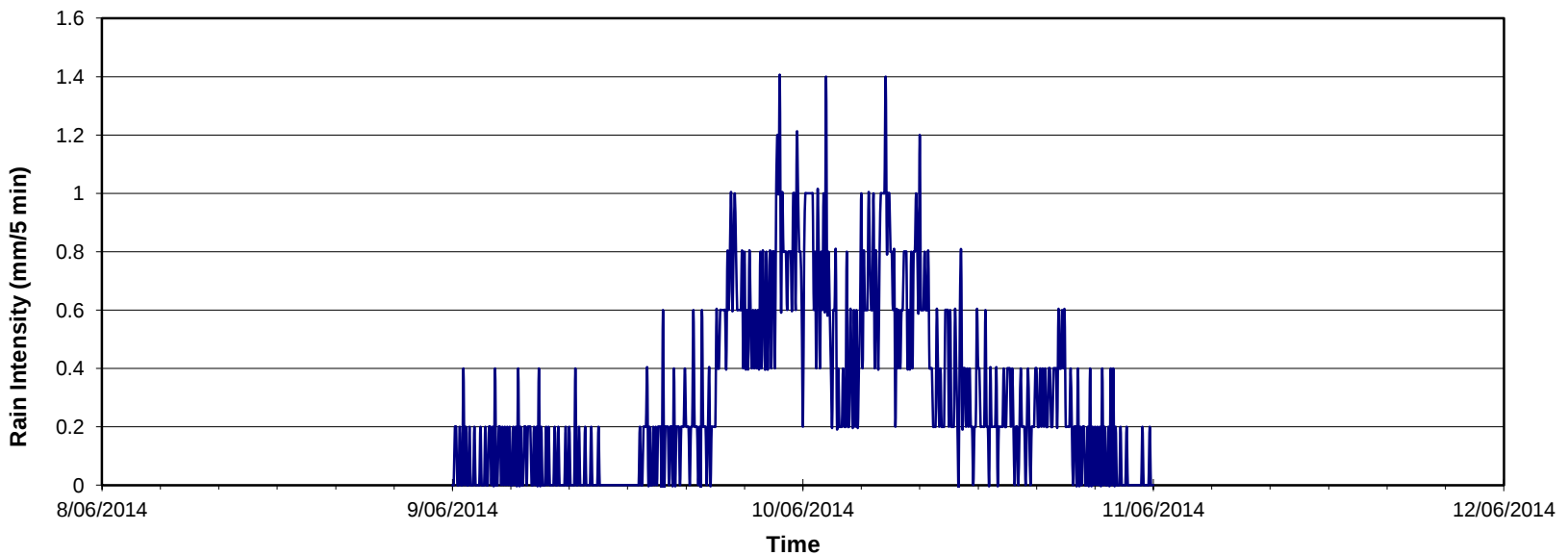
Data Frequency: 4.999999995 minutes

Duration (hours)	0.17	0.3	0.5	1	2	6	12	24	48	72
Event Rainfall (mm)	2.40	4.60	6.20	11.20	20.60	53.20	98.00	150.60	177.80	179.80
100 year	14.4	20.5	25.1	35.7	50	85.5	119.8	168	196.6	215.6
50 year	11.9	16.9	20.8	29.5	41.6	71.6	100.9	142.1	166.4	182.5
20 year	9.2	13.1	16.1	22.9	32.4	56.5	80.2	113.7	133.1	146
10 year	7.6	10.8	13.2	18.8	26.8	47.1	67.1	95.7	112.1	122.9
5 year	6.2	8.8	10.8	15.3	22	38.9	55.8	80	93.7	102.7
2 year	4.5	6.4	7.9	11.2	16.2	29.2	42.2	61	71.4	78.3
1 year	3.6	5.1	6.3	9	13	23.4	33.8	48.8	57.2	62.7
6 month	2.6	3.8	4.6	6.6	9.5	17.1	24.7	35.8	41.8	45.9
3 month	1.8	2.6	3.1	4.5	6.5	11.6	16.8	24.3	28.5	31.2
Calc Storm ARI	0.4	0.8	1.0	2.0	4.3	16.5	44.7	63.9	66.2	47.2

Rain Event ARI Analysis: Rangiora (E2476621, N5767215), 9/6/2014-11/6/2014



Rainfall: Rangiora (E2476621, N5767215), 9/6/2014-11/6/2014



Please note that the Annual Recurrence Interval (ARI) simply gives an estimate of how often a storm of a given magnitude will occur. The Annual Exceedance Probability (AEP) presents this information in a different form, as the probability that a storm of given magnitude will occur in any single year.

ARI (yrs)	AEP
100	1%
50	2%
20	5%
10	10%
5	20%
2	50%
1	100%
0.5	200%
0.25	400%

Appendix E : WELL LOGS



Unknown No: M35/18081

Well Name: BH002

Owner: WAIMAKARIRI DISTRICT COUNCIL



Street of Well: Corner of South Belt and Pentecost Road

File No: CO9C/69237

Locality: Rangiora

Allocation Zone: Ashley

NZGM Grid Reference: M35:76228-65255 QAR 3

NZGM X-Y: 2476228 - 5765255

Location Description:

Uses: Foundation/Investigation Bore

ECan Monitoring:

Well Status: Sealed / Grouted up

Drill Date: 29 Jul 2009

Water Level Count: 0

Well Depth: 13.20m -GL

Strata Layers: 3

Initial Water Depth: -1.00m -MP

Aquifer Tests: 0

Diameter:

Isotope Data: 0

Yield/Drawdown Tests: 0

Measuring Point Ait: 27.28m MSD QAR 4

Highest GW Level:

GL Around Well: 0.00m -MP

Lowest GW Level:

MP Description: G.L.

First Reading:

Last Reading:

Driller: McMillan Water Wells Ltd

Calc. Min. GWL:

Drilling Method: Hollow Stem Auger

Last Updated: 08 Dec 2009

Casing Material:

Last Field Check:

Pump Type:

Screens:

Yield:

Screen Type:

Drawdown:

Top GL:

Specific Capacity:

Bottom GL:

Aquifer Type:

Aquifer Name:

Date	Comments
14 Jul 2009	Permitted Bore
29 Sep 2009	Gridref changed from: M35:7633-6524 - Bore log received

Borelog for well M35/18081

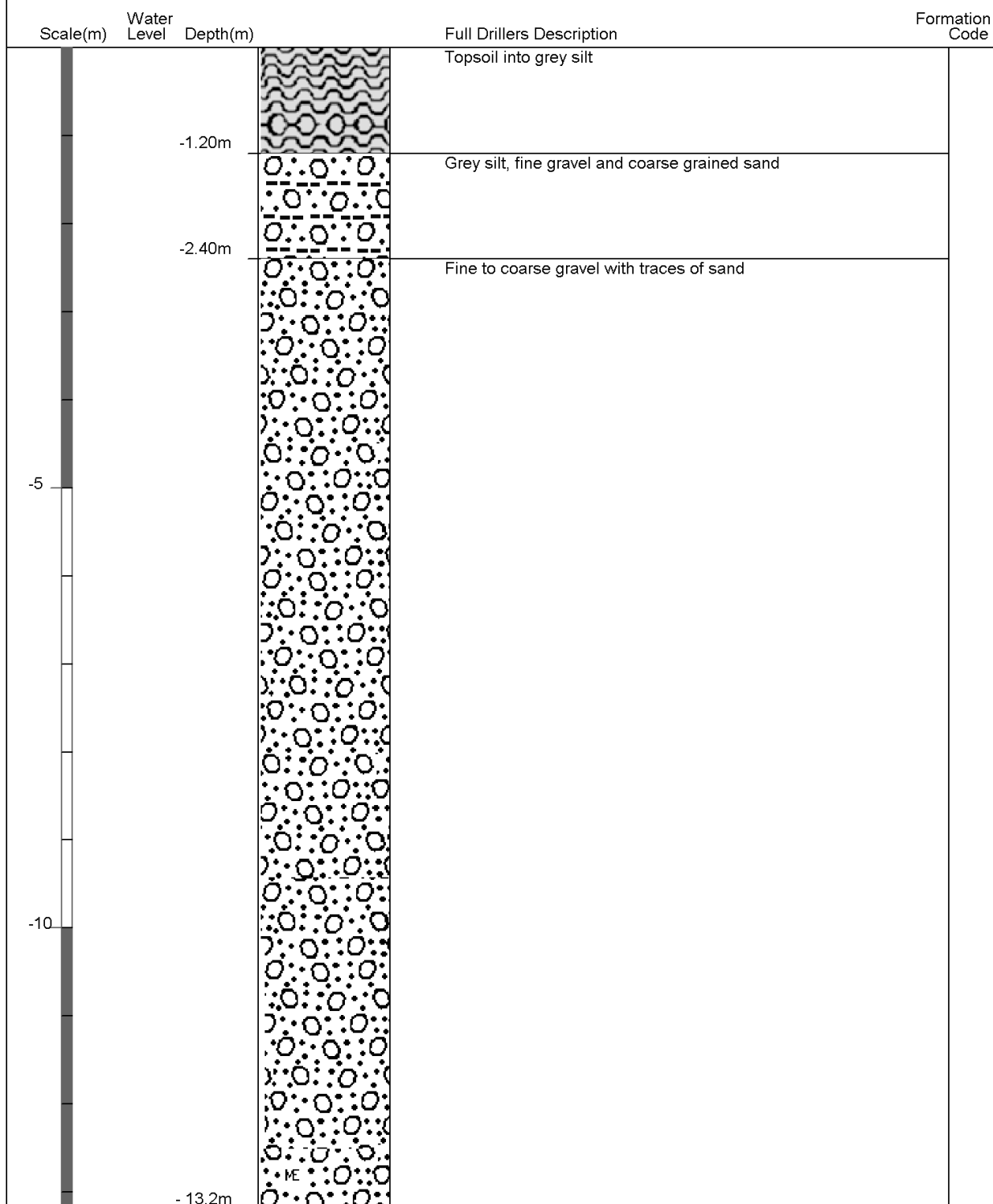
Gridref: M35:76228-65255 Accuracy : 3 (1=high, 5=low)

Ground Level Altitude : 27.28 +MSD

Driller : McMillan Water Wells Ltd

Drill Method : Hollow Stem Auger

Drill Depth : -13.2m Drill Date : 29/07/2009



Bore or Well No: M35/0257

Well Name:

Owner:



Street of Well:

Locality: SOUTHBROOK

NZGM Grid Reference: M35:769-646 QAR 4

NZGM X-Y: 2476900 - 5764600

Location Description:

ECan Monitoring:

Well Status: Not Used

File No:

Allocation Zone: Ashley

Uses:

Drill Date: 18 Nov 1968

Well Depth: 18.30m -GL

Initial Water Depth:

Diameter: 914mm

Water Level Count: 0

Strata Layers: 2

Aquifer Tests: 0

Isotope Data: 0

Yield/Drawdown Tests: 0

Measuring Point Ait: 23.08m MSD QAR 4

GL Around Well: 0.00m -MP

MP Description:

Driller: Cashmere Drilling (1967) Ltd

Drilling Method: Driven Pipe

Casing Material:

Pump Type: Unknown

Yield: 0 l/s

Drawdown: 0 m

Specific Capacity:

Aquifer Type: Unknown

Aquifer Name:

Highest GW Level:

Lowest GW Level:

First Reading:

Last Reading:

Calc. Min. GWL: -1.10m -MP

Last Updated: 26 Jan 1995

Last Field Check:

Screens:

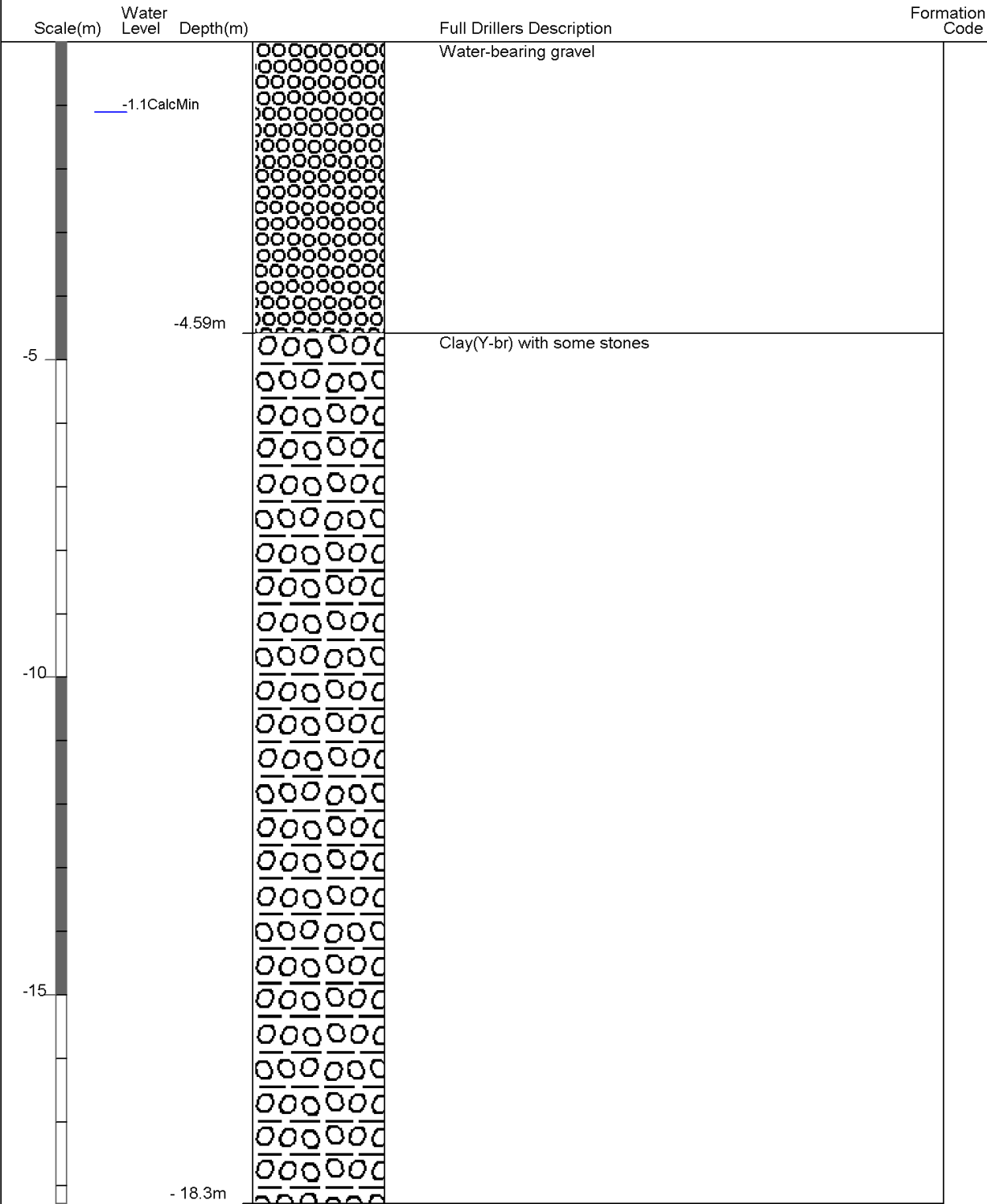
Screen Type:

Top GL:

Bottom GL:

Borelog for well M35/0257

Gridref: M35:769-646 Accuracy : 4 (1=high, 5=low)
Ground Level Altitude : 23.08 +MSD
Driller : Cashmere Drilling (1967) Ltd
Drill Method : Driven Pipe
Drill Depth : -18.29m Drill Date : 18/11/1968



Appendix F : SHALLOW SITE INVESTIGATION RESULTS

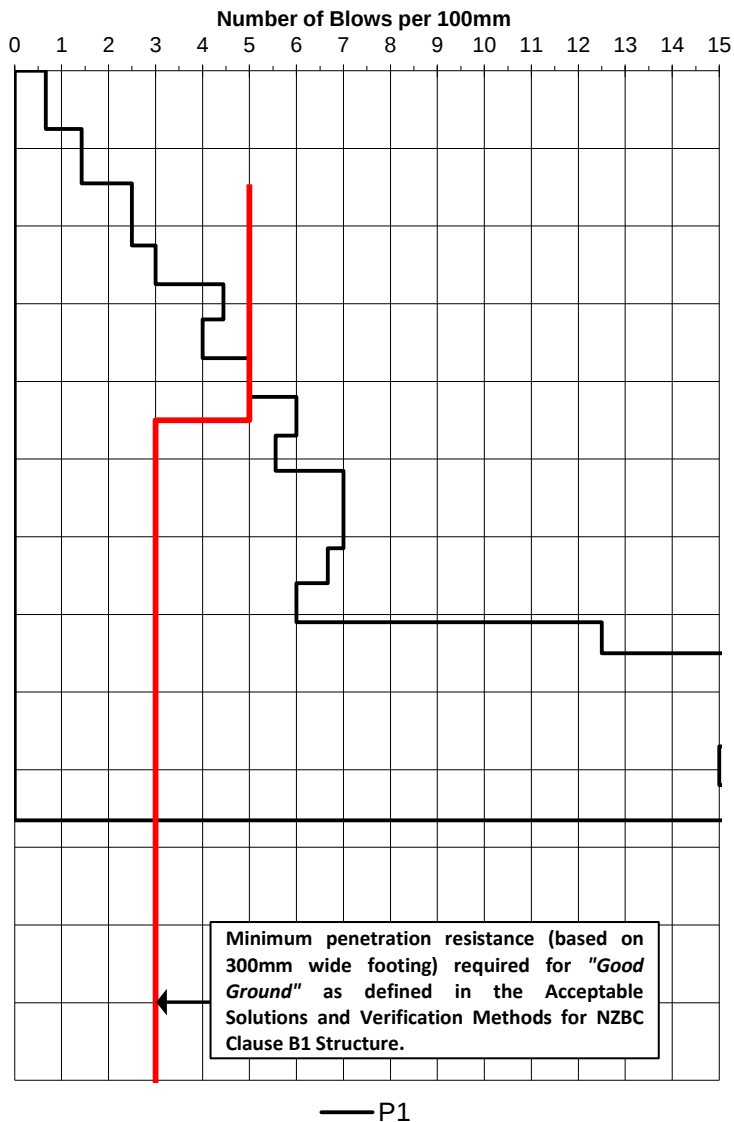
SITE INVESTIGATION RECORD

D.P.
Lot
Technical Category
N/A Rural

Client **Mr BL Clarke & Williams
McKenzie Trustees**

Site **141 South Belt (Lot 3 DP73557) &
104 Townsend Rd (Lot 1 DP 45826), Rangiora**

SCALA PENETROMETER TESTS

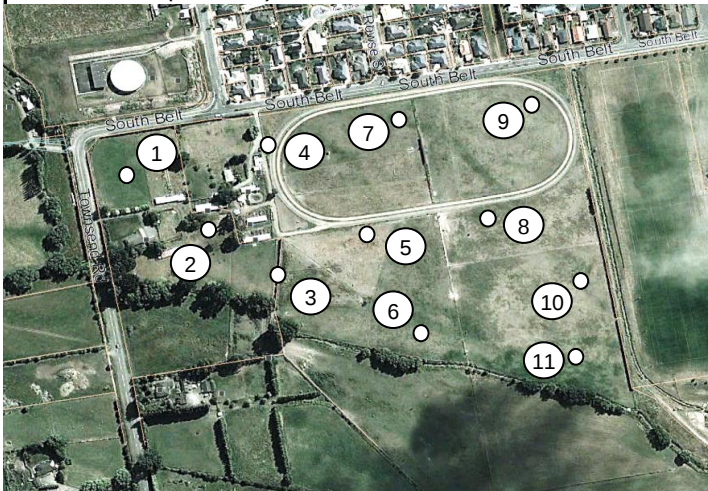


DEPTH

BORE LOGS

DEPTH [m]	Hand Auger	Machine Auger	Test Pit
G.L.	☒	☐	☐
0.2	(Borehole @ 1)		
0.4	Dark brown TOPSOIL, wet, with rootlets <2mm Ø		
0.6	Water Table @ 0.6m		
0.8			
1.0			
1.2			
1.4	Brownish grey sandy GRAVEL, saturated		
1.6	STOP - Gravel		
1.8			
2.0			
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			

SITE PLAN (Not to Scale)



COMMENTS

LOGGED BY:

LW / PN

CHECKED BY:

JTA

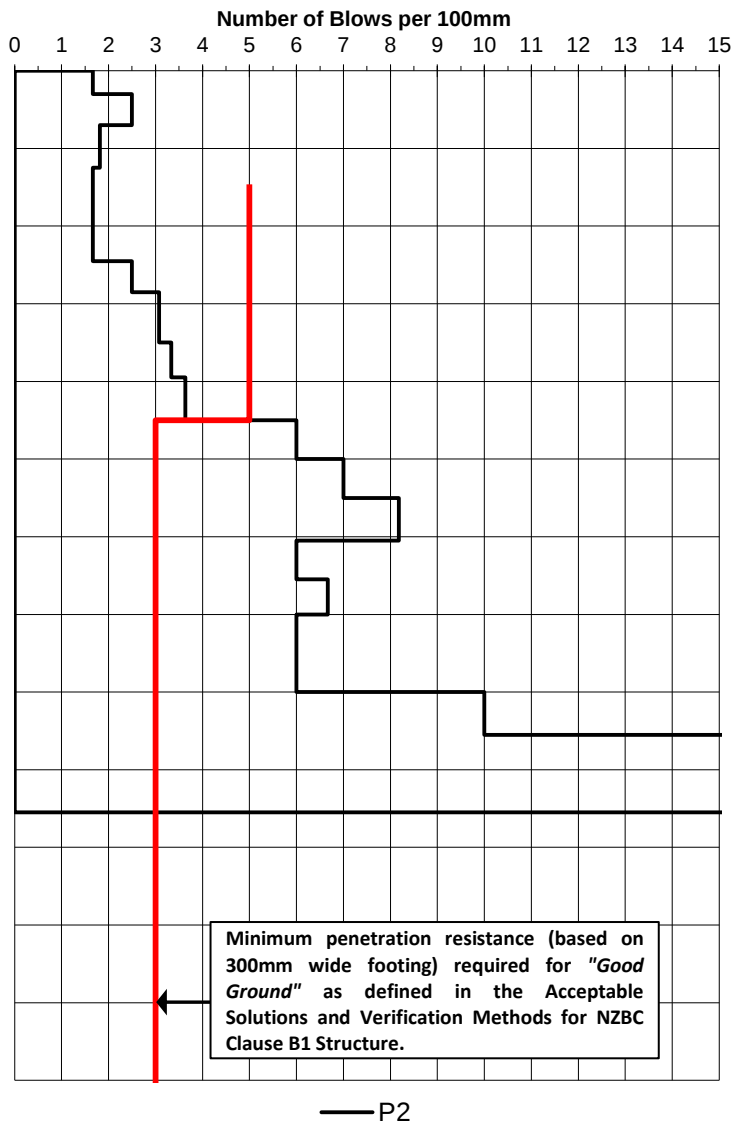
SITE INVESTIGATION RECORD

Client **Mr BL Clarke & Williams
McKenzie Trustees**

Site **141 South Belt (Lot 3 DP73557) &
104 Townsend Rd (Lot 1 DP 45826), Rangiora**

Technical Category
N/A Rural

SCALA PENETROMETER TESTS



DEPTH

BORE LOGS

DEPTH [m]	Hand Auger	Machine Auger	Test Pit
G.L.	☒	☐	☐
0.2	(Borehole @ 2)		
0.4			
0.6			
0.8			
1.0			
1.2			
1.4			
1.6			
1.8			
2.0			
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			

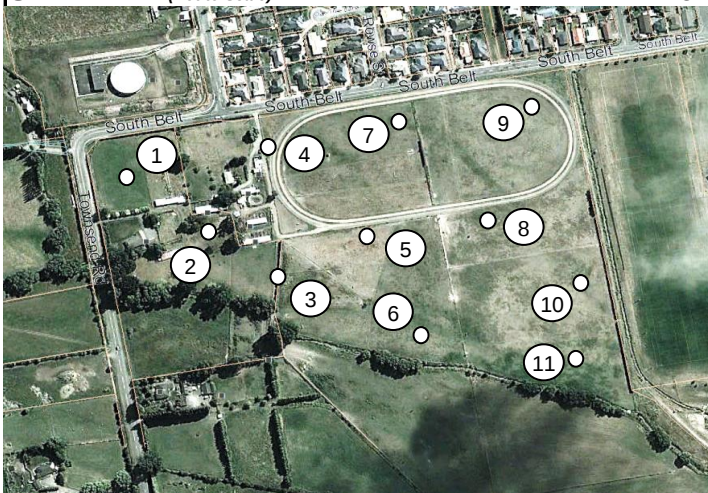
Dark brown silty TOPSOIL Fill, moist to wet, with some grey silt content with iron staining, minor rootlets

Grey sandy clayey SILT, moist to wet, iron staining, (grinding stones - could not retrieve stone sample)

Brownish grey sandy SILT, moist to wet, with traces of rootlets <5%
STOP - Gravel

Water Table
@ 1.4m

SITE PLAN (Not to Scale)



COMMENTS

LOGGED BY:

LW / PN

CHECKED BY:

JTA

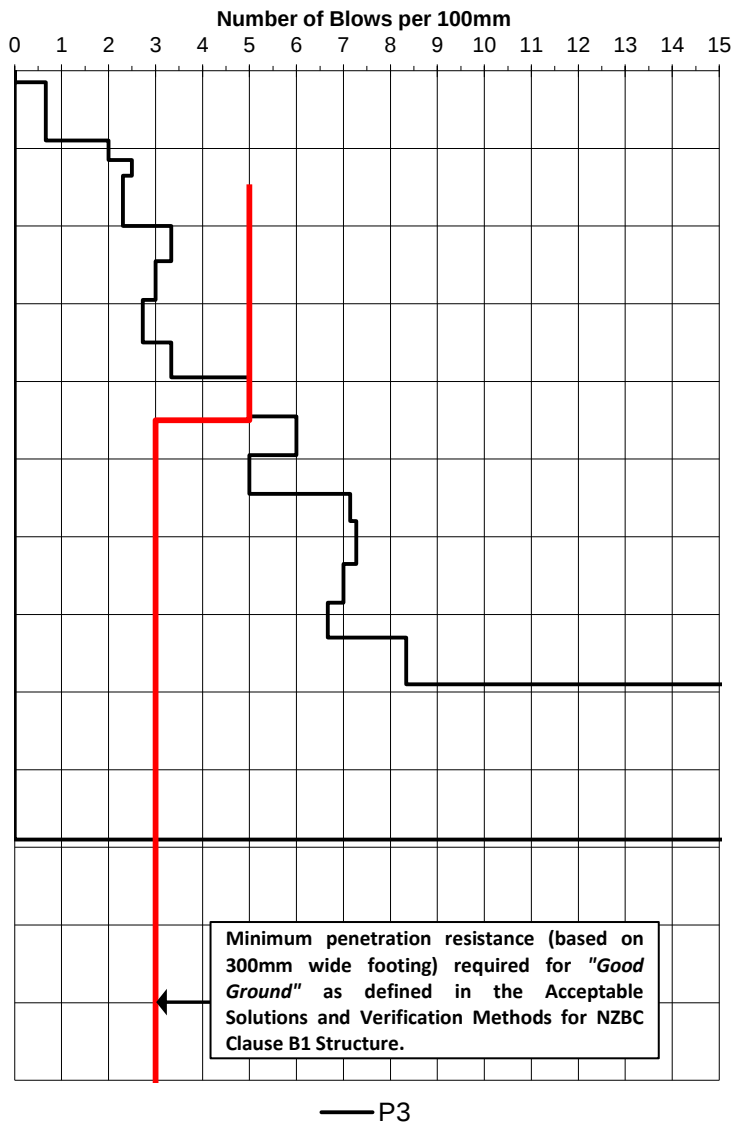
SITE INVESTIGATION RECORD

Client **Mr BL Clarke & Williams
McKenzie Trustees**

Site **141 South Belt (Lot 3 DP73557) &
104 Townsend Rd (Lot 1 DP 45826), Rangiora**

Technical Category
N/A Rural

SCALA PENETROMETER TESTS



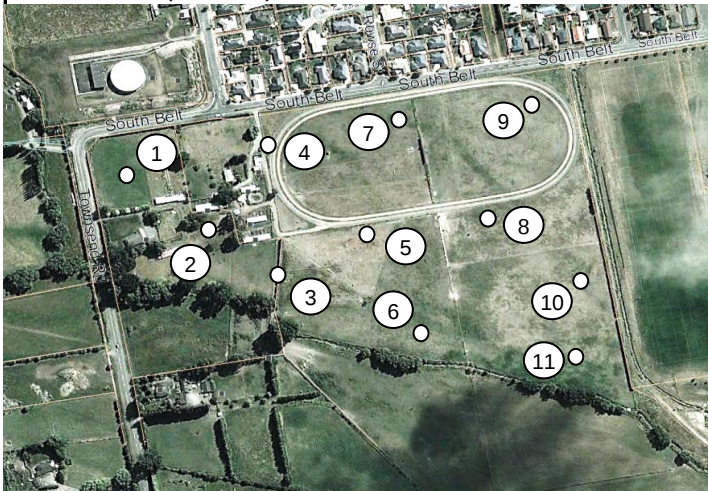
DEPTH

BORE LOGS

DEPTH [m]	Hand Auger	Machine Auger	Test Pit
G.L.	☒	☐	☐
0.2	(Borehole @ 3) Dark brown silty TOPSOIL Fill, wet, with rootlets and some stones		
0.4	Grey clayey SILT, moist, iron staining, with traces of rootlets		
0.6			
0.8			
1.0	Grey sandy clayey SILT, moist, iron staining		
1.2			
1.4	Grey sandy silty GRAVEL, moist to wet, stones		
1.6	Grey sandy SILT, moist to wet		
1.8	Bluish grey sandy GRAVEL, wet		
2.0	STOP - Gravel		
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			

Water Table
@ 1.0m

SITE PLAN (Not to Scale)



COMMENTS

LOGGED BY:

LW / PN

CHECKED BY:

JTA

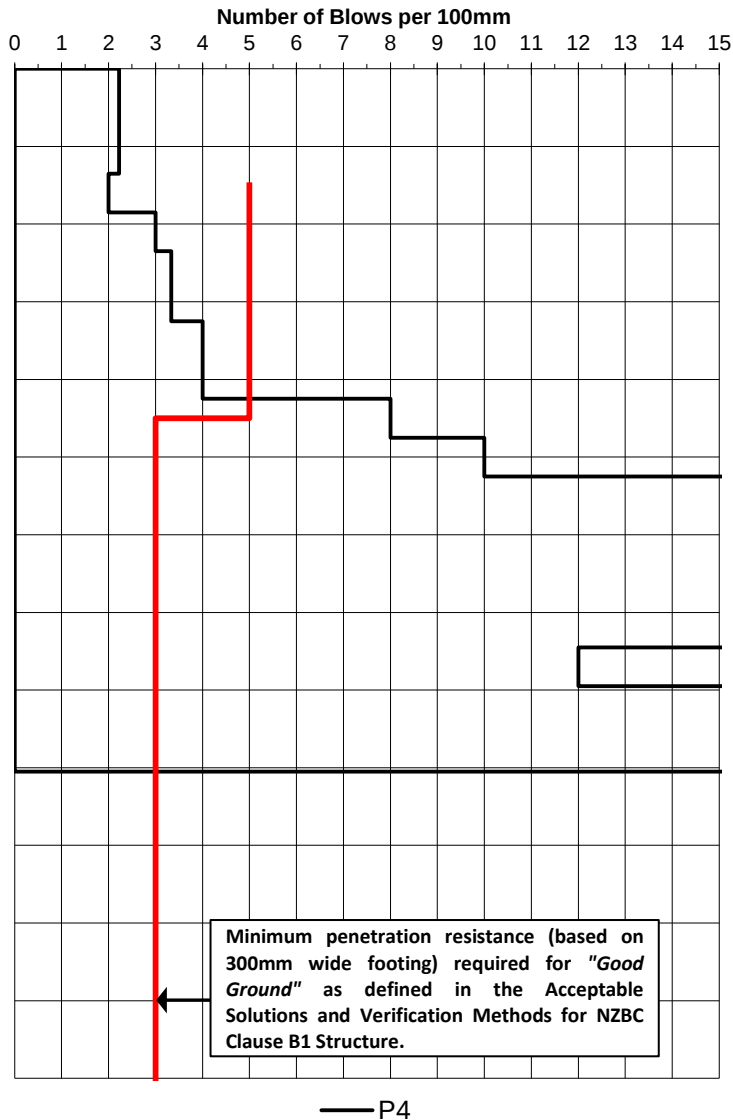
SITE INVESTIGATION RECORD

Client **Mr BL Clarke & Williams
McKenzie Trustees**

Site **141 South Belt (Lot 3 DP73557) &
104 Townsend Rd (Lot 1 DP 45826), Rangiora**

Technical Category
N/A Rural

SCALA PENETROMETER TESTS

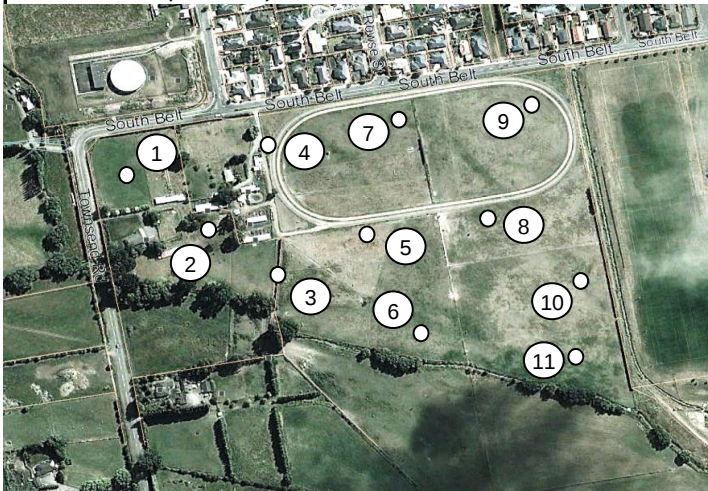


DEPTH

BORE LOGS

DEPTH [m]	Hand Auger	Machine Auger	Test Pit
G.L.	☒	☐	☐
0.2	(Borehole @ 4)		
0.4	Dark brown silty TOPSOIL Fill, moist, with rootlets and some stones <20%		
0.6	Grey clayey SILT, damp, iron staining		
0.8	Grey clayey sandy SILT, damp, iron staining		
1.0	STOP - Stones		
1.2			
1.4			
1.6			
1.8			
2.0			
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			

SITE PLAN (Not to Scale)



COMMENTS

LOGGED BY:

LW / PN

CHECKED BY:

JTA