

TEST PIT No: **TP102**

JOB NUMBER: 6518788

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling

TEST PIT LOCATION:

RL:
DATUM:

TEST_PIT P:\6516518788\OHOKA MEADOWS DS\GINTOHOKAM.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP103**

TEST PIT LOG

SHEET 1 of 1

[illegible]

TEST_PIT P:1651\6518788\OHOKA MEADOWS DSI\GIN\TOHOKAM.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP104**

SHEET 1 of 1

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling		JOB NUMBER: 6518788									
SITE LOCATION:		CLIENT: WDC									
CIRCUIT: TEST PIT LOCATION:											
COORDINATES: N E		R L: DATUM:									
DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	Scale	SV	γ (kPa)	SAMPLES	DEPTH (m)
			OL	M	SILT, some fine to medium sand, minor medium to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	TOPSOIL				S1	
0.5			GW	M	Fine to coarse GRAVEL, minor fine to coarse sand, trace clay, trace silt; light brownish grey; moist. Gravel: rounded to sub-angular.	RIVER GRAVELS				S2	0.5
1.0										S3	1.0
END OF LOG @ 1.1 m											
1.5											1.5
2.0											2.0
2.5											2.5
3.0											3.0
3.5											3.5
DATE EXCAVATED: 22/7/13 CONTRACTOR: Phil (Dawe Contracting Ltd)						COMMENTS:					
LOGGED BY: CJS EQUIPMENT:						S1 13:068 TP104 0.0-0.1m					
SHEAR VANE No: METHOD:						S2 13:068 TP104 0.5-0.6m					
						S3 13:068 TP104 1.0-1.1m					
FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET											
Revision 1											

TEST PIT No: **TP105**

TEST PIT LOG

SHEET 1 of 1

PROJECT:		Ohoka Meadows and Mandeville WWTP soil sampling			JOB NUMBER: 6518788	
SITE LOCATION:					CLIENT: WDC	
CIRCUIT:		TEST PIT LOCATION:				
COORDINATES: N		R.L:				
E		DATUM:				
DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT
			QL	M	SILT, some fine to medium sand, minor medium to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	TOP SOIL
0.5			GW	M	Fine to coarse GRAVEL, minor fine to coarse sand, minor silt, trace clay; dark brown; moist. Gravel: rounded to sub-angular.	RIVER GRAVELS
1.0						
1.5						
2.0					END OF LOG @ 1.6 m	
2.5						
3.0						
3.5						
DATE EXCAVATED: 22/7/13		CONTRACTOR: Phil (Dawe Contracting Ltd)		COMMENTS:		
LOGGED BY: CJS		EQUIPMENT:		S1 13:068 TP105 0.5-0.6m		
SHEAR VANE No:		METHOD:		S2 13:068 TP105 1.5-1.6m		
FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET						
Revision 1						

TEST_PIT P:65116518788\OHOKA MEADOWS DSI\GIN\TOHOKAM.GPJ BECA.GDT 13/8/13

TEST PIT LOG

SHEET 1 of 1

[illegible]

TEST_PIT P:165116518788\OHOKA MEADOWS DS\GIN\OHOKAM.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP107****TEST PIT LOG**

SHEET 1 of 1

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling				JOB NUMBER: 6518788			
SITE LOCATION:				CLIENT: WDC			
CIRCUIT:				TEST PIT LOCATION:			
COORDINATES: N E				R.L: DATUM:			

DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	Scale	SV	γ (kPa)	SAMPLES	DEPTH (m)
		X X X X X X X X X X X X X X X X X X X X	ML	M	SILT, minor fine sand, minor fine to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets.. Pocket of coarse sand, light yellowish brown.	IMPORTED TOPSOIL				S1	
0.5			GP	M	Coarse sandy fine to coarse GRAVEL; light yellowish brown; moist, non plastic. Gravel: rounded.	RIVER GRAVELS				S2	0.5
1.0				S	Becoming saturated.						1.0
1.5					END OF LOG @ 1.5 m					S3	1.5
2.0											2.0
2.5											2.5
3.0											3.0
3.5											3.5

DATE EXCAVATED: 23/7/13	CONTRACTOR: Phil (Dawe Contracting Ltd)	COMMENTS: S1 13:068 TP107 0.0-0.1m S2 13:068 TP107 0.5-0.6m S3 13:068 TP107 1.4-1.5m
LOGGED BY: CJS	EQUIPMENT:	
SHEAR VANE No:	METHOD:	

TEST_PIT_P106518788OHOKA MEADOWS DSIGINTOHOKAM.GPJ BECA.GDT 13/8/13

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

Revision 1

A4 Scale 1:20

TEST PIT No: **TP108****TEST PIT LOG**

SHEET 1 of 1

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling		JOB NUMBER: 6518788	
SITE LOCATION:		CLIENT: WDC	
CIRCUIT:		TEST PIT LOCATION:	
COORDINATES: N E		R L: DATUM:	

DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	Scale	SV	γ (kPa)	SAMPLES	DEPTH (m)
		x x x x x x x x x x x x x x x x x x x x	ML	M	SILT, minor fine sand, minor fine to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	IMPORTED TOPSOIL					
0.5			GP	M	Coarse sandy fine to coarse GRAVEL, trace clay, trace fine cobbles; light yellowish brown; moist, non plastic. Gravel/Cobbles: rounded.	RIVER GRAVELS				S1	0.5
1.0											1.0
1.5										S2	1.5
					END OF LOG @ 1.6 m						
2.0											2.0
2.5											2.5
3.0											3.0
3.5											3.5

DATE EXCAVATED: 23/7/13	CONTRACTOR: Phil (Dawe Contracting Ltd)	COMMENTS: S1 13:068 TP108 0.6-0.7m S2 13:068 TP108 1.5-1.6m
LOGGED BY: CJS	EQUIPMENT:	
SHEAR VANE No:	METHOD:	

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

Revision 1

TEST_PIT_P:\6518788\OHOKA MEADOWS DS\GINT\OHOKA.M.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP109****TEST PIT LOG**

SHEET 1 of 1

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling				JOB NUMBER: 6518788			
SITE LOCATION:				CLIENT: WDC			
CIRCUIT: TEST PIT LOCATION:							
COORDINATES: N E				R L: DATUM:			
DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	DEPTH (m)
		x x	ML	M	SILT, minor fine sand, minor fine to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	IMPORTED TOPSOIL	
0.5			GP	M	Coarse sandy fine to coarse GRAVEL, fine cobbles; light yellowish brown; moist, non plastic. Gravel: rounded.	RIVER GRAVELS	0.5
1.0							1.0
1.5							1.5
					END OF LOG @ 1.6 m		
2.0							2.0
2.5							2.5
3.0							3.0
3.5							3.5
DATE EXCAVATED: 23/7/13				CONTRACTOR: Phil (Dawe Contracting Ltd)		COMMENTS: S1 13:068 TP109 0.6-0.7m S2 13:068 TP109 1.5-1.6m	
LOGGED BY: CJS				EQUIPMENT:			
SHEAR VANE No:				METHOD:			
FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET							

TEST PIT P:\6518788\OHOKA MEADOWS DS\GINT\OHOKA.M.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP110****TEST PIT LOG**

SHEET 1 of 1

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling		JOB NUMBER: 6518788	
SITE LOCATION:		CLIENT: WDC	
CIRCUIT: COORDINATES: N E		TEST PIT LOCATION: R L: DATUM:	

DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	Scale	SV	T _v (kPa)	SAMPLES	DEPTH (m)
			ML	M	SILT, minor fine sand, minor fine to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	I.T.					
0.5			GM	M	SILT, some fine to coarse gravel, some fine to coarse sand, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular; trace cobbles.. Trace rootlets..	FILL				S1	0.5
1.0											1.0
1.5										S2	1.5
2.0											2.0
2.5											2.5
3.0			GP	M	Coarse sandy medium to coarse GRAVEL; greyish brown; moist, non plastic. Gravel: rounded to sub-angular.	RIVER GRAVELS				S3	3.0
3.5					END OF LOG @ 3 m						3.5

DATE EXCAVATED: 23/7/13	CONTRACTOR: Phil (Dawe Contracting Ltd)	COMMENTS: S1 13:068 TP110 0.5-0.6m S2 13:068 TP110 1.4-1.5m S3 13:068 TP110 2.9-3.0m I.T. = IMPORTED TOPSOIL
LOGGED BY: CJS	EQUIPMENT:	
SHEAR VANE No:	METHOD:	

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

Revision 1

TEST_PIT_P:\6518788\OHOKA MEADOWS DS\GINT\OHOKA.M.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP111**

TEST PIT LOG

SHEET 1 of 1

PROJECT:		Ohoka Meadows and Mandeville WWTP soil sampling		JOB NUMBER: 6518788							
SITE LOCATION:				CLIENT: WDC							
CIRCUIT:		TEST PIT LOCATION:									
COORDINATES: N		R.L:									
E		DATUM:									
DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	Scale	SV	T' (kPa)	SAMPLES	DEPTH (m)
0.5			ML	M	SILT, minor fine sand, minor fine to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	I.T.				S1	0.5
			GM	M	Sandy fine to coarse GRAVEL, minor silt; dark grey; moist, non plastic. Gravel: rounded to sub-angular; trace cobbles..	FILL				S2	
										S3	
										S4	
1.0											1.0
1.5											1.5
2.0											2.0
2.5											2.5
3.0											3.0
3.5			GP	M	Coarse sandy medium to coarse GRAVEL; greyish brown; moist, non plastic. Gravel: rounded to sub-angular.	R.G.					3.5
					END OF LOG @ 3.5 m						
DATE EXCAVATED: 23/7/13		CONTRACTOR: Phil (Dawe Contracting Ltd)		COMMENTS:							
LOGGED BY: CJS		EQUIPMENT:		S1 13:068 TP111 0.0-0.1m							
SHEAR VANE No:		METHOD:		S2 13:068 TP111 0.6-0.7m							
				S3 13:068 TP111 1.5-1.6m							
				S4 13:068 TP111 3.4-3.5m							
				I.T. = IMPORTED TOPSOIL, R.S. = RIVER GRAVELS							
FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET											
Revision 1											

TEST_PIT P:165116518788\OHOKA MEADOWS DSI\GINTO\HOKAM.GPJ BECA.GDT 13/8/13

TEST PIT No: **TP112****TEST PIT LOG**

SHEET 1 of 1

PROJECT: Ohoka Meadows and Mandeville WWTP soil sampling		JOB NUMBER: 6518788	
SITE LOCATION:		CLIENT: WDC	
CIRCUIT: N COORDINATES: E		TEST PIT LOCATION: R L: DATUM:	

DEPTH (m)	WATER LEVEL	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	Scale	SV	T (kPa)	SAMPLES	DEPTH (m)	
0.5			ML	M	SILT, minor fine sand, minor fine to coarse gravel, trace clay; dark grey; moist, low plasticity. Gravel: rounded to sub-angular. Trace rootlets..	I.T.					S1	0.5
			GM	M	Sandy fine to coarse GRAVEL, minor silt; dark grey; moist, non plastic. Gravel: rounded to sub-angular; trace cobbles.. Trace plaster.. Strip of red plastic encountered.	FILL						S2
1.0												
1.5												1.5
2.0												2.0
2.5												2.5
3.0			GP	M	Coarse sandy medium to coarse GRAVEL; greyish brown; moist, non plastic. Gravel: rounded to sub-angular.	RIVER GRAVELS					S3	3.0
3.5					END OF LOG @ 3.1 m							3.5

DATE EXCAVATED: 23/7/13	CONTRACTOR: Phil (Dawe Contracting Ltd)	COMMENTS: S1 13:068 TP112 0.5-0.6m S2 13:068 TP112 1.4-1.5m S3 13:068 TP112 3.0-3.1m I.T. = IMPORTED TOPSOIL
LOGGED BY: CJS	EQUIPMENT:	
SHEAR VANE No:	METHOD:	

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

Revision 1

TEST_PIT_P16518518788OHOKA MEADOWS DSIGINTOHOKAM.GPJ BECA.GDT 13/8/13

Appendix B - Relevant ECan well records

Borelog for well M35/9184

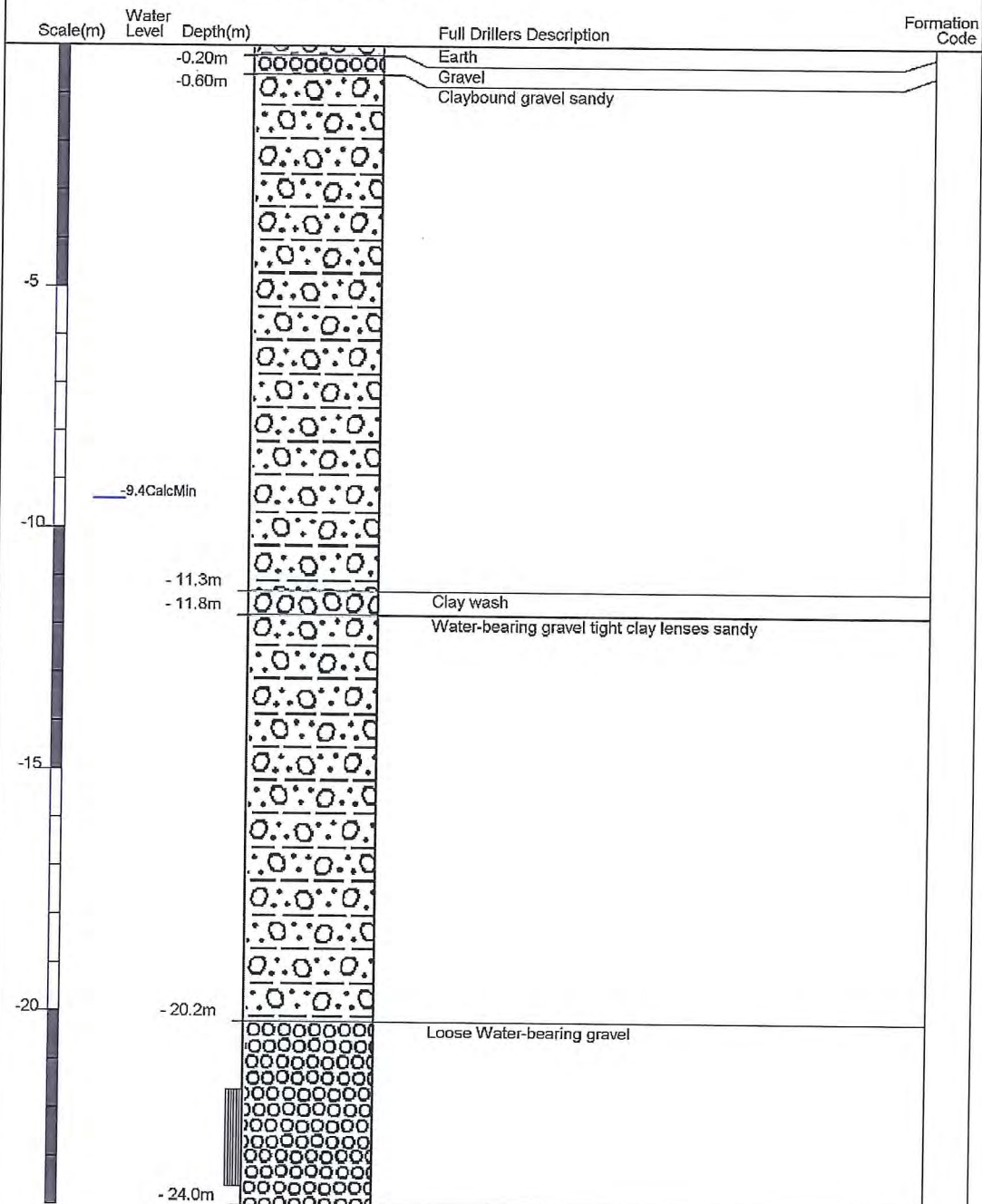
Gridref: M35:7264-5824 Accuracy : 4 (1=high, 5=low)

Ground Level Altitude : 37 +MSD

Driller : Clemence Drilling Contractors

Drill Method : Not Recorded

Drill Depth : -24m Drill Date : 20/11/2001



Borelog for well M35/9398

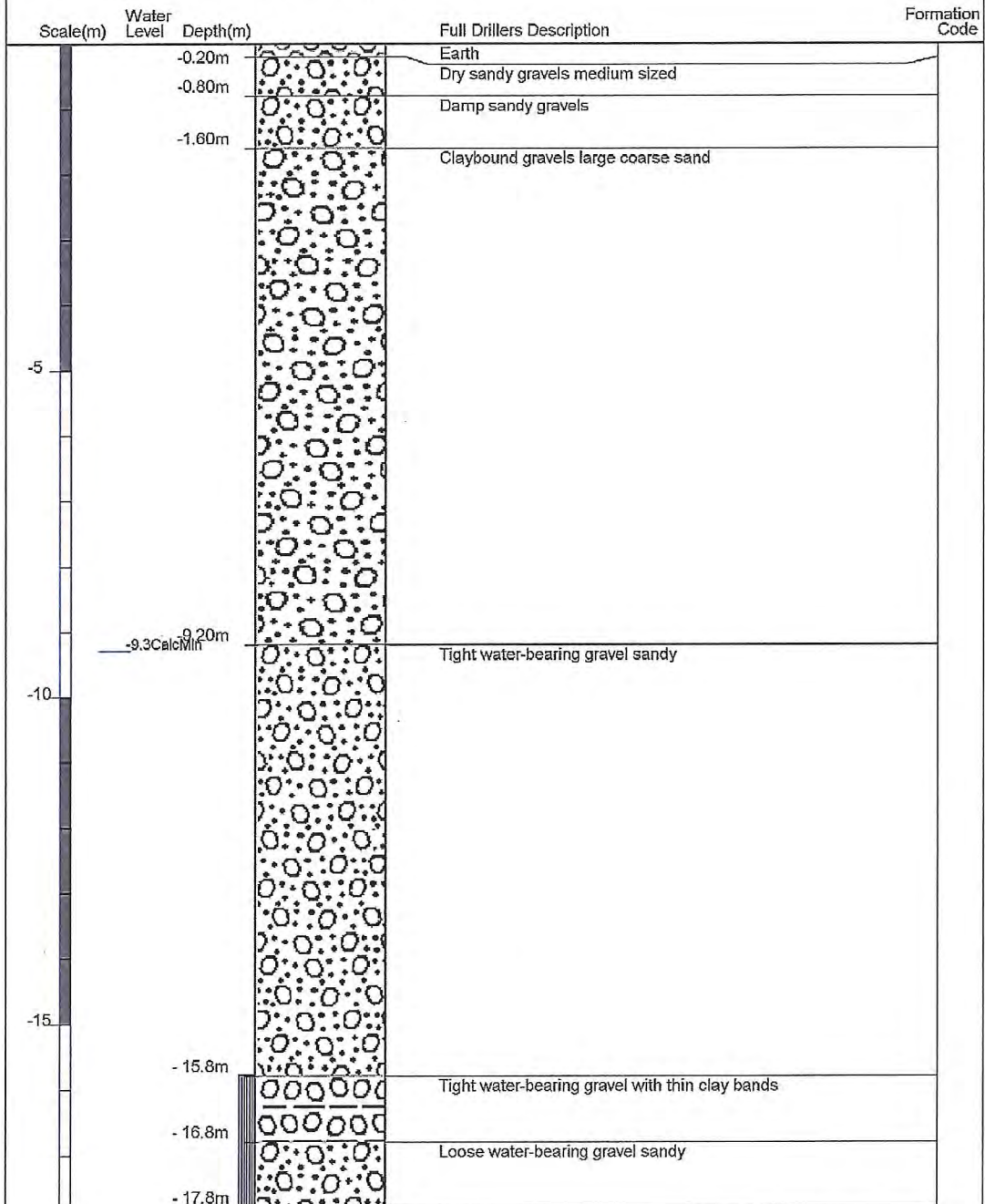
Gridref: M35:7235-5831 Accuracy : 4 (1=high, 5=low)

Ground Level Altitude : 39 +MSD

Driller : Clemence Drilling Contractors

Drill Method : Rotary Rig

Drill Depth : -17.8m Drill Date : 8/12/2002



Borelog for well M35/9741

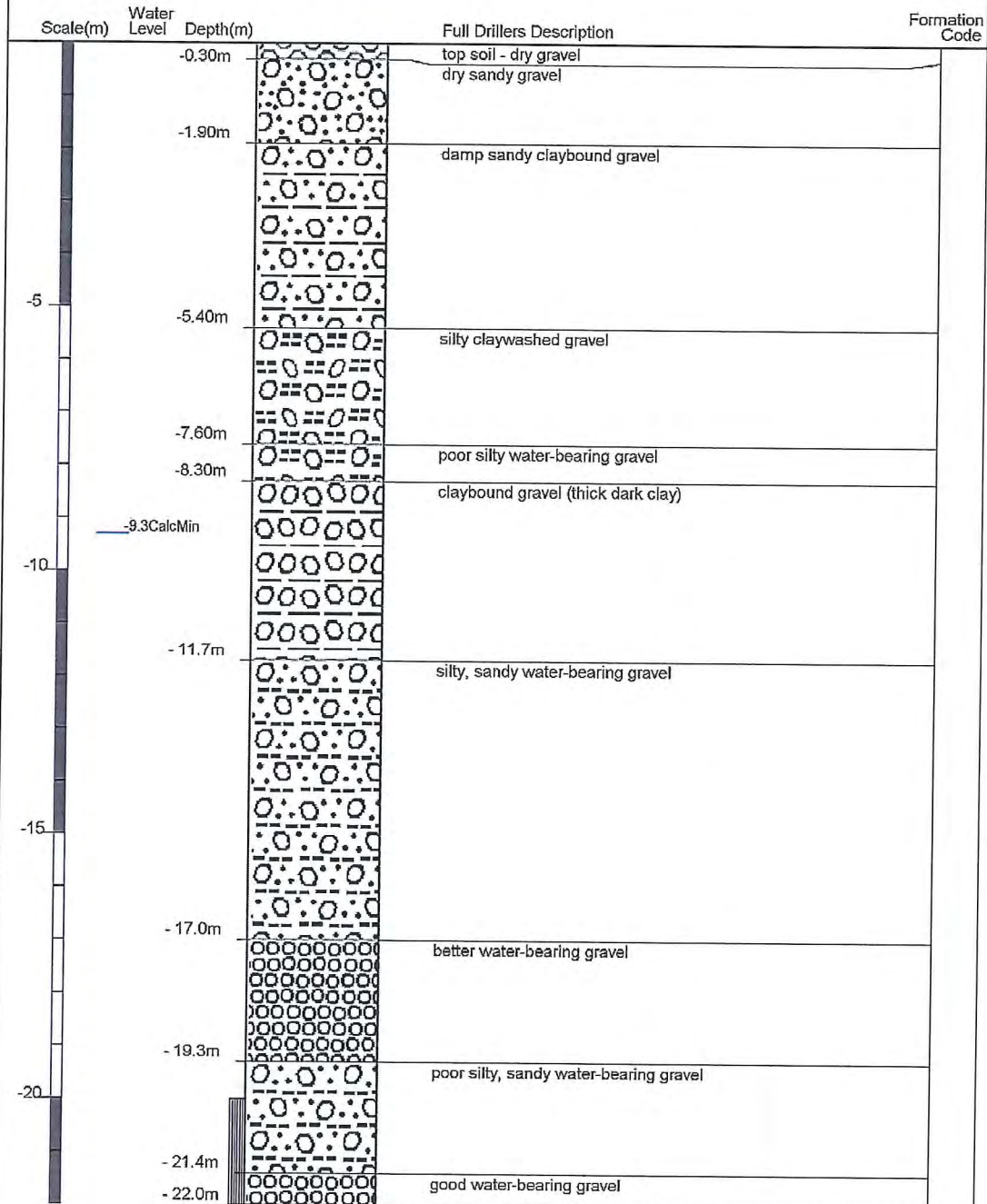
Gridref: M35:7283-5824 Accuracy : 4 (1=high, 5=low)

Ground Level Altitude : 36 +MSD

Driller : Clemence Drilling Contractors

Drill Method : Rotary/Percussion

Drill Depth : -22m Drill Date : 23/03/2004



Borelog for well M35/9876

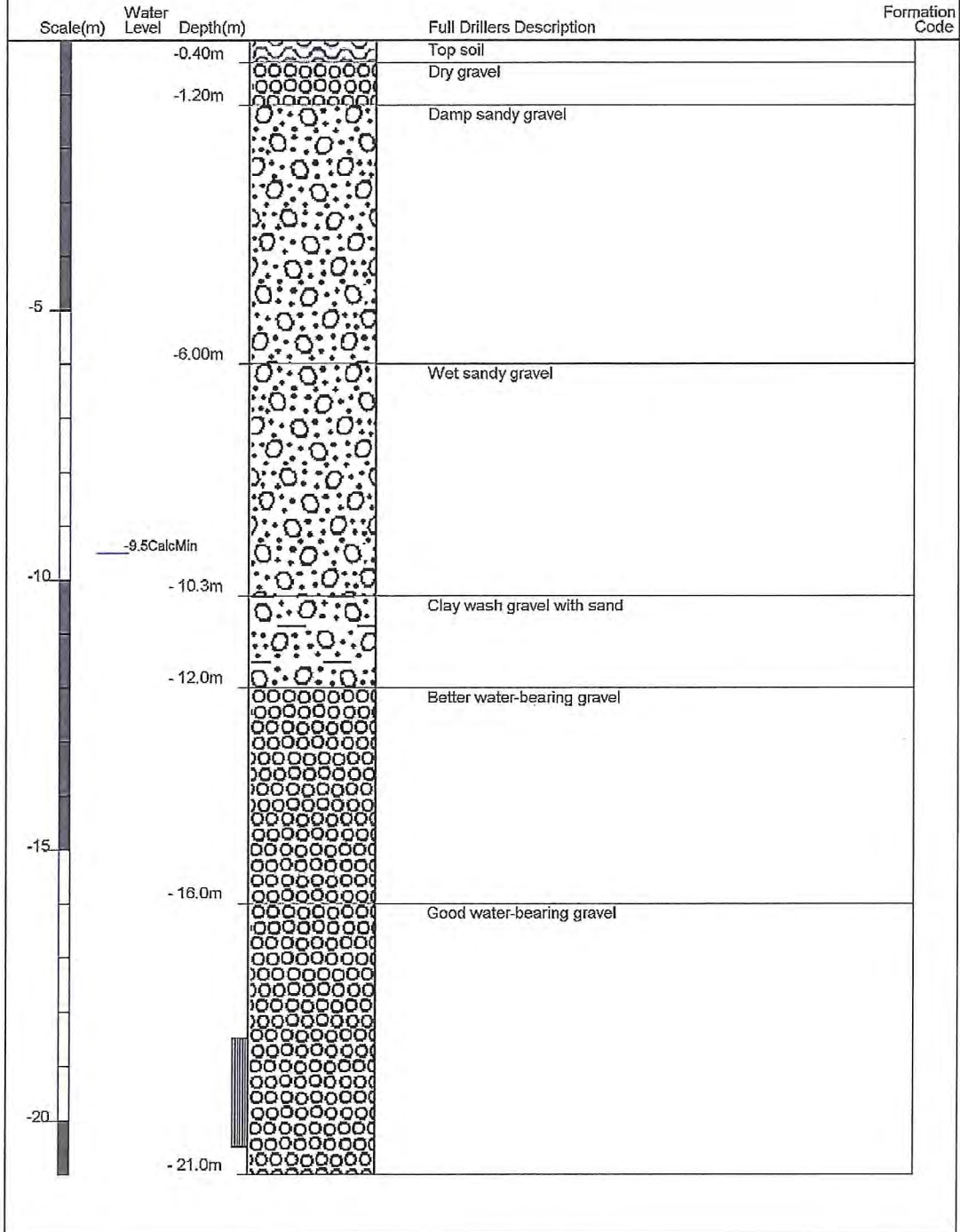
Gridref: M35:7256-5822 Accuracy : 3 (1=high, 5=low)

Ground Level Altitude : 37 +MSD

Driller : Clemence Drilling Contractors

Drill Method : Rotary/Percussion

Drill Depth : -21m Drill Date : 12/10/2003



Borelog for well M35/11107

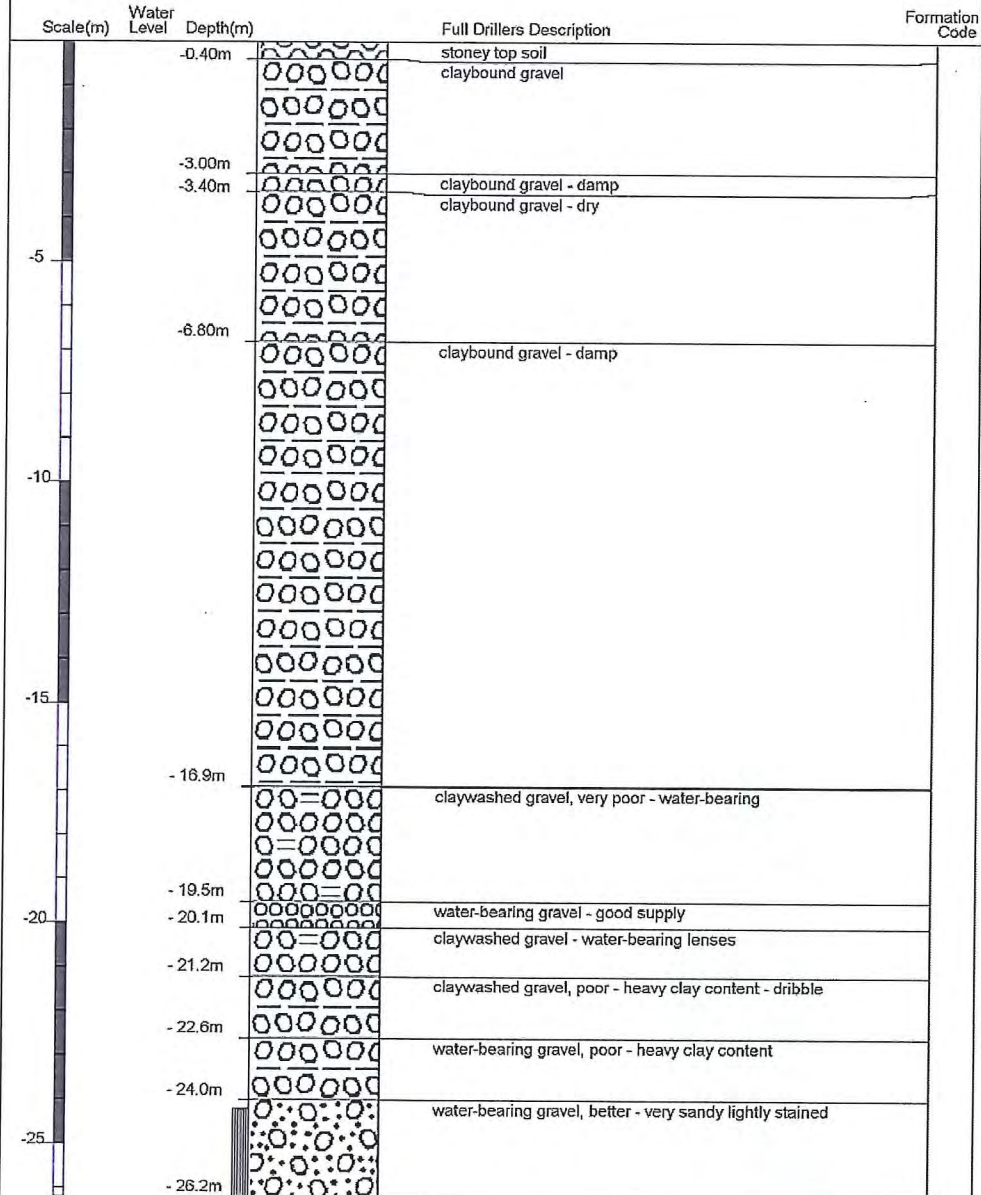
Gridref: M35:7204-5880 Accuracy : 3 (1=high, 5=low)

Ground Level Altitude : 38 +MSD

Driller : Clemence Drilling Contractors

Drill Method : Rotary/Percussion

Drill Depth : -26.2m Drill Date : 3/03/2006



Appendix C - Inspection Pit engineering logs (IP01 – IP11) including DCP test results

Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP01**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **10 Sep 2014**

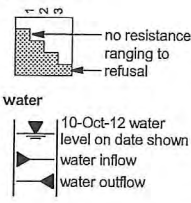
date completed: **10 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator, Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide: -

excavation information				material substance											
method	support	1 penetration	2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear @ remoulded @ peak (kPa)	DCP (blows/ 100 mm)	structure and additional observations
E	N	1	2				1.0		ML	SILT: non plastic to low plasticity, dark brown, some fine to medium grained sand and minor fine to medium rounded gravel, moist. Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, some silt, sand is fine to coarse grained, moist to saturated, medium dense to very dense. 1.2 m: becoming brown-grey, with minor silt <					

method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator support N none S shoring	penetration  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet W _p plastic limit W _L liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP02**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **10 Sep 2014**

date completed: **10 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide: -

excavation information					material substance				
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description
N		1						ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, moist.
X		2						GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, some silt and trace rootlets/roots, sand is fine to coarse grained, moist to saturated, medium dense to very dense.
BH		3							0.6 m: silt becoming minor
B						1.0			
R						2.0			2.0 m: rootlets absent
E						3.0			
						4.0			
						5.0			Test pit IP02 terminated at 4.5 m Machine limit

method	penetration	samples & field tests	classification symbol & soil description	consistency / relative density
N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator	no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	moisture D dry M moist W wet W _p plastic limit W _L liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP03**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **10 Sep 2014**

date completed: **10 Sep 2014**

logged by: *J. Byron-Joyce*

checked by: **B. Raasch**

position: Not Specified

surface elevation: Not Specified

pit orientation: NW-SE

DCP id.: -

equipment type: Hitachi 13.5t Excavator; Track

excavation method: Machine Excavator

excavation dimensions: 3.0 m long 0.8 m wide: -

excavation information					material substance					structure and additional observations				
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear @ remoulded @ peak (kPa)	DCP (blows/100 mm)	structure and additional observations
N	1	1						ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, moist.	M				TOPSOIL
X	2	2				1.0		GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, sand is fine to coarse grained, moist, very dense.		VD			SPRINGSTON FORMATION Relative density inferred
BH	3	3				2.0		GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, minor silt, sand is fine to coarse grained, moist to saturated, very dense. 1.5 m: with some cobbles (<150mm)					
B						3.0								
R						4.0								
E						5.0			Test pit IP03 terminated at 4.2 m Machine limit	S				

Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP04**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **10 Sep 2014**

date completed: **10 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide: -

excavation information					material substance				
method	support	penetration	water	samples & field tests	depth (m)	graphic log	classification symbol	material description	moisture condition
N		1					ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, moist.	M
X		2					GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, sand is fine to coarse grained, moist, dense.	D
BH		3					GP	Sandy GRAVEL: fine to coarse grained, brown-grey, some silt, sand is fine to coarse grained, moist to saturated, very dense. 1.0 m: with some cobbles (<150mm)	VD
B					1.0				
R					2.0				
E					3.0				
					4.0				
					5.0				
								Test pit IP04 terminated at 4.3 m Machine limit	S

method
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

support
N none
S shoring

penetration
no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
U## undisturbed sample ##mm diameter
D disturbed sample
B bulk disturbed sample
E environmental sample
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shearpeak/remoulded (uncorrected kPa)
R refusal

classification symbol & soil description based on Unified Classification System

moisture
D dry
M moist
W wet
W_p plastic limit
W_L liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP05**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **11 Sep 2014**

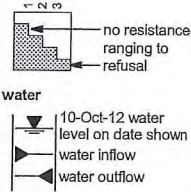
date completed: **11 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide:

excavation information					material substance									
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (kPa)	DCP (blows/100 mm)	structure and additional observations
N		1						ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, moist.	M				TOPSOIL
		2						GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, trace rootlets, sand is fine to coarse grained, moist, medium dense to very dense, 0.6 m: rootlets absent		MD			SPRINGSTON FORMATION
		3									D			
											VD			Relative density inferred
						1.0								
						2.0		GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, some cobbles (<150mm) and minor silt, sand is fine to coarse grained, moist to saturated, very dense.					
						3.0			3.0 m: becoming grey	W				
						4.0				S				
						5.0			Test pit IP05 terminated at 4.2 m Machine limit					

method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator support N none S shoring	penetration  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP06**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **11 Sep 2014**

date completed: **11 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified		surface elevation: Not Specified		pit orientation: NW-SE		DCP id.: -	
equipment type: Hitachi 13.5t Excavator; Track		excavation method: Machine Excavator		excavation dimensions: 3.0 m long 0.8 m wide.			

excavation information				material substance				structure and additional observations					
method	support	penetration	water	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (kPa)	DCP (blows/100 mm)	structure and additional observations
N							ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, dry.	D				TOPSOIL
							GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, trace rootlets, sand is fine to coarse grained, dry, medium dense to very dense.	MD				SPRINGSTON FORMATION
									D				Relative density inferred
							GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, minor cobbles (<150mm), sand is fine to coarse grained, dry to saturated.	VD				
					1.0								
					2.0								
					3.0								
					4.0								
					5.0			Test pit IP06 terminated at 4.5 m Machine limit	S				

method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator support N none S shoring	penetration  no resistance ranging to refusal water  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet W _p plastic limit W _L liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP07**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

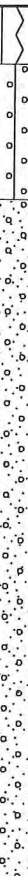
date excavated: **11 Sep 2014**

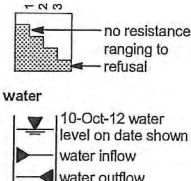
date completed: **11 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide:

excavation information				material substance										
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear ● remoulded ● peak (kPa)	DCP (blows/ 100 mm)	structure and additional observations
HA	N	1				1.0		ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, moist. Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, sand is fine to coarse grained, moist, dense to very dense. Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, some silt, sand is fine to coarse grained, moist to saturated, very dense. 1.4 m: silt becoming minor	M		50 100 150 200		TOPSOIL
		D						SPRINGSTON FORMATION						
		VD						Relative density inferred						
						2.0		GP						
						3.0								
						4.0								
						5.0			Test pit IP07 terminated at 4.5 m Machine limit	S				

method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator support N none S shoring	penetration  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear/peak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet W _p plastic limit W _L liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP08**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **10 Sep 2014**

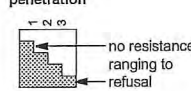
date completed: **10 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide: -

excavation information					material substance				
method	support	penetration	water	samples & field tests	depth (m)	classification symbol	material description	moisture condition	consistency / relative density
N		1				ML	SILT: non plastic to low plasticity, dark brown, some fine to medium grained sand and minor fine to medium rounded gravel, moist.	M	
X		2				GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, sand is fine to coarse grained, moist, dense to very dense.	D	
BH		3				GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown-grey, minor silt, sand is fine to coarse grained, moist, very dense.	VD	
B					1.0				
R					2.0				
E					3.0				
					4.0				
					5.0				
							Test pit IP08 terminated at 3.3 m Target depth		

method	penetration	samples & field tests	classification symbol & soil description based on Unified Classification System	consistency / relative density
N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator	 no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	moisture D dry M moist W wet W _p plastic limit W _L liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP09**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **10 Sep 2014**

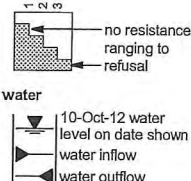
date completed: **10 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide: -

excavation information					material substance									
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (kPa)	DCP (blows/100 mm)	structure and additional observations
N		1						ML	SILT: non plastic to low plasticity, dark brown, some fine to medium grained sand and minor fine to medium rounded gravel, moist.	M				TOPSOIL
		2						GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, sand is fine to coarse grained, moist, medium dense to very dense.					SPRINGSTON FORMATION
		3												Relative density inferred
						1.0		GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, some cobbles (<150mm) and minor silt, sand is fine to coarse grained, moist, very dense.					
						2.0			2.0 m: becoming grey-brown					
						3.0								
						4.0			Test pit IP09 terminated at 3.5 m Target depth					
						5.0								

method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator support N none S shoring	penetration  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet W _p plastic limit W _L liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP10**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **11 Sep 2014**

date completed: **11 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified surface elevation: Not Specified pit orientation: NW-SE DCP id.: -
equipment type: Hitachi 13.5t Excavator; Track excavation method: Machine Excavator excavation dimensions: 3.0 m long 0.8 m wide:

excavation information					material substance									
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (kPa)	DCP (blows/100 mm)	structure and additional observations
N		1						ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, moist.	M				TOPSOIL
		2						GW	Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, trace rootlets, sand is fine to coarse grained, moist, very dense.		VD			SPRINGSTON FORMATION
		3						GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, some silt, sand is fine to coarse grained, moist to saturated, very dense.					Relative density inferred
						1.0			1.5 m: silt becoming minor, with some cobbles (<150mm)					
						2.0								
						3.0								
						4.0								
						5.0			Test pit IP10 terminated at 4.4 m Machine limit	S				

method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator	penetration 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet W _p plastic limit W _L liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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CDF_0_9_05_LIBRARY\GLB rev-AP Log COF EXCAVATION + PSP/DCP 15611AA TEST PITS.GPJ <<DrawingFile>> 20/11/2014 15:12

Engineering Log - Excavation

client: **Waimakariri District Council**

principal: -

project: **Mandeville North Plan Change**

location: **975 Tram Road and 450, 460 and 474 Mandeville Road**

Excavation ID. **IP11**

sheet: 1 of 1

project no. **GENZCHRI15611AA**

date excavated: **11 Sep 2014**

date completed: **11 Sep 2014**

logged by: **J. Byron-Joyce**

checked by: **B. Raasch**

position: Not Specified

surface elevation: Not Specified

pit orientation: NW-SE

DCP id.: -

equipment type: Hitachi 13.5t Excavator; Track

excavation method: Machine Excavator

excavation dimensions: 3.0 m long 0.8 m wide:

excavation information							material substance									
method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear ⊗ remoulded ⊙ peak (kPa)	DCP (blows/ 100 mm)	structure and additional observations		
N	1	2	3			1.0		ML	SILT: non plastic to low plasticity, dark brown, some fine to coarse grained sand and minor fine to medium rounded gravel, dry. Silty Sandy GRAVEL: fine to coarse grained, sub-rounded, pale brown, minor roots and rootlets, sand is fine to coarse grained, dry, medium dense to very dense.	D				TOPSOIL		
								GW						MD	SPRINGSTON FORMATION	
								D						VD	Relative density inferred	
						2.0		GP	Sandy GRAVEL: fine to coarse grained, sub-rounded, brown-grey, sand is fine to coarse grained, moist to saturated, very dense. 1.5 m: with some cobbles (<150mm)	M						
						3.0										
						4.0			Test pit IP11 terminated at 4.0 m Collapse	S						
						5.0										

method

N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

support

N none
S shoring

penetration

no resistance
ranging to
refusal

water

10-Oct-12 water
level on date shown
water inflow
water outflow

samples & field tests

U## undisturbed sample ##mm diameter
D disturbed sample
B bulk disturbed sample
E environmental sample
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shearpeak/remoulded
(uncorrected kPa)
R refusal

classification symbol & soil description based on Unified Classification System

moisture

D dry
M moist
W wet
W_p plastic limit
W_L liquid limit

consistency / relative density

VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense



Photo 1: Inspection Pit 01



Photo 2: Inspection Pit 02

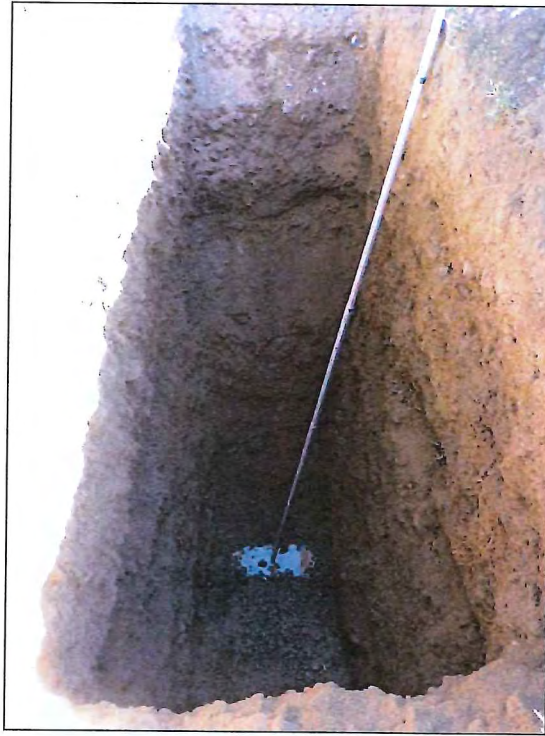


Photo 3: Inspection Pit 03

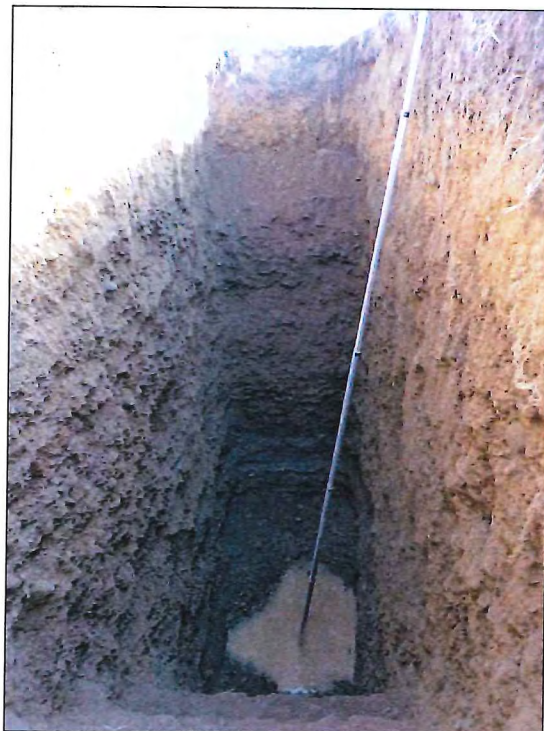


Photo 4: Inspection Pit 04



Photo 5: Inspection Pit 05



Photo 6: Inspection Pit 06



Photo 7: Inspection Pit 07



Photo 8: Inspection Pit 08

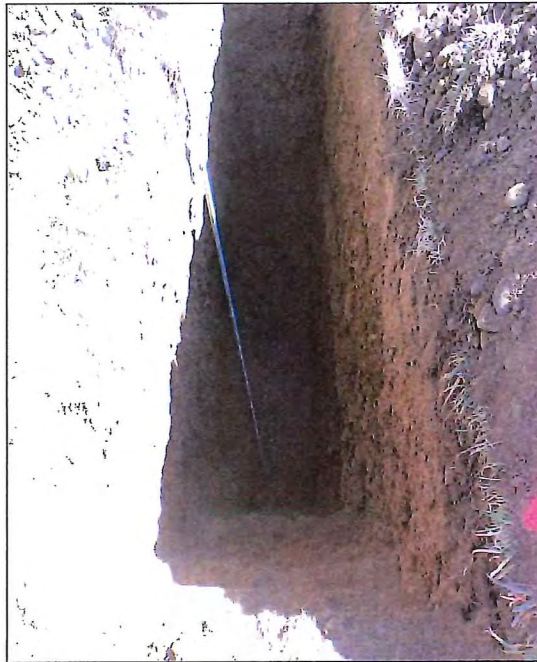


Photo 9: Inspection Pit 09



Photo 10: Inspection Pit 10