Appendix B – Groundwater monitoring bore network

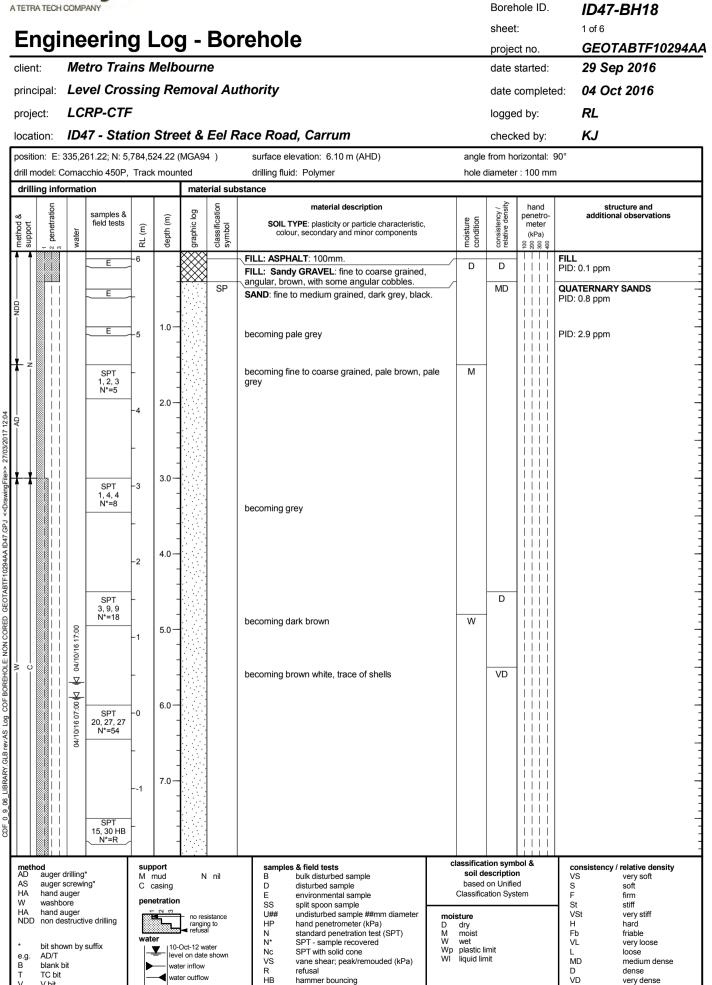
- Bore construction summaries
- Lithological borehole logs
- Bore construction licences

NOTE: THIS DATA IS PROVIDED ELECTRONICALLY ONLY

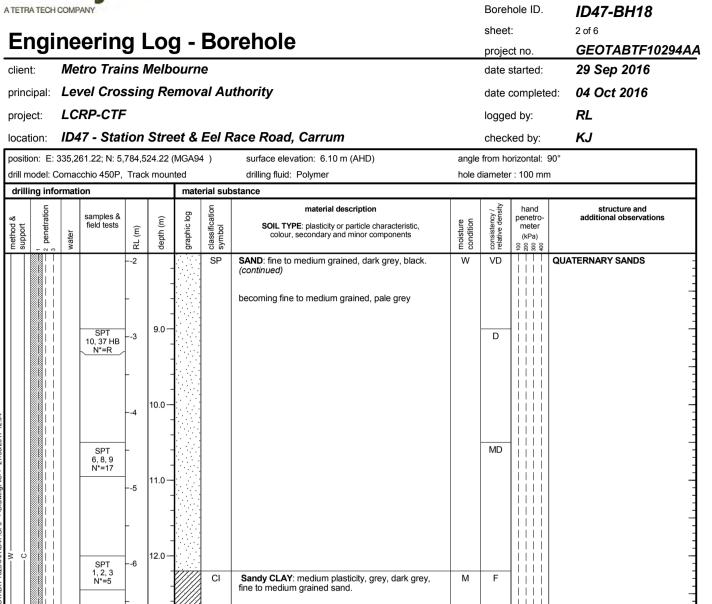


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V bi



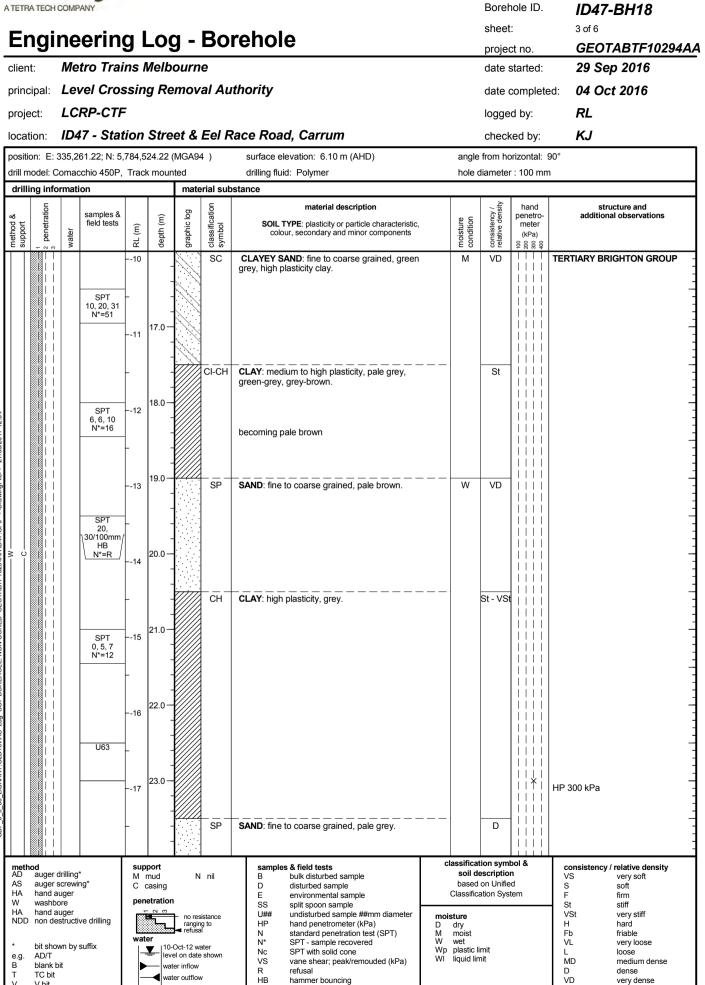




CDF_0_9_06_LIBRARY.GLB rev:AS Log COF BOREHOLE: NON CORED GEOTABTF10294AA ID47.GPJ <<DrawingFile>> 27/03/2017 12

		SAND: fine to coarse grained, grey, with some medium plasticity clay pockets.	W VD	
 	8 14.0 8 8 9 15.0 9 9 9 9 9 9 9 			- - - - - - - - - - - - - - - - - - -
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit WI 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





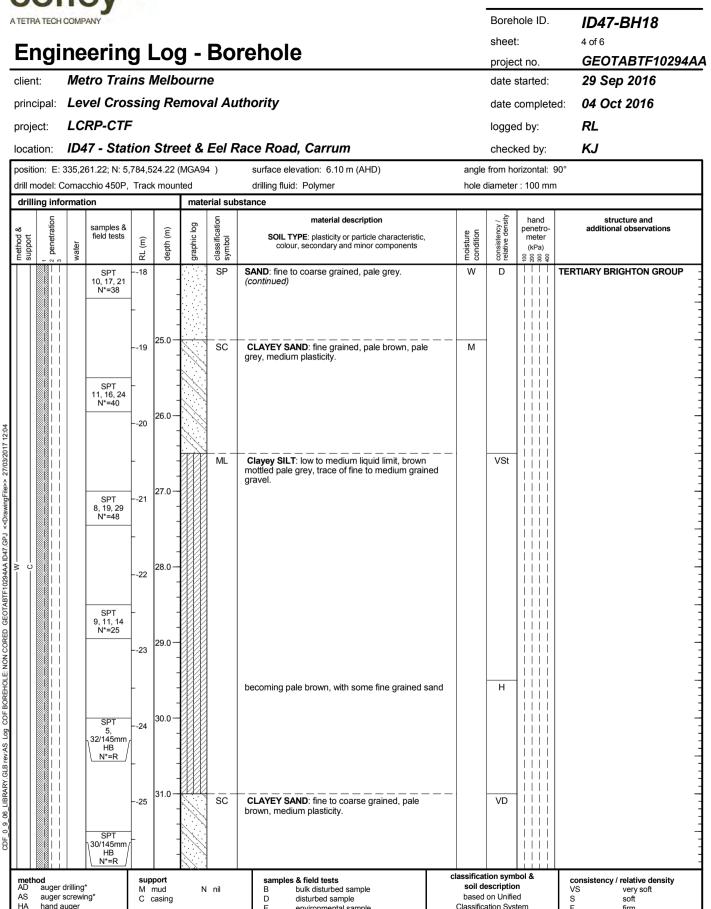
0294AA ID47.GP. **POTARTE** NON BOREHOLE SOF Log rev:AS I GLB IBRARY

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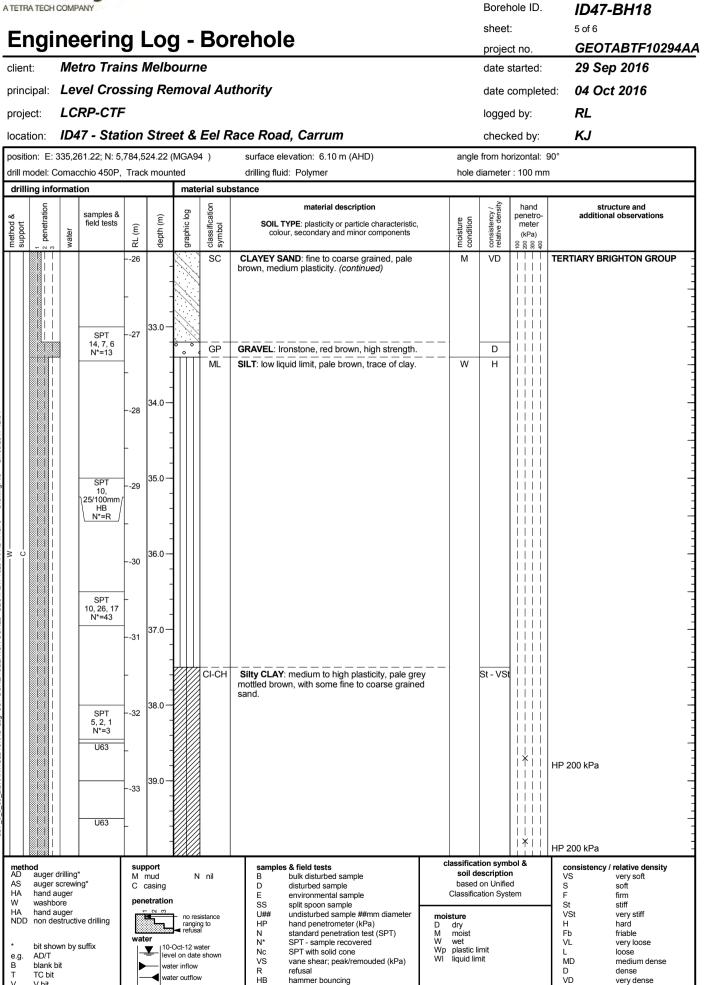


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W







GEOTABTF10294AA ID47. NON COF Log 'ev:AS GLB **IBRARY**

Vbi



TETRA TE				al		A _	Bo	robolo			Boreh sheet	nole ID. :	ID47-BH18 6 of 6
	-			<u> </u>		_		rehole			projec	ct no.	GEOTABTF10294A
client:			tro Tra								date s	started:	29 Sep 2016
orincipa	1: 1	Lev	el Cro	ssin	g Re	emov	ral Au	thority			date o	complet	ed: 04 Oct 2016
oroject:	1	LCI	RP-CTI	=							logge	d by:	RL
ocation	: /	ID4	7 - Sta	tion	Stre	et &	Eel F	ace Road, Carrum			check	ed by:	KJ
position:	E: 3	35,26	61.22; N: 5	,784,5	24.22	(MGAS	4)	surface elevation: 6.10 m (AHD)		angle	e from ho	orizontal:	90°
			chio 450P,	Trac	k mour	-		drilling fluid: Polymer		hole	diameter	: 100 mr	n
drilling i		mati	on			mat	erial sul				کر ا	hand	
method & support bondration	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	hand penetro- meter (kPa) ୁର ରୁ ରୁ ବୁ	structure and additional observations
	3 7	-		34	-		CI-CH	Silty CLAY: medium to high plasticity, pale gree mottled brown, with some fine to coarse grained sand. (continued)		W	St - VSt	- 0 6 4	TERTIARY BRIGHTON GROUP
			SPT 5, 7, 16 N*=23	- 35 -	- - 41.0 - -		 ML	Clayey SILT: low liquid limit, grey, grey-brown.		M	VSt		GELLIBRAND MARL
			SPT 7, 17, 26	36	- 42.0 - - -						H		
:			N*=43	37	- 43.0 - -								
			SPT 7, 14, 29 N*=43	38	44.0 — - - -				-	W			
			SPT 10, 15 HB	39	- 45.0 — - -								
			N*=R	40	46.0-		2	Borehole ID47-BH18 terminated at 45.80 m Target depth					
				- 41 -	- 47.0 - -	-							
method AD aug AS aug HA har W was HA har NDD nor * bit s e.g. AD	ger dr ger so nd au shbor nd au n des show /T nk bit bit	re iger structiv n by s	g* ve drilling	M C pen	■ 10- lev	no refus rangi	vater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	mois D M W Wp	soil d based Classific		n d	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



ATETR	ATECH	HCON	PANY							F	lole ID.		ID47-BH18
Di	07	۸r	no	tor	Installatio					s	heet:		1 of 1
										p	oroject no).	GEOTABTF10294A
clien	it:				ns Melbourne					C	late start	ed:	29 Sep 2016
princ	cipal:	Le	evel	Cros	sing Removal Aut	hority				c	late com	pleted:	04 Oct 2016
proje	ect:	L	CRP	-CTF						le	ogged by	<i>!</i> :	RL
loca	tion:	ID	47 -	Stat	ion Street & Eel Ra	ace Road	, Carr	um		c	hecked	by:	KJ
positi	on: E	: 335	261.22	2; N: 5,	784,524.22 (MGA94)	surface ele	vation: 6.	10 m (AHD)		angle fro	om horizor	ntal: 90°	
<u> </u>		,,		-	50P, Track mounted	drilling fluid				hole dia	meter : 10	0 mm	
ariiiin	ng info	ormat	ion		ial substance material name		piezome	eter construction			bore co	nstruction lic	ense:WRK098271
method & support	water	RL (m)	depth (m)	graphic log					ID47-BH18		driller:	company: permit no.:	Earthcore Drilling L. Adolphson 0738
		-6	-		FILL								
			-	XXXX	QUATERNARY SANDS					\times			
DDN		_	- 1										
			-										
			-										
AD		-4	2								Grout		-
			-										
* *		_	3-										
			-										
			-										
		-2	4										-
	8		-										
	04/10/16 17:00	_	- 5 —								Benton	ite	
			-						· · · · · · · · · ·				
	4/10/16 07:00		-										
	00:20	-0	6				6.00 m						-
	1/10/16		-										
	ò	-	7-										
 ∧ ∪			-								Sand		
			-										
		2	8										
			-										
		-	9—				<u>9.00 m</u>						
			-										
			_ 10—										
		4	-										
			-										
		-	11-										
			-										
× ∪			-		-					×A			
se			rt g log for	details	graphic log / core recove	ry ID		type	installation date	stickup (m)	tip depth (m)	water level (m)	(AHD)
wate	nr 10-0	Oct-12	, water		core recovered	ID47-BH	18	standpipe piezo.	04/10/2016	0.00 m	9.00 m		stickup tip water level 6.10 -2.90
	- wate	er inflo			(graphic symbols indicate material) no core recovere								
			drilling f ing fluid	luid loss I loss									
<u>-</u>			ure test										
25	(lugeo	ns) for	r depth										
	interva	al SHOV	víl										

Works Licence ID:

WLE066488

Printed on: 11 Jan 2017 1:23:33 pm

COPY OF RECORD IN THE VICTORIAN WATER REGISTER LICENCE TO CONSTRUCT WORKS

under Section 67 of the Water Act 1989

The information in this copy of record is as recorded at the time of printing. Current information should be obtained by a search of the register. The State of Victoria does not warrant the accuracy or completeness of this information and accepts no responsibility for any subsequent release, publication or reproduction of this information.

This licence does not remove the need to apply for any authorisation or permission necessary under any other Act of Parliament with respect to anything authorised by the works licence.

Water used under this licence is not fit for any use that may involve human consumption, directly or indirectly, without first being properly treated.

This licence is not to be interpreted as an endorsement of the design and/or construction of any works (including dams). The Authority does not accept any responsibility or liability for any suits or actions arising from injury, loss, damage or death to person or property which may arise from the maintenance, existence or use of the works.

Each person named as a licence holder is responsible for ensuring all the conditions of this licence are complied with.

This licence authorises its holders to construct the described works, subject to the conditions.

Licence Holder(s)

METRO TRAINS MELBOURNE PTY LTD C/- COFFEY of LEVEL 1, 436 JOHNSTON STREET ABBOTSFORD VIC 3067

Licence Contact Details

METRO TRAINS MELBOURNELEVEL 1, 436 JOHNSTON STREETPTY LTD C/- COFFEYABBOTSFORD VIC 3067

Licence Details

Expiry date	11 Jan 2018
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	NA for construct/decommission
Water system	Frankston (GMU)

Summary of Licensed Works

The details in this section are a summary only. They are subject to the conditions specified in this licence.

Works ID	Works type	Use of water
WRK095832	Bore	Observation
WRK095833	Bore	Observation
WRK095834	Bore	Observation
WRK095835	Bore	Observation
WRK095836	Bore	Observation
WRK098270	Bore	Observation
WRK098271	Bore	Observation

Description of Licensed Works

WORKS ID	WRK095832
----------	-----------

Works type	Bore	
Works type	Dole	
Works subtype	Drilled bore	
Proposed maximum depth	Unrestricted	
Works location		
Easting	Northing	Zone MGA
335520.312	5783379.030	Zone 55
Land description		
Volume 7410 Folio 898		
Lot 1 of Plan TP533906N		

Description of Licensed Works

WORKS ID WRK095833			
Works type	Bore		
Works subtype	Drilled bore		
Proposed maximum depth	Unrestricted		
Works location			
Easting	Northing	Zone MGA	
335583.829	5783169.366	Zone 55	
Land description			
Property address 69C YOUNG STREET FRA escription of Licensed W			
69C YOUNG STREET FRA			
69C YOUNG STREET FRA escription of Licensed W			
69C YOUNG STREET FRA escription of Licensed W WORKS ID WRK095834	orks		
69C YOUNG STREET FRA escription of Licensed W WORKS ID WRK095834 Works type	orks Bore		
69C YOUNG STREET FRA escription of Licensed W WORKS ID WRK095834 Works type Works subtype	orks Bore Drilled bore		
69C YOUNG STREET FRA escription of Licensed W WORKS ID WRK095834 Works type Works subtype Proposed maximum depth	orks Bore Drilled bore	Zone MGA	

Land description

Property address	
69C YOUNG STREET FRANKSTON 3199	

Description of Licensed Works

WORKS ID WRK095835		
Works type	Bore	
Works subtype	Drilled bore	
Proposed maximum depth	Unrestricted	
Works location		
Easting	Northing	Zone MGA
335408.316	5783796.679	Zone 55

Land description

Property address

1/ STATION STREET CARRUM 3197

Description of Licensed Works

WORKS ID WRK095836

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	Unrestricted
Works location	

Northing

5784416.814

Easting 335270.964

Zone MGA Zone 55

Land description

Property address

1/ STATION STREET CARRUM 3197

Description of Licensed Works

WORKS ID WRK098270			
Works type	Bore		
Works subtype	Drilled bore		
Proposed maximum depth	Unrestricted		
Works location			
Easting	Northing	Zone MGA	
335455.613	5783550.662	Zone 55	
ny of Decord			

Land description

Property address

1/ STATION STREET CARRUM 3197

Description of Licensed Works

WORKS ID WRK098271

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	Unrestricted

Works location

Easting	Northing	Zone MGA
335257.861	5784514.546	Zone 55

Other land description

95 C3

Property address

Location(s) in or near BONBEACH, Parish: Lyndhurst

Related Instruments

Related water-use entities Nil

Application History

Reference	Type	Status	Lodged date	Approved date	Recorded date
WLV703729	Modify	Approved	11 Jan 2017	11 Jan 2017	
WLI604791	Issue	Approved	01 Sep 2016	01 Sep 2016	

Conditions

Licence WLE066488 is subject to the following conditions:

Siting and construction

- 1 The bore(s) must be drilled at the location specified in the application approved by the Authority.
- 2 If after drilling the bore is considered unsatisfactory a replacement bore may be drilled on the land specified in the licence.

Preventing pollution

- 3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.
- 4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.
- 5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

Construction standards

6 The bore(s) must be constructed, and where relevant decommissioned, in accordance with the Minimum Construction Requirements for Water Bores in Australia, Edition 3 or its successor.

Drilling licence and supervision requirements

- 7 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a [DrillerClass] driller, with appropriate endorsements.
- 8 If artesian pressure is expected or encountered, then a driller licensed under the Water Act 1989, and endorsed as a class 3 driller, must install casing in the bore(s) to a suitable depth, and in a suitable manner, to prevent its outbreak. A suitable valve must also be fitted to the bore.

Bore completion report

9 A Bore Completion Report must be submitted to the Authority within 28 working days of the bore(s) being completed.

Protecting water resources

- 10 No more than [dspNumberOfWorks] bore(s) may be brought to final development under this licence.
- 11 At the completion of drilling and before the drilling rig leaves the site, all but [dspNumberOfWorks] bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.
- 12 The bore(s) must be located at least 30 metres from any authority's channel, reserve or easement unless authorised by the Authority.

Protecting water quality

- 13 Drilling must not exceed the maximum depth.
- 14 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.
- 15 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be

screened within the one bore or in any other manner to allow connection between them.

16 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

Protecting other water users

- 17 The diameter of the drill casing must not exceed 130 millimetres.
- 18 The bore(s) must be constructed so that water levels in the bore(s) can be measured by an airline, a piezometer or a method approved in writing by the Authority.

Fees and charges

19 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.

END OF COPY OF RECORD



ENVIRONMENTAL-GROUNDWATER

Projec Site L Locat	ct LXI ct No. _XRA ion Drilled	RA Level Crossing 3133036 ID18 I 01/08/2017 - 01/08/2017	Casing 50 mm PV	C (Cla	Diameter (h (m) 5.00	Gi El Co Lo Ci	rid Re levati ollar I oggeo hecke	efGDA on RL- IByAl edBy	.94_MGA	5864, 5788587 A_zone_55 on pletion Gatic	
Depth (m)	Drilling Method	Sample ID	Water ID18-BH13 Well Details	Graphic Log	Soil Type	LITHOLOGICAL DESCRIPTION (Classification Group Symbol); olour; Secondary / Minor Compo		Moisture	Consistency	C Odou materi	COMMENTS/ ONTAMINANT INDICATORS rs, staining, waste als,separate phase s, imported fill, ash.	Elevation (m)
0.2 0.4 0.6 0.6 1 1.2 1.4 1.6 1.2 2.2 2.4 3.2 2.4 3.2 3.4 3.4 3.4 4.4 4.4 4.6 1.4 4.8	HA		-Bentonite									-0.6 -0.6 -0.6 -1.6 -1.1 -2.1 -2.1 -2.1 -2.1 -3.1
5.2					Terminati achieved.	on Depth at: 5.00 m. Target depth					1	
Notes GHD S Drillin AH-A	Soil C Ig Abb Air Har	previations nmer, AR-Air Rotary, BE-E	Bucket Excavation, CC-Co	oncrete	Coring,	andards AS 1726-1993. This log is Moisture Abbreviations D-Dry, SM-Slightly Moist,	Consiste Granular	ency / r Soils	Abbrev SVL-V	iations ery	Cohesive Soils VS	S-Very
DC-Di (shove SD-So	amon el), HF onic Di	d Core, FH-Foam Hammer A-Hollow Flight Auger, NE rilling, SFA-Solid Flight Aug v Sampler	r, HA-Hand Auger, HE-Ha DD-Non Destructive Drillin	ind Exe g, PT-l	cavation Pushtube,	M-Moist, VM-Very Moist, W-Wet, S-Saturated	Loose, L- Dense, D Dense	Loos	e, MD-N	Medium	Soft, S-Soft, F-Firm, ST-Stiff, VST-Very S H-Hard	,



ENVIRONMENTAL-GROUNDWATER

Projec Site L Locat	ct LX ct No. _XRA ion Drilleo	RA Level Crossing 3133036 ID18 1 31/07/2017 - 01/08/2017		Ca	asing 50 mm P∖	/C (Clas	Diameter (: h (m) 11.90	n Slotted PV	G E C L C	irid Re levatio ollar F ogged	ef GDA on RL 0.22 I By Al ed By	94_MGA 2 an Wilso	346, 5788779 _zone_55 n Jetion Gatic	
Depth (m)	Drilling Method	Sample ID	Water		Well Details	Graphic Log	Soil Type	LITHOLOGICAL DES (Classification Grou plour; Secondary / Mi	ip Symbol);		Moisture	Consistency	C I Odou materi	COMMENTS/ ONTAMINANT NDICATORS rs, staining, waste als,separate phase , imported fill, ash.	Elevation (m)
0.2	HA						rock fragi GRAVEL	medium, angular, bro nents (NATURAL - SC medium, angular, bro nents (NATURAL - SC	DIL) wn, with silt,		D W	D			-0.2
0.8 1 1.2 1.4 1.6 1.8							silt (NATI SAND me	edium, brown, with roc JRAL - SOIL) edium, grey, with rock AL - SOIL)	-		w	D S			0.8
1.6 1.8 1.8 1.2 1.2 1.2	SFA														-1.6 -1.8 -1.8
2.4					Grout										-2.4
3.2 3.4 3.4 3.6	PT														-3 -3.2 -3.2 -3.4 -3.4
3.8 4 4.2 4.4 4.4															
4.4															-4.4
	Soil C	lassifications The GHD (Soil	Clas	sification is base	ed on Au	ustralian Sta	andards AS 1726-1993	3. This log is	not inten	ded for	r geoteo	chnical p	urposes.	
AH-A DC-Di (shove SD-Sc	Air Har amon el), HF onic D	mer, AR-Air Rotary, BE-E d Core, FH-Foam Hammer A-Hollow Flight Auger, NE rilling, SFA-Solid Flight Au- / Sampler	r, HA D-N	A-Ha Ion [ind Auger, HE-H Destructive Drillir	and Exc ng, PT-F	avation Pushtube,	Moisture Abbreviat D-Dry, SM-Slightly M-Moist, VM-Very M W-Wet, S-Saturated	Moist, loist,	Consist Granula Loose, L Dense, I Dense	r Soils	s VL-Ve e, MD-N	ery Iedium	Cohesive Soils VS Soft, S-Soft, F-Firm ST-Stiff, VST-Very S H-Hard	,



ENVIRONMENTAL-GROUNDWATER

Page 2 of 3

Depth (m)	Drilling Method	Sample ID	Water	ID18-BH10	Well Details	Graphic Log	Soil Type Size; Co	LITHOLOGICAL DESCR (Classification Group S Jour; Secondary / Minor	Symbol); P or Compone	ents.	Moisture	Consistency	C I Odou materi	COMMENTS/ ONTAMINANT NDICATORS rs, staining, waste als,separate phase , imported fill, ash.	Elevation (m)
5.4					-Grout		CLAY hig sand (NA	h plasticity, medium, dark TURAL - SOIL)	k grey, trac	e	w	ST			-5.4
6.2 6.4 6.6							Sandy CL blue- grey	AY medium to high plast , with fine sand (NATUR/	ticity, mediu AL - SOIL)	 .m,	w	ST			-6.2 -6.4
- 6.8 - 7							SAND fine SOIL)	e, blue- grey, with clay (N	ATURAL -		w	D			-6.8
7.2 7.4 7.6 7.8 8 8					-Bentonite			dium, grey (NATURAL -			w	L			-7.2 -7.4 -7.4 -7.6 -7.8 -7.8 -8 -8
8.4 8.6 9 9.2 9.2								AY medium to high plast ue- grey, with medium to L - SOIL)			w	D			-8.4 -8.6
9.6 9.8 10 10.2 10.4 10.6					-Sand		SAND fin - SOIL)	e to medium, grey, trace o	clay (NATU	JRAL	w	D			-9.6 -9.8 -10 -10. -10. -10. -10.
Notes															F
		assifications The GHD	Soil (Classific	ation is base	d on Au	istralian Sta	ndards AS 1726 1003 T	This log is n	ot intond	od fo	r acoto	chnical n	urpagag	
		reviations	5011	514331116	adon 13 Dast	a on At	Stranari Old	Moisture Abbreviation		Consiste		-		urp0000.	
AH-A DC-Dia (shove SD-So	ir Ham amond el), HFA onic Dri	mer, AR-Air Rotary, BE-E I Core, FH-Foam Hammer A-Hollow Flight Auger, NC illing, SFA-Solid Flight Au Sampler	r, HA D-N	-Hand A on Dest	Auger, HE-Ha ructive Drillir	and Exc ng, PT-F	avation Pushtube,	D-Dry, SM-Slightly Moi M-Moist, VM-Very Moist W-Wet, S-Saturated	iist, G t, L	Granular Loose, L-I Dense, D- Dense	Soils	s VL-V e, MD-N	ery Medium	Cohesive Soils VS Soft, S-Soft, F-Firm ST-Stiff, VST-Very H-Hard	٦,



ENVIRONMENTAL-GROUNDWATER

Page 3 of 3

			_								
Depth (m)	Drilling Method	Sample ID	Water	ID18-BH10 Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Parti Size; Colour; Secondary / Minor Components		Consistency	C I Odou materi	COMMENTS/ ONTAMINANT INDICATORS rs, staining, waste als,separate phase s, imported fill, ash.	Elevation (m)
											Ē
- 11.2	1										E -11.:
- 11.4				Sand							E -11.4 E
11.2											E -11.0 E
- 11.8						Termination Depth at: 11.90 m. Target depth					E -11.8
12						achieved.					E -12
- 12.2											E -12. E
12 12.2 12.4 12.4 12.6 12.6 12.6 12.6 12.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13											12. -
- 12.6											12. -
- 12.8											12.8 -
- 13											13
- 13.2											13.: E
13.4											E -13.4
- 13.6											13. E
13.8											E -13.
14											E -14
											E - 14.:
- 14.4											-14.4
- 14.6											E -14.
											E -14.
15											-15
- 15.2											-15.
- 15.4											E 15.
- - 15.6											E 15.
- 15.8											-15.
16											-16
- 16.2											-16.
- 16.4											-16.
- 16.0											- 16.4
15.2 15.4 15.6 15.8 15.8 16.2 16.4 16.4 16.6											F
- 16.8											E -16.8 E
Notes	;										
			Soil	Classification is based	on Au	stralian Standards AS 1726-1993. This log is not in		-		ourposes.	
AH-A	Air Har	oreviations nmer, AR-Air Rotary, BE-E				Coring, D-Dry, SM-Slightly Moist, Gran	istency ular Soi	s VL-V	'ery	Cohesive Soils VS	
DC-Di (shove SD-So	amon el), HF onic Di	d Core, FH-Foam Hammer A-Hollow Flight Auger, ND rilling, SFA-Solid Flight Aug / Sampler	', H/ D-N	A-Hand Auger, HE-Han Ion Destructive Drilling,	id Exc , PT-P	avation M-Moist, VM-Very Moist, Loos ushtube, W-Wet, S-Saturated Dens	e, L-Loos e, D-Der	e, MD-I	Vedium	Soft, S-Soft, F-Firm, ST-Stiff, VST-Very S H-Hard	, -



ENVIRONMENTAL-GROUNDWATER

Projec Projec Site L Locat	ct No. LXRA tion	RA Level Crossing 3133036	7				Drill Co. Driller Rig Type Drill Methe Total Dept Diameter (th (m) 2.95	G E C	rid Re levati ollar l	ef GDA on RL 0.9 d By A	.94_MGA	5862, 5788043 A_zone_55 in	
B.C.L	No. N	N/A		Casin	g 50 mm P∖	/C (Cla	ss 18)	Screen 0.5mm Slotted PV0	C (Class 1	18)	Surfa	ce Com	pletion Monument	
Depth (m)	Drilling Method	Sample ID	Water	ID18-BH16	Well Details	Graphic Log	Soil Type	LITHOLOGICAL DESCRIPTION (Classification Group Symbol); olour; Secondary / Minor Compo		Moisture	Consistency	C Odou materi	COMMENTS/ ONTAMINANT INDICATORS rs, staining, waste als,separate phase s, imported fill, ash.	Elevation (m)
0.2	HA				Grout		CLAY hig mottled o	h plasticity, very fine, dark grey wi brange, trace rootlets (NATURAL - h plasticity, very fine, dark grey wi brange, trace rootlets, and shells	SOIL)	M W	S S		arbon staining arbon staining	-0.4
1.2 1.4 1.4	SFA						CLAY hig	AL - SOIL) gh plasticity, very fine, black- brown AL - SOIL)	1	w	s	distinc	t organic odour	-1.4
1.8					-Sand									
2.4							Terminati	on Depth at. 2:95 m						-2.
3.2														
3.8 4 4														
4.4														-4.4
- 4.8 Notes		lassifications The GHD	Soil	Classific	nation is have		Istralian Str	andards AS 1726-1993. This log is	not inter				urnoses	-4.8 -
			5011	Juggill	Jacon 13 Dast			Moisture Abbreviations			-			
AH-A DC-Di (shove SD-So	Air Har iamon el), HF onic Di	breviations nmer, AR-Air Rotary, BE- d Core, FH-Foam Hamme 'A-Hollow Flight Auger, NI rilling, SFA-Solid Flight Au / Sampler	er, HA DD-N	-Hand on Desi	Auger, HE-Ha tructive Drillir	and Exe ng, PT-F	cavation Pushtube,	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Consiste Granula Loose, L Dense, D Dense	r Soils	s VL-V e, MD-N	ery Nedium	Cohesive Soils VS Soft, S-Soft, F-Firm ST-Stiff, VST-Very S H-Hard	Ι,



ENVIRONMENTAL-GROUNDWATER

Projec Site L Locat	ct LXI ct No. _XRA ion Drilled	RA Level Crossing 3133036 ID18 1 31/07/2017 - 01/08/2017		Casing 50 mm PV		Diameter (h (m) 2.15	n Slotted PV0	G E C L	rid Re levatio ollar F ogged hecke	ef GDA on RL 0.06 I By Al ed By	94_MGA 66 an Wilso	365, 5788641 zone_55 n	
Depth (m)	Drilling Method	Sample ID	Water	ID18-BH14 Well Details	Graphic Log	Soil Type	LITHOLOGICAL DES (Classification Grou Jlour; Secondary / M	up Symbol);		Moisture	Consistency	C(I Odour materia	COMMENTS/ DNTAMINANT NDICATORS 's, staining, waste als,separate phase , imported fill, ash.	Elevation (m)
0.2 0.4 0.6 1.2 1.2 1.4 1.6 1.4 1.6 2.2 2.6 3.2 3.2 3.4 3.4 3.4 4.4 4.6 4.8	HA			Bentonite		SILT high (NATURA (NATURA (NATURA	h plasticity, very fine, \L - SOIL) on Depth at: 2.15 m. ⁻¹	NATURAL -	SOIL) potlets k grey	M	F	weak o	rganic odour	-0.2 -0.4 -0.6 -0.8 1 -1.2 -1.4 -1.2 -1.4 -1.6 -2.2 -2.4 -2.6 -2.4 -2.6 -3.2 -3.2 -3.4 -3.6 -3.8 -3.8 -3.8 -3.8 -4 -4.2 -4.4 -4.6 -4.8
Notes	;													F
			_											
		Iassifications The GHD Soreviations	ioil	Classification is base	d on Au	istralian Sta	Moisture Abbreviat		not intend		<u> </u>		urposes.	
AH-A DC-Di (shove SD-So	Air Har amon el), HF onic Di	nmer, AR-Air Rotary, BE-B d Core, FH-Foam Hammer 'A-Hollow Flight Auger, ND rilling, SFA-Solid Flight Aug / Sampler	r, H/ D-N	A-Hand Auger, HE-Ha Non Destructive Drillin	and Exc ng, PT-F	avation Pushtube,	D-Dry, SM-Slightly M-Moist, VM-Very M W-Wet, S-Saturated	Moist, loist,	Granula Loose, L Dense, D Dense	r Soils	s VL-Ve e, MD-N	ery ⁄ledium	Cohesive Soils VS Soft, S-Soft, F-Firm, ST-Stiff, VST-Very S H-Hard	



ENVIRONMENTAL-GROUNDWATER

Projec Projec Site L Locat Date I	ct No. XRA I ion Drilled	RA Level Crossing 3133036 D18 31/07/2017 - 31/07/2017				Drill Co. Driller Rig Type Drill Metho Total Dept Diameter (h (m) 5.50 mm)	G E C L	rid Re levation ollar I oggeo hecke	on RL 0.2 IBy A ed By	A94_MGA 53 Ian Wilsor	1	
B.C.L	No. N	I/A	Ci	asing 50 mm PV	C (Clas	ss 18)	Screen 0.5mm Slotted PV	C (Class 1	8)	Surfa	ce Comp	letion Gatic	
Depth (m)	Drilling Method	Sample ID	Water	Well Details	Graphic Log	Soil Type	LITHOLOGICAL DESCRIPTION (Classification Group Symbol); lour; Secondary / Minor Compo		Moisture	Consistency	CC IN Odours materia	OMMENTS/ DNTAMINANT NDICATORS s, staining, waste ils,separate phase imported fill, ash.	Elevation (m)
0.2	НА			Grout		rock fragr GRAVEL	medium, angular, brown, with silt, nents (NATURAL - SOIL) medium, angular, brown, with silt, nents (NATURAL - SOIL)		D W	D VD			-0.2 -0.4 -0.6 -0.8
1.2 1.4 1.6 1.8	SFA			Bentonite	2889	SILT fine, (NATURA	dark brown- black, trace rootlets L - SOIL)		W	S	distinct	organic odour	-1.2 -1.4 -1.4 -1.6
2.2						CLAY hig SOIL)	h plasticity, very fine, grey (NATU	RAL -	w	s			-2.2
3.2 3.4 3.4 3.6				Sand		SILT fine,	dark brown- black (NATURAL - S	SOIL)	W	S	distinct	organic odour	-3
- 3.8 - 4 - 4.2 - 4.4 - 4.4 - 4.6							h plasticity, very fine, grey, trace s L - SOIL)	sand	W	S			-3.8
4.8													E -4.8
Drillin AH-A DC-Di (shove SD-Sc	Soil Cl g Abb sir Ham amond el), HF/ onic Dri	assifications The GHD S reviations Imer, AR-Air Rotary, BE-E I Core, FH-Foam Hammer A-Hollow Flight Auger, ND illing, SFA-Solid Flight Aug Sampler	Bucket E ; HA-Ha D-Non I	xcavation, CC-Co and Auger, HE-Ha Destructive Drillin	oncrete and Exc g, PT-F	ustralian Sta Coring, cavation Pushtube,	h plasticity, very fine, grey, with sa andards AS 1726-1993. This log is Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		ency / r Soils -Loose	Abbrev s VL-V e, MD-I	chnical pu riations fery Medium • Very	rmeability, sloppy. urposes. Cohesive Soils VS Soft, S-Soft, F-Firm, ST-Stiff, VST-Very S H-Hard	,



ENVIRONMENTAL-GROUNDWATER

d Depth (m)	Drilling Method	Sample ID	Water	ID18-BH11 Well Details	Graphic	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Pa Size; Colour; Secondary / Minor Componen	article ents.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
- 5.2					IA.	(NATURAL - SOIL)					E -5.2
- 5.2 - 5.4				Sand		CLAY high plasticity, very fine, grey, trace san (NATURAL - SOIL)	d	w	н		-5.4
- 5.6						Termination Depth at: 5.50 m					5.6
- 5.6 - 5.8 - 6											-5.8
- 6											<u>-6</u>
											-6.2
- 6.2 - 6.4											E -6.4
											E -6.6
- 6.8											E -6.8
-7											E -7
- 6.6 - 6.8 - 7 - 7.2 - 7.2 - 7.4 - 7.6 - 7.8 - 8 - 8.2 - 8.4											E -7.2
-74											E -7.4
- 7 6											E -7.6
- 7.8											E -7.8
8											E -8
82											E -8.2
0.2											E
											E -8.4
- 8.6											8.6
- 8.8 - 9											
											-9
- 9.2 - 9.4											E
											E -9.4
- 9.6											-9.6
- 9.8											E -9.8
- 10											E -10
- 10.2											E -10
- 10.4											E -10
- 10.6											E -10
- 10.8											E -10
Notes		1	1	1			I		<u> </u>	1	F
			Soil	Classification is based of	on Aust	tralian Standards AS 1726-1993. This log is no					
		previations nmer, AR-Air Rotary, BE-B	Buck	et Excavation. CC-Conc	crete C		onsister ranular s	-			S-Verv
DC-Dia (shove SD-So	amono el), HF onic Dr	d Core, FH-Foam Hammer A-Hollow Flight Auger, ND rilling, SFA-Solid Flight Aug v Sampler	; H/ D-N	A-Hand Auger, HE-Hand Ion Destructive Drilling, F	l Excav PT-Pu	vation M-Moist, VM-Very Moist, Lo shtube, W-Wet, S-Saturated De	oose, L-L ense, D-l ense	oose	e, MD-N	Medium Soft, S-Soft, F-Firm	Ι,



ENVIRONMENTAL-GROUNDWATER

Client LXRA Project LXRA Level Crossing Project No. 3133036 Site LXRA ID18 Location Date Drilled 03/08/2017 - 03/08/2017				Total Dept	Oriller Grid Ref GDA94_MGA_zone_55								
B.C.L	No. I	N/A		Casing 50 mm PV	/C (Cla	ss 18)	Screen 0.5mm Slotted PV	/C (Class	18)	Surfa	ce Com	pletion Monument	
Depth (m)	Drilling Method	Sample ID	Water	ID18-BH17 Well Details	Graphic Log	Soil Type Size; Co	LITHOLOGICAL DESCRIPTION (Classification Group Symbol) olour; Secondary / Minor Comp	; Particle onents.	Moisture	Consistency	C Odou materi	COMMENTS/ ONTAMINANT INDICATORS rs, staining, waste als,separate phase a, imported fill, ash.	Elevation (m)
0.2 0.4 0.6 1 1.2 1.4 1.2 2.2 2.4 2.6 3.2 2.4 2.6 3.2 3.4 3.2 3.4 3.6 3.8 4 4.2 4.4 4.6	HA			-Grout -Bentonite		SOIL)	D fine, dark grey- brown (NATUR		W	S			-0.6 -0.6 -0.6 -0.6 -1.1 -1.4 -1.4 -1.4 -1.6 -2.6 -2.6 -2.6 -3.6
5			Π	SIGKOA		Terminati	on Depth at: 5.00 m						E _
	Soil C		Soil	Classification is base	l ed on Au	Lustralian Sta	andards AS 1726-1993. This log is					urposes.	-5.2
AH-A DC-Di (shove SD-Sc	amon amon el), HF onic D	breviations mmer, AR-Air Rotary, BE-E d Core, FH-Foam Hammer A-Hollow Flight Auger, ND rilling, SFA-Solid Flight Aug v Sampler	, HA	A-Hand Auger, HE-Ha Non Destructive Drillin	and Exc ng, PT-F	cavation Pushtube,	Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Consist Granula Loose, I Dense, Dense	ar Soils	s VL-V e, MD-N	ery Nedium	Cohesive Soils VS Soft, S-Soft, F-Firm, ST-Stiff, VST-Very S H-Hard	,



ENVIRONMENTAL-GROUNDWATER

-	Casing 50 mm PV/C	Total Dept Diameter (DrillerGrid Ref GDA94_MGA_zone_55Rig TypeElevationDrill MethodCollar RL 0.325Total Depth (m) 3.00Logged By Alan WilsonDiameter (mm)Checked By				
			Screen U.Smm Slotted PV	U (Ulass 18)	Surfa	ice completion Monument	
ample ID ate Ate	ID18-BH18 Well Details	Soil Type	(Classification Group Symbol);	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	
	-Grout Bentonite				5 5		-0.2 -0.4 -0.6 -1 -1.2 -1.4 -1.6 -1.6 -1.6 -1.6 -2.2
			on Depth at: 3.00 m. Target depth				-2.6
		achieved.					E -3.2
							-3.4
							-4.2
							-4.4
							E -4.6
							E -4.8
							Ē
-S -Air Rotary, BE-Bucké H-Foam Hammer, HA Flight Auger, NDD-Ne	et Excavation, CC-Con A-Hand Auger, HE-Han Ion Destructive Drilling,	ncrete Coring, nd Excavation , PT-Pushtube,	ndards AS 1726-1993. This log is Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Consistency Granular Sol Loose, L-Loo	Abbrev ils VL-V se, MD-N	riations 'ery Cohesive Soils VS Medium Soft, S-Soft, F-Firm	ı, ⁻
	ample ID	Air - 03/08/2017	Crossing Driller Rig Type Drill Metho Total Depti Diameter (no rotal Depti Diameter (no rotal Depti Diameter (no rotal Depti Diameter (no rotal Depti Soli Type Soli Type Site; Con rotal Depti Soli Type Site; SAN rotal Depti Soli Type Site; Con rotal Depti Soli Type Site; SAN rotal Depti Soli Type Site; SAN Soli Type Site; Soli Classification is based on Australian Stati Soli Type Site; Soli	Crossing Driller Rig Type Total Depth (m) 3.00 Diameter (mm) 177 - 03/09/2017 Casing 50 mm PVC (Class 18) Screen 0.5mm Slotted PV ample ID I IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Crossing Driller Rig Type Drill Method Total Depth (m) 3.00 Diameter (rm) Grid F Eleva Diameter (rm) Cosing 50 mm PVC (Class 18) Screen 0.5mm Slotted PVC (Class 18) ample ID org 00 00 00 00 00 00 00 00 00 00 00 00 00	Crossing Driller Rig Type Drill Method Total Depth (m) 3.00 Total De	Diritier Order Mark GNAS_MGA_zone_55 NB Type Diritier (m) 3.00 Collar RL 0.325 177 - 03082017 Casing 50 mm PVC (Class 18) Surface Ompletion Monument ample ID Image Mark Street (Mark Str



Drill Co.

ENVIRONMENTAL-GROUNDWATER

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Client LXRA Project LXRA Level Crossing Project No. 3133036 Site LXRA ID18 Location Date Drilled 01/08/2017 - 01/08/2017

Drill Co.	
Driller	
Rig Type	
Drill Method	
Total Depth (m)	12.00
Diameter (mm)	

Easting, Northing 335866, 5788585 Grid Ref GDA94_MGA_zone_55 Elevation Collar RL 1.828 Logged By Alan Wilson

Checked By

Drilling Method	Sample ID	Water	ID18-BH12 Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.
HA 2 4 6 8 2 4 6 8 7 7 7 7 4 6 8 8 2 4 6 8 8 2 4 6 8 8					CLAY medium plasticity, very fine, dark brown with mottled orange, trace rootlets, trace sand (NATURAL - SOIL)	М	ST	
4 6 8 PT					CLAY medium plasticity, very fine, pale grey, trace \rootlets, trace fine sand (NATURAL - SOIL)	M	ST	
2			Grout					
- 4 5 3					SAND fine, pale grey (NATURAL - SOIL) Silty CLAY medium plasticity, very fine, dark brown (NATURAL - SOIL)	M	ST	distinct organic odour
2 4 6 8					CLAY high plasticity, very fine, dark brown (NATURAL - SOIL) SAND fine, dark grey (NATURAL - SOIL)	M 	ST MD	distinct organic odour
6 8					SAND fine, pale grey (NATURAL - SOIL)	w	L	

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
	M-Moist, VM-Very Moist,		Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



MONITORING WELL ID18-BH12

ENVIRONMENTAL-GROUNDWATER

Page 2 of 3

Depth (m)	Drilling Method	Sample ID		D18-BH12	Well Details	Graphic Log	Soil Type	LITHOLOGICAL DESCRIF (Classification Group Sy plour; Secondary / Minor (/mbol); Particle	ture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phas	Elevation (m)
Dept	Drilli		Water	D18-	Well	Grap				Moisture	Cons	liquids, imported fill, ash	Eleva
5.2								h plasticity, very fine, pale AL - SOIL)	brown- grey	w	ST		-5.4
5.8 6 6.2 6.4 6.6					Grout		Sandy Cl (NATUR/	AY high plasticity, very fine	e, blue- grey	w	ST		
6.8 7 7.2 7.4					Bentonite		Sandy Cl (NATURA	AY high plasticity, very fine AL - SOIL)		w	ST		-7.2 -7.2 -7.4 -7.6
7.6 7.8 8 8.2								e to medium, pale blue- gre \L - SOIL)	ey, trace clay	w	F		-7.8
8.4 8.6 8.8							SAND fin - SOIL)	e to medium, pale grey- gre	een (NATURAL	w	F		-8.4 8.6 8.8 8.8
9.2	SFA							v plasticity, fine to medium, 'URAL - SOIL)	, green, trace	w.	F		
9.8					Sand								
- 10.6 - 10.8							SAND fin	e to medium, green (NATU	JRAL - SOIL)	W	F		
 Notes		1	1	<u></u>	<u>.</u>	<u>r::::</u>	I			1	1	1	<u> </u>
			Soil	Classif	ication is base	d on Au	ustralian Sta	andards AS 1726-1993. Thi					
AH-A DC-Di (shove SD-Sc	Drilling Abbreviations Moisture Abbreviations Consistency Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard												



ENVIRONMENTAL-GROUNDWATER

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Depth (m)	Drilling Method	Sample ID	Water	ID18-BH12 Well Details	Graphic Log	Soil Type	LITHOLOGICAL I (Classification G lour; Secondary	roup Symbol);	Particle onents.	Moisture	Consistency	C(I Odour materia	COMMENTS/ DNTAMINANT NDICATORS s, staining, waste als,separate phase , imported fill, ash.	Elevation (m)
11.2	1000 M			Sand								5		-11.4
12.1 12.2 12.4 12.4 12.6 12.6 13.6 13.6 13.6 14.1 13.6 14.1 14.1 15.1 15.2 15.4 15.6 15.7 15.8 15.8 15.8						Termination achieved.	on Depth at: 12.00	m. Target dept	.h					-12. -12. -12. -12. -12. -12. -13. -13. -13. -13. -13. -13. -13. -13
16.2 16.4 16.6 16.8														-16.
GHD S		lassifications The GHD S	Soil	Classification is based	on Au	stralian Sta	ndards AS 1726-7	993. This loa is	s not intend	ded for	, r geote	chnical p	urposes.	
Drillin AH-A DC-Dia (shove SD-Sc	GHD Soil Classifications The GHD Soil Classification is based on Australian Str Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler							viations vity Moist, y Moist, ted	Consiste Granular Loose, L- Dense, D Dense	ency A r Soils -Loose	Abbrev SVL-Ve e, MD-N	iations ery /ledium	Cohesive Soils VS Soft, S-Soft, F-Firm, ST-Stiff, VST-Very S H-Hard	,



ENVIRONMENTAL-GROUNDWATER

Projec Projec Site L Locat	Client LXRA Project LXRA Level Crossing Project No. 3133036 Site LXRA ID18 Location Date Drilled 03/08/2017 - 03/08/2017			Drill Co. Driller Rig Type Drill Method Total Depth (m) 4.00 Diameter (mm)				Easting, Northing 334995, 5789167 Grid Ref GDA94_MGA_zone_55 Elevation Collar RL 0.707 Logged By Alan Wilson Checked By				
B.C.L	No. N	I/A	Casing 50 mm	PVC (Class 18)	Screen 0.5mm Slotted PVC	(Class 18)	Su	urface Com	pletion Monumer	nt	
Depth (m)	Drilling Method	Sample ID	ID18-BH15 Well Details	Graphic Log	Soil Type (Cl Size; Colou	HOLOGICAL DESCRIPTION lassification Group Symbol); Part ır; Secondary / Minor Component	Moisture	Consistency	CON IND Odours, materials	MMENTS/ TAMINANT ICATORS staining, waste separate phase nported fill, ash.	Elevation (m)	
0.2 0.4 0.6 1 0.6 1 1.2 1.4 1.6 2.2 2.4 2.6 3.2 3.4 3.6 3.8	HA		-Grout		Silty SAND fi SOIL) SAND fine, u SAND fine, u	ine, dark grey (NATURAL - SOIL) ine, pale grey, with shells (NATURA iniform, white (NATURAL - SOIL) iniform, pale grey (NATURAL - SOIL)	M	s s s			-0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.2 -1.4 -1.6 -1.4 -1.6 -2 -2.2 -2.4 -2.6 -2.4 -2.6 -3.2 -3.2 -3.4 -3.6 -3.8	
4.2					Termination I achieved.	Depth at: 4.00 m. Target depth					- 4.2 - 4.4 4.6 4.8	
											Ē	
Drillin AH-A	Soil Cl g Abb ir Han	nreviations	Bucket Excavation, CC	C-Conci	ete Coring,	D-Dry, SM-Slightly Moist,	Consisten Granular S	cy Abb Soils V	L-Very	Cohesive Soils		
(shove SD-So	H-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, C-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation hovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, S-Window Sampler											

Works Licence ID:

WLE067645

Printed on: 10 Feb 2017 10:14:07 am

COPY OF RECORD IN THE VICTORIAN WATER REGISTER LICENCE TO CONSTRUCT WORKS

under Section 67 of the Water Act 1989

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This licence authorises its holders to construct the described works, subject to the conditions.

Licence Holder(s)

DALE SCOTT MCKENZIE of LEVEL 1, 436 JOHNSTON STREET ABBOTSFORD VIC 3067

Licence Contact Details

DS MCKENZIE

LEVEL 1, 436 JOHNSTON STREET ABBOTSFORD VIC 3067

Licence Details

Expiry date	10 Feb 2018
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	NA for construct/decommission
Water system	Unincorporated (GMU)

Summary of Licensed Works

The details in this section are a summary only. They are subject to the conditions specified in this licence.

Works ID	Works type	Use of water
WRK098877	Bore	Investigation
WRK098878	Bore	Investigation
WRK098879	Bore	Investigation
WRK098880	Bore	Investigation
WRK098881	Bore	Investigation
WRK098882	Bore	Investigation
WRK098883	Bore	Investigation

Description of Licensed Works

WORKS ID WRK098877

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	Unrestricted

Works location

Easting	Northing	Zone MGA
334853.420	5786207.099	Zone 55

Other land description 95 C2

Property address

Location(s) in or near CHELSEA, Parish: Lyndhurst

Description of Licensed Works

WORKS ID WRK098878

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	Unrestricted

Works location

Easting	Northing	Zone MGA
334786.573	5786571.717	Zone 55

Land description

Property address

STATION STREET CHELSEA 3196

Description of Licensed Works

WORKS ID WRK098879

Works type	Bore	
Works subtype	Drilled bore	
Proposed maximum depth	Unrestricted	
Works location <i>Easting</i>	Northing	Zone MGA
334691.810	5786792.714	Zone 55
Land description		

Description of Licensed Works

WORKS ID WRK098880		
Works type	Bore	
Works subtype	Drilled bore	
Proposed maximum depth	Unrestricted	
Works location		
Easting	Northing	Zone MGA
334523.899	5787206.168	Zone 55

Land description

Property address

STATION STREET CHELSEA 3196

Description of Licensed Works

WORKS ID WRK098881

Works type	Bore	
Works subtype	Drilled bore	
Proposed maximum depth	Unrestricted	
Works location		
Easting	Northing	Zone MGA
333463.556	5789401.734	Zone 55

Land description

Property address

STATION STREET ASPENDALE 3195

Description of Licensed Works

WORKS ID WRK098882			
Works type	Bore		
Works subtype	Drilled bore		
Proposed maximum depth	Unrestricted		
Works location			
Easting	Northing	Zone MGA	
333370.330	5789597.763	Zone 55	
Conv of Record			

Land description

Property address

STATION STREET ASPENDALE 3195

Description of Licensed Works

WORKS ID WRK098883

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	Unrestricted

Works location

Easting	Northing	Zone MGA
333582.506	5789172.252	Zone 55

Other land description

95 C2

Property address

Location(s) in or near CHELSEA, Parish: Lyndhurst

Related Instruments

Related	entitlements	Nil

Related water-use entities Nil

Application History

Reference	Type	Status	Lodged date	Approved date	Recorded date
WLI605559	Issue	Approved	10 Feb 2017	10 Feb 2017	

Conditions

Licence WLE067645 is subject to the following conditions:

Siting and construction

- 1 The bore(s) must be drilled at the location specified in the application approved by the Authority.
- 2 If after drilling the bore is considered unsatisfactory a replacement bore may be drilled on the land specified in the licence.

Preventing pollution

- 3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.
- 4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.
- 5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

Construction standards

6 The bore(s) must be constructed, and where relevant decommissioned, in accordance with the Minimum Construction Requirements for Water Bores in Australia, Edition 3 or its successor.

Drilling licence and supervision requirements

- 7 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a Class 1, 2, or 3 driller, with appropriate endorsements.
- 8 If artesian pressure is expected or encountered, then a driller licensed under the Water Act 1989, and endorsed as a class 3 driller, must install casing in the bore(s) to a suitable depth, and in a suitable manner, to prevent its outbreak. A suitable valve must also be fitted to the bore.

Bore completion report

9 A Bore Completion Report must be submitted to the Authority within 28 working days of the bore(s) being completed.

Protecting water resources

- 10 At the completion of drilling, and before the drilling rig leaves the site, all bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.
- 11 The bore(s) must be located at least 30 metres from any authority's channel, reserve or easement unless authorised by the Authority.

Protecting water quality

- 12 Drilling must not exceed the maximum depth.
- 13 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.
- 14 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be screened within the one bore or in any other manner to allow connection between them.
- 15 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

Fees and charges

16 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.

END OF COPY OF RECORD



	A TECH (COMP		g l	Log	g -	Во	rehole		Boreh sheet projec		ASPEN-BH01 1 of 6 GEOTABTF10294A
lient		Ме	tro Trai	ins	Melb	ourn	e Pty	v. Ltd.			started:	20 Feb 2017
orinc								ithority		date o	complete	ed: 22 Feb 2017
oroje	ct:	Hyo Che	drogeo elsea	logi	cal a	nd G	ieote	chnical Investigation, Aspendale and	1	logge	d by:	BP
ocati	ion:	Sta	tion St	reet	, Asp	bend	ale			check	ed by:	KJ
			1; N: 5789 50, Truck i)		surface elevation: 6.56 m (AHD) drilling fluid: Polymer	-		rizontal: 9 ter : HW	90°
	ng info			noun	leu	mate	erial sul	ostance	Casin	y ulame		
ø	ation		samples &		(L	bol	ation	material description	a 5	icy / ensity	hand penetro-	structure and additional observations
support	1 2 penetration 3	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	meter (kPa) 0 & 8 & 9	
Î			E	-	-			FILL: ASPHALT: 100mm. FILL: CLAYEY GRAVEL: medium to	D	VD		FILL
			E	-6			SP	Coarse grained, dark grey, orange	М	L - MD		QUATERNARY SANDS
			E	-	-		SP	∫ fines fines SAND: fine to coarse grained, grey				duplicate and triplicate environmental samples (QC3 & QC4)
				-	1.0-			becoming pale grey				
_			E	-5	-							
			SPT 0, 1, 2 N*=3									
				-	2.0-							
								becoming brown, pale brown, grey				
				-4	-							
					3.0-							
			SPT 2, 4, 3 N*=7		-							
				-3								
casing —					-							
- HW ca				-	4.0-			becoming brown, orange-brown, trace of fines		D		
				-2	-							
			SPT 8, 9, 11 N*=20	-2	-							
			11 20	-	5.0-				W	-		
					-							
			SPT 9, 9, 15	-1	-							
			N*=24	-	6.0-							
					-							
:				-0				becoming grey, trace of quartz gravel, fine to coarse		VD		
					-			grained				
			SPT 20/125mm	 r	7.0-							
			HB N=R		-							
				1								
			I					complex & field tests	assificat	tion sym		consistency / relative days the
metho AD AS	auger o auger s	crewin		M	port mud casing	N	nil	B bulk disturbed sample D disturbed sample	soil de based	escription on Unifie	n d	consistency / relative density VS very soft S soft
ha W Ha	hand a washbo hand a	ore		per	etration ⊢∾∽			E environmental sample C SS split spoon sample		ation Syst	em	F firm St stiff
NDD			ve drilling		▝▁	no res rangir refusa	sistance ig to il		ture dry moist			VSt very stiff H hard Fb friable
* e.g.	bit shov AD/T	wn by s	suffix	wat	▼ 110-	Oct-12 w		N* SPT - sample recovered W Nc SPT with solid cone Wp	wet plastic li			VL very loose L loose
B.	blank b TC bit	it				er inflow		VS vane shear; peak/remouded (kPa) WI R refusal	liquid lin	πL		MD medium dense D dense



TETR	RA TECH	COMP	ANY								hole ID.	ASPEN-BH01	
Engineering Log - Borehole								shee	t:	2 of 6			
										proje	ct no.	GEOTABTF10294A	
clier	nt:		tro Trai				-			date	e started: 20 Feb 2017		
orin	cipal:			Crossing Removal Authority date complete						complete	ed: 22 Feb 2017		
oroj	ect:		arogeo elsea	iogi	cai a	na G	d Geotechnical Investigation, Aspendale and logged by:					BP	
oca	tion:	Sta	tion St	reet,	, Asp	bend	ale			chec	ked by:	KJ	
posit	ion: E:	33347	1; N: 5789	390 (N	1GA94)		surface elevation: 6.56 m (AHD)	ang	le from h	orizontal:	90°	
			50, Truck i	nount	ed	<u> </u>		drilling fluid: Polymer	cas	ing diame	eter : HW		
arii	ing info	ormati	on				rial sub	material description		iity	hand	structure and	
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	moisture	consistency / relative density	penetro- meter (kPa) କୁ ରୁ ରୁ କୁ	additional observations	
= 0	3 6 7	5		-	σ	5	SP	SAND: fine to coarse grained, grey. (continued		D		QUATERNARY SANDS	
			SPT 14, 12, 10	2	-							-	
			N*=22		- 9.0 <i>-</i> -							_	
				F	9.0-								
				3	-								
				3						VD			
			OPT		10.0 —								
			SPT 12, 21, 29 N*=50		-								
				4	-								
					-								
				-	11.0 —							-	
			SPT 10,	5	-							-	
casing -			10/50mm N*=R		- 12.0 —								
-HW ca				-	- 12.0							-	
					-							-	
				6	-								
					13.0 —							-	
			SPT 4, 3, 4 N*=7		-	/////	СН	CLAY: high plasticity, green, grey, trace of sar	nd. M	F	1111	TERTIARY BRIGHTON GROUP	
			N =/	7	-							-	
z					-								
				F	14.0 —							-	
			SPT	8	-						<u>iiii</u>	-	
			4, 12, 15 N*=27		15.0		SC	CLAYEY SAND : fine to coarse grained, green-grey, mottled orange-brown, medium		D			
				F	15.0 —			plasticity.					
				_	-							-	
				9	-						liii		
									alceste	ation	bol 8	1	
Met AD	auger	drilling* screwin		sup Mr	nud	N	nil	samples & field tests B bulk disturbed sample	soil	ation sym descriptic d on Unifie	on	Consistency / relative density VS very soft	
AS HA W	hand a washb	auger	ч		asing etration	1		D disturbed sample E environmental sample		ication Sys		S soft F firm St stiff	
HA NDE	hand a	auger	ve drilling		- 0 0 		istance a to	SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	moisture			St stiff VSt very stiff H hard	
INDL				wate		refusa	ſ	N standard penetration test (SPT) N* SPT - sample recovered	D dry M moist W wet			Fb friable VL very loose	
	L												
* e.g. B	bit sho AD/T blank l	own by s	suffix		▲ leve	Oct-12 wa el on date er inflow		NcSPT with solid coneVSvane shear; peak/remouded (kPa)	Wp plastic WI liquid			L loose MD medium dense	

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ATET		COMP	ANY	a I	0	a -	Bo	rehole			Boreh sheet	iole ID. :	ASPEN-BH01 3 of 6
											projec	ct no.	GEOTABTF10294A
clier			tro Trai				-				date s	started:	20 Feb 2017
prin	cipal:		el Cros								date o	complete	ed: 22 Feb 2017
proj	ect:	Ch	arogeol elsea	ogi	cai a	ina G	eote	chnical Investigation, Aspendal	e and	1	logge	d by:	BP
loca	ition:	Sta	tion St	reet	, Asj	oend	ale				check	ed by:	KJ
posit	ion: E:	33347	1; N: 5789	390 (N	/IGA94)		surface elevation: 6.56 m (AHD)		angle	from ho	rizontal:	90°
		-	50, Truck r	nount	ed			drilling fluid: Polymer		casinę	g diame	ter : HW	
arii	ling info	ormati	on			mate	rial sub	material description			ity '	hand	structure and
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components		moisture condition	consistency / relative density	penetro- meter (kPa)	additional observations
			SPT 5, 8, 13 N*=21	- 10 11	- - - 17.0 – -		SC	CLAYEY SAND: fine to coarse grained, green-grey, mottled orange-brown, medium plasticity. (continued) becoming yellow-brown, with some fine grained gravel	1	Μ	D VD		TERTIARY BRIGHTON GROUP
			\ <u>16</u> /70mm <u>N</u> *=R		18.0			Sandy CLAY: high plasticity, brown, mottled pale-grey, fine to medium grained sand.			VSt		
- w - HW casing			SPT 3, 5, 8 N*=13		20.0			becoming pale grey					HP 350 - 450 kPa
			SPT 5, 9, 8 N*=17	15	22.0		 SC	CLAYEY SAND: fine to medium grained, pale grey, mottled green-grey, brown, low plasticity, some pockets of fine to medium grained grave	 with I.		MD		
meti AD AS HA W HA NDE	auger auger hand a washb hand a non de bit sho	screwir uger ore uger structiv	ng* ve drilling	M C d pen	v 10-	no res rangin refusa	í ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	mois D M W Wp	soil de based Classifica ture dry moist wet plastic li		n d	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
* e.g. B T V	bit sho AD/T blank t TC bit V bit		suffix	wat	■	-	ater shown	N* SPT - sample recovered	W Wp	wet			VL very loose



Eng Slient: principal: project:	ine M Le H	eering Log - Borehole etro Trains Melbourne Pty. Ltd. evel Crossing Removal Authority ydrogeological and Geotechnical Investigation, Aspendale and helsea tation Street, Aspendale								sheet proje date date logge	ct no. started: complete ed by:	BP
ocation:					-		ale	surface elevation: 6.56 m (AHD)	anale		ked by:	KJ 90°
rill model:	Xplor	a 50, Ti		``				drilling fluid: Polymer	Ŭ		eter : HW	
bout the second the se		samp field t	les & tests	(m)	(m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic,	tion	consistency / relative density	hand penetro- meter	structure and additional observations
support 1 2 penetr	3 water			RL (n	depth (m)	graph		colour, secondary and minor components	moisture condition	consis relativ	(kPa) 02 08 08 08	
		Ue	33	18 	- - - 25.0 — - -		SC	CLAYEY SAND: fine to medium grained, pale grey, mottled green-grey, brown, low plasticity, with some pockets of fine to medium grained gravel. (continued)	M	MD		TERTIARY BRIGHTON GROUP
	i	SF 3, 1 N*=	1, 7		- 26.0 - - - 27.0 -		SM	SILTY SAND: fine grained, brown, mottled orange-brown, with some pockets of fine to coarse grained gravel, trace of high plasticity clay pockets.				GELLIBRAND MARL
HW casing		SF 7, 4/70 ∖N*=	2, mm	21 	- - 28.0 - - - 29.0		· · · · ·	becoming dark green-grey				SPT refusal on gravel band
		SF 21,9 N*=	9, 11	23 - 24	- - - 30.0 — - - - -			trace of shell fragments				
		SF 8,7 N*=	7,9	25 sup	31.0 - - - port			samples & field tests	classificat			consistency / relative density
AS auge HA hand W wash HA hand NDD non o	auge destruction iown b c bit it	ving*	ng	pen wat	etration etration etration er er ↓ leve wat	I	ater e shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	soil de based Classific isture dry moist wet plastic li	escriptio on Unifie ation Sys	ed	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



	II C y									
TETRA TEC	H COMPANY							Bore	hole ID.	ASPEN-BH01
Enai	inaari	n a		2	Do	rahala		shee	t:	5 of 6
Eng	meen	ng	LΟ	<u>y -</u>	DU	rehole		proje	ct no.	GEOTABTF10294A
client:	Metro T	rains	Melb	ourn	e Pty	. Ltd.		date	started:	20 Feb 2017
principal:	Level C	rossi	ng Re	emov	al Au	thority		date	complete	ed: 22 Feb 2017
project:	Hydrog	eolog	ical a	nd G	Geote	chnical Investigation, Aspendal	e and	logge	ed by:	BP
ocation:	Chelsea Station		t Aci	nond	ala				ked by:	KJ
	: 333471; N: 5		-		aie	surface elevation: 6.56 m (AHD)	ong		,	
	Xplora 50, Tru)		drilling fluid: Polymer	-		orizontal: 9 eter : HW	90
drilling in	formation			mate	erial sub	stance		-		
ation	sample	s &		Бõ	ation	material description		cy / ensity	hand penetro-	structure and additional observations
method & support 2 penetration		sts (m) BL	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	meter (kPa) ତୁ ରୁ ରୁ ରୁ ଦ୍ୱ	
	 	17 1 27 28 - - 18	33.0		SM	SILTY SAND: fine grained, brown, mottled orange-brown, with some pockets of fine to coar grained gravel, trace of high plasticity clay pocke (continued)		MD		GELLIBRAND MARL
AS auge HA hand	I SP1 I 20, 26 N*=4 I	23 9 31 - - 22 7 - - - 32 7 - - 33 Su M C	39.0			samples & field tests B bulk disturbed sample D disturbed sample E environmental sample	soil base	MD MD		consistency / relative density VS very soft S soft F firm St eriff
W wash HA hand NDD non o	bore auger destructive drilling nown by suffix k bit it	,	ter ↓10- ↓ lev wa		al ater e shown	SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	moisture D dry M moist W wet Wp plastic WI liquid I	limit		St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



TETR	ATECH	COMF		2			_				Boreh sheet	nole ID.		ASPEN-BH01 6 of 6		
Er	ngi	ne	erin	g l	-0(9 -	RO	rehole			proje	ct no.		GEOTABTF10294A		
clien	it:	Ме	tro Tra	ins l	Nelb	ourn	e Pty	. Ltd.			date s	started		20 Feb 2017		
princ	cipal:	Le	vel Cro	ssin	g Re	mov	al Au	thority			date of	comple	ted:	22 Feb 2017		
proje	ect.	Hy	drogeo	logi	cal a	nd G	Geote	chnical Investigation, Aspendal	le and		logge	d bv [.]		6 of 6 GEOTABTF10294AA 20 Feb 2017 22 Feb 2017 BP KJ structure and additional observations CLLIBRAND MARL		
locat			elsēa ation St	root	۸cr	hond	alo					(ed by:		6 of 6 GEOTABTF10294AA 20 Feb 2017 22 Feb 2017 BP KJ structure and		
			71; N: 5789				aie	outcos algustion: 6 56 m (AUD)		nalo			000	ΛJ		
			50, Truck)		surface elevation: 6.56 m (AHD) drilling fluid: Polymer		•		orizontal: ter : HW				
	ing inf					mate	erial sub	<u> </u>			5					
method & support	penetration	er	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	sture	condition	consistency / relative density	hand penetro meter (kPa)	-			
	- 01 0	° water		RL	dep	gra						300 J	_			
HW casing			SPT 15, 18, 25 N*=43		-		SM	SILTY SAND: fine grained, brown, mottled orange-brown, with some pockets of fine to coa grained gravel, trace of high plasticity clay pock (continued)	arse	М	MD			LLIBRAND MARL		
				34	-			Borehole ASPEN-BH01 terminated at 40.45 m								
					- 41.0 —			Target depth Standpipe installation Backfill details						-		
					_			0.0m-8.5m: grout 8.5m-9.5m: bentonite								
				35	-			9.5m-13.0m: sand 13.0-40.45m: grout				; ; ; ;		-		
				-00				Standpipe details								
				_	42.0 —			0.0m-10.0m: unslotted 50mm PVC, Class 18 10.0m-13.0m: machine slotted, 50mm PVC, Class	ass					-		
					-			18 End caps and flush mounted gatic cover								
				36	-									-		
					-											
				_	43.0 —									-		
					-											
				37										-		
					-											
				_	44.0 —									-		
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				38	_									-		
	111				-							iiii				
				-	45.0 —									-		
				39	-									-		
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				40	-									-		
		· I			- 47.0 —											
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		i			-									_		
	111			41	-											
meth AD	iod auger	r drilling	*		port mud	N	l nil	samples & field tests B bulk disturbed sample	s	oil de	ion sym escriptio	n		consistency / relative density VS very soft		
AS HA	auger hand	r screwi auger		C	casing			D disturbed sample E environmental sample			on Unifie ation Sys			S soft F firm		
W HA	washl hand	bore auger		-	etration		sistance	SS split spoon sample U## undisturbed sample ##mm diameter	moistur				_	St stiff VSt very stiff		
NDD			ve drilling		<u> </u>	 no res rangir refusa 	ng to	HP hand penetrometer (kPa) N standard penetration test (SPT)	D dry					H hard Fb friable		
*		own by	suffix	wat	10-0	Oct-12 w	ater	N* SPT - sample recovered Nc SPT with solid cone	W we Wp pla	et astic li				VL very loose L loose		
e.g. B T	AD/T blank				- leve	el on date er inflow		VS vane shear; peak/remouded (kPa) R refusal		uid lin				MD medium dense D dense		
T V	TC bit V bit	τ		-	- wat	er outflov	N	HB hammer bouncing						VD very dense		

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	gi	COMP		g l	Log	g -	Во	rehole		sheet		ASPEN-BH02 1 of 6 GEOTABTF10294A
lient	<u> </u>		tro Trai	<u> </u>		_				projec date s	started:	02 Mar 2017
							-	ithority				
								chnical Investigation, Aspendale and	d		complete	
orojeo	ct:	Che	elsea	-				ennear ne congation, rispondare an	4	logge	d by:	BP
ocati	on:	Sta	tion St	reet	, Asp	oend	ale			check	ed by:	KJ
			6; N: 5789)		surface elevation: 6.72 m (AHD)	angle	from ho	rizontal:	90°
			50, Truck i	moun	ted	<u> </u>		drilling fluid: Polymer	hole	diameter	: 150 mm	n
ariiiin	ng info ⊂	rmati	on			mate		material description		ţ,	hand	structure and
metnod & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) ତୁ ରୁ ରୁ କୁ	additional observations
	9.07	2			0	, 	00	FILL: ASPHALT: 150mm.	20			FILL
			E	f				FILL: Sandy GRAVEL: fine to coarse grained, orange-brown.	М	VD		
			E		-	Æ	SP	FILL: SAND: fine to coarse grained, dark grey,		L - MD		QUATERNARY SANDS
			E	-6	-		57	black, with some fines. SAND: fine to medium grained, dark grey, grey.				YOATENNAKT JANUJ
					1.0-							
0000000			E	1				becoming pale grey		MD		
			SPT									
			3, 4, 4 <u>N*=8</u> E	-5	-							
000000					2.0-			becoming pale brown				
100000				Γ								
000000			SPT		-							
1000000			2, 4, 4 N*=8	-4	-							
000000					3.0-							
0.0000				Γ								
1000000					-					D		
000000				-3	-							
10101010			SPT 3, 8, 10	1	4.0-							
-			3, 8, 10 N*=18		-							
		06-03-17 I		-2	-							
000000		0-90		_	-			becoming fine to coarse grained, brown, trace of	W			
00000	11			L	5.0-			fines			1111	
000000			SPT	ſ	-							
000000			3, 7, 13 N*=20	_1	-							
000000	<u> </u>			1'	-							
0000000				L	6.0-							
100000					-			becoming grey, pale grey, trace of fine grained		VD		
000000	i i			-0				quartz gravel			1111	
202020			SPT	1	7.0-							
			5, 13, 18 N*=31		- 1.0							
100000	i i			1	-							
000000				1	-							
10000					-							
S	auger auger	screwin		M	port mud casing	N	l nil	B bulk disturbed sample D disturbed sample	soil d based	tion symbol escription on Unifie	n d	consistency / relative density VS very soft S soft
N	hand a washb	ore			etration	ı		E environmental sample SS split spoon sample	Classific	ation Syst	em	F firm St stiff
	hand a non de		ve drilling			 no res rangin refusa 	sistance ng to	U## undisturbed sample ##mm diameter mois HP hand penetrometer (kPa) D	sture dry			VSt very stiff H hard
*	bit sho	wn by a	suffix	wat		-		N standard penetration test (SPT) M N* SPT - sample recovered W	moist wet			Fb friable VL very loose
e.g.	AD/T blank b				- leve	Oct-12 w el on date er inflow		Nc SPT with solid cone Wp VS vane shear; peak/remouded (kPa) WI	plastic I liquid lir			L loose MD medium dense
	TC bit	/10				er outflov		R refusal HB hammer bouncing				D dense



Eng			g l	-00	g -	Во	rehole			Boreh sheet projed		ASPEN-BH02 ^{2 of 6} GEOTABTF10294A
client: principal: project:	Me Le Hy	etro Trai vel Cros drogeol	ins l ssin	Velb g Re	ourn emov	e Pty al Au	. Ltd.	le and	1	date s	started: complete	02 Mar 2017
location:	-	nelsea ation Sti	reet	Ası	hend	ale					a by:	KJ
		86; N: 5789				4/0	surface elevation: 6.72 m (AHD)		angle		orizontal:	
		a 50, Truck r			,		drilling fluid: Polymer		Ŭ		: 150 mr	
drilling in	format	tion			mate	erial sub	stance					
method & support penetration	s 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	hand penetro- meter (kPa) ତୁ ବ୍ଷୁ ଚ୍ଛି ଚ୍ଛି	structure and additional observations
		SPT 13, 23, 5/20mm HB N*=R		- - - 9.0-		SP	SAND: fine to medium grained, dark grey, grey (continued)		W	VD		QUATERNARY SANDS
		U63	3	- - - 10.0 - - -			Sandy CLAY: high plasticity, dark grey, fine to coarse grained sand, grading to clayey sand, sulfuric odour.			F - St	×	HP 100 kPa
		SPT 6, 12, 17 N*=29		- 11.0 - - 12.0		SP	SAND: fine to medium grained, brown, dark brown, with some fines.			D		
		SPT 18, 6/30mm HB N=R	7	- - 13.0 - -						VD		
		SPT 0, 3, 4 N*=7	8			CH	Sandy CLAY: high plasticity, grey, mottled orange-brown, fine to medium grained sand.		М	F - St		TERTIARY BRIGHTON GROUP
		U63	9 Sup	- -			becoming grey, mottled dark grey	cla	ssificat	VSt tion syml	 	
AS auge HA hand W wash HA hand NDD non o	auger destruct nown by c bit it	ing* tive drilling	pen wat	etration	1	ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	C moist D c M r W v Wp p	soil de based lassifica	escription on Unifie ation Syst	n d	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose D dense VD very dense



CH COMPANY Borehole ID. ASPEN-Bit ineering Log - Borehole sheet: 3 of 6 project no. GEOTABTF Metro Trains Melbourne Pty. Ltd. date started: 02 Mar 2017 I: Level Crossing Removal Authority Hydrogeological and Geotechnical Investigation, Aspendale and Chelsea date completed: 08 Mar 2017 : Station Street, Aspendale checked by: KJ E: 33586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° it: Xplora 50, Truck mounted drilling fluid: Polymer hole diameter : 150 mm structure and additional observal	10294A
Image: Station Street, Aspendale surface elevation: 6.72 m (AHD) angle from horizontal: 90° KJ E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° kole diameter: 150 mm	7
Metro Trains Melbourne Pty. Ltd. date started: 02 Mar 2017 I: Level Crossing Removal Authority Hydrogeological and Geotechnical Investigation, Aspendale and Chelsea date completed: 08 Mar 2017 : Station Street, Aspendale checked by: KJ E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° hole diameter : 150 mm material substance	7
I: Level Crossing Removal Authority Hydrogeological and Geotechnical Investigation, Aspendale and Chelsea date completed: 08 Mar 2017 : Station Street, Aspendale logged by: BP :: Station Street, Aspendale KJ E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° I:: xplora 50, Truck mounted drilling fluid: Polymer hole diameter : 150 mm	
Hydrogeological and Geotechnical Investigation, Aspendale and Chelsea logged by: BP Station Street, Aspendale checked by: KJ E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° I: Xplora 50, Truck mounted drilling fluid: Polymer hole diameter : 150 mm	7
Chelsea logged by: DP : Station Street, Aspendale checked by: KJ E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° I: Xplora 50, Truck mounted drilling fluid: Polymer hole diameter : 150 mm	
Chersea checked by: KJ Station Street, Aspendale checked by: KJ E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° hole diameter : 150 mm hole diameter : 150 mm information material substance	
E: 333586; N: 5789170 (MGA94) surface elevation: 6.72 m (AHD) angle from horizontal: 90° I: Xplora 50, Truck mounted drilling fluid: Polymer hole diameter : 150 mm nformation material substance	
I: Xplora 50, Truck mounted drilling fluid: Polymer hole diameter : 150 mm nformation material substance	
samples & C D E material description	
Samples & reduction Samples & reduction Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit TYPE: plasticity or particle characteristic, colour, secondary and minor components Solit	
CH Sandy CLAY: high plasticity, grey, mottled M VSt TERTIARY BRIGHTON orange-brown, fine to medium grained sand.	GROUP
	-
	-
Image: Science of the second secon	
	-
SPT	
N*=13 1 18.0 − 1	-
	-
12 becoming mottled green-brown and pale grey L IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	
SPT	
	-
	-
	-
	-
	-
SPT 22.0	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
1 23.0 becoming mottled orange-brown and pale grey 1 1 1	
1 6,5,5 -17 1 </td <td></td>	
support samples & field tests classification symbol & consistency / relative d	ensity
ger drilling* M mud N nil B bulk disturbed sample soil description VS very soft ger screwing* C casing D disturbed sample based on Unified S soft	
nd auger E environmental sample Classification System F firm shbore SS split spoon sample St stiff	
nd auger no resistance no destructive drilling no resistance ranging to U## undisturbed sample ##mm diameter no destructive drilling no destructive dr	
shown by suffix view of the standard penetration test (SFT) with infost view of the st	e



	A TECH						De	ve h e l e		•	Boreh sheet	iole ID.	ASPEN-BH02 4 of 6
Eľ	ıgı	ne	erin	g I	<u>-0(</u>	J -	R0	rehole			projec	ct no.	GEOTABTF10294AA
clien	it:	Ме	tro Trai	ins l	Nelb	ourn	e Pty	Ltd.			date s	started:	02 Mar 2017
princ	cipal:		el Cros							_	date o	complete	ed: 08 Mar 2017
proje	ect:		drogeo elsea	logi	cal a	nd G	Seoted	chnical Investigation, Aspendale	e and		logge	d by:	BP
locat	tion:		tion St	reet	, Asµ	bend	ale				check	ed by:	KJ
positi	on: E:	33358	6; N: 5789	170 (N	- /IGA94)		surface elevation: 6.72 m (AHD)		angle	from ho	rizontal:	90°
			50, Truck i	mount	ed			drilling fluid: Polymer		hole d	liameter	: 150 mn	n
drilli	ing info	ormati	on			mate	erial sub				È	hand	of much we and
method & support	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	hand penetro- meter (kPa) © % % %	structure and additional observations
5 0	3 / 7	\$		Ľ.	q	5	ML	Sandy SILT: medium liquid limit, pale brown, find			o ≝ VSt - H		TERTIARY BRIGHTON GROUP
			U63		- - - 25.0 — - - - -			to coarse grained sand.					× HP >600 kPa
			SPT 2, 5/70mm HB N*=R		26.0 27.0 		SC	CLAYEY SAND: fine to coarse grained, brown, low plasticity, with some pockets of fine to mediu grained gravel.	— — IM		VD		GELLIBRAND MARL
			SPT 16, 5/50mm HB N*=R	21 	- 28.0 — - - 29.0 —			becoming fine grained, dark green-grey					
			SPT 7, 8, 9 N*=17				SM	SILTY SAND: fine grained, green-grey, with som pockets of sandy clay and fine grained gravel, tra of shell fragments.	ne ace		MD		
meth	00d		SPT 5, 12, 15 N*=27	- 	31.0 - - - port			samples & field tests	clas		ion sym		
AD AS HA W HA NDD * e.g. B T V	D auger drilling* M S auger screwing* C A hand auger / washbore Per A hand auger D non destructive drilling bit shown by suffix g. AD/T blank bit TC bit					I	ater e shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	moist D d M n W v Wp p	based lassifica		d	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

CDF 0 9 06 LIBRARY.GLB rev.AU Log COF BOREHOLE: NON CORED GEOTABTF10294AA CHELSPEN.GPJ <</br>



ATETR	A TECH	COMP	ANY								Boreh	ole ID.		ASPEN-BH02
E,	nai	no	orin	а I	~	ч _	R۸	rehole			sheet	:		5 of 6
	iyi	ne	eiiii	y ı	-0(<u> </u>	DU	lenole			proje	ct no.		GEOTABTF10294A
clier	it:	Ме	tro Trai	ins I	Nelb	ourn	e Pty	. Ltd.			date s	started:		02 Mar 2017
prind	cipal:							thority			date o	complet	ed:	08 Mar 2017
proje	ect:			logi	cal a	nd G	eote	chnical Investigation, Aspendal	e anc	1	logge	d by:		BP
		-	elsea tion St	root	Acr	ond	alo					-		KJ
loca					-		ale					ed by:	000	Ŋ
•	ition: E: 333586; N: 5789170 (MG, model: Xplora 50, Truck mounted)		surface elevation: 6.72 m (AHD) drilling fluid: Polymer				orizontal: : : 150 mr		
	ing info					mate	rial sub	Istance						
	tion		samples &			g	tion	material description			y / nsity	hand		structure and
method & support	1 2 penetration 3	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components		moisture condition	consistency / relative density	penetro- meter (kPa) § & & & &		additional observations
					_		SM	SILTY SAND: fine to coarse grained, green-gre mottled yellow-brown, low plasticity.	y,	М	MD		GEL	LIBRAND MARL
M			SPT 11, 12, 14 N*=26 SPT 5, 5, 6 N*=11 SPT 8, 11, 17 N*=28 SPT 8, 9, 16 N*=25 SPT 11, 13, 20		33.0 			becoming grey, mottled yellow-brown, with some pockets of sandy clay, medium plasticity	e					
HA hand auger W washbore HA hand auger NDD non destructive drilling					port mud casing etration er	 no res rangin ◄ refusa 	I	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	moist D (M)	soil de based Classifica	ion symi sscriptio on Unifie ation Sys	n d	V S F S V H F	soft firm t stiff St very stiff hard o friable
HA W HA	AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T B blank bit T TC bit						g to I ater shown	E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	moist D M W Wp	ture dry moist	ation Sys		F S V H	firm stiff St very stiff hard o friable L very loose loose D medium dens dense



Client:	neerin ^{Metro Tra} Level Cro	ins Me ssing	elbo Ren	ourn nov	e Pty al Au		and	shee proje date date	ct no. started: completed	
project:	Chelsea	-				;;;;;;;;;		logge	-	BP
location:	Station St				ale				ked by:	KJ
	333586; N: 5789 Xplora 50, Truck)		surface elevation: 6.72 m (AHD) drilling fluid: Polymer	Ū.		orizontal: 90 r : 150 mm)°
drilling inf		mounted		mate	rial sub	istance	TIDIE	ulamete	1.150 mm	
method & support	samples & field tests	Ê	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa)	structure and additional observations
w _ me sup		RL	del	dra dra	SM		E D M	5 E	100 200 400	GELLIBRAND MARL
						Borehole ASPEN-BH02 terminated at 40.25 m Target depth Standpipe installation Backfill details 0.0m-9.5m: grout 9.5m-10.5m: bentonite 10.5m-14.0m: sand 14.0-40.25m: grout Standpipe details 0.0m-11.0m: unslotted 50mm PVC, Class 18 11.0m-14.0m: machine slotted, 50mm PVC, Class 18 End caps and flush mounted gatic cover	S			
AS auger HA hand W washt HA hand NDD non d	pore auger estructive drilling pwn by suffix bit	suppo M mu C cas penetr water	ud sing ration		ter shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	based	lescriptic d on Unifie cation Sys	i n ed	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



TETRA TEC	ine	erin	<u> </u>				rehole		Boreh sheet projec		CHEL-BH01 1 of 6 GEOTABTF10294A
client: principal: project: location:	Le Hy Ch		ssir logi	ng Re ical a	mov nd G	al Au Geote	r. Ltd. Ithority chnical Investigation, Aspendale and	d	date o logge	started: complete d by: ked by:	06 Feb 2017 ed: 08 Feb 2017 BP KJ
position: E drill model:)		surface elevation: 6.63 m (AHD) drilling fluid: Polymer	-		orizontal: r : 100 mn	
method & ui Buillinp		samples 8 field tests	(m)	depth (m)	graphic log	classification symbol	ostance material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa)	structure and additional observations
		E E E 	LF 			SP	FILL: ASPHALT: 100mm. FILL: Sandy GRAVEL: medium to coarse grained, sub-angular to angular, grey. FILL: CLAYEY SAND: medium to coarse grained, grey, mottled orange. SAND: fine to coarse grained, grey, dark grey. becoming pale grey, pale brown	D M	ND L - MD		FILL QUATERNARY SANDS
1 100301 1		SPT 2, 4, 5 N*=9 SPT 4, 9, 9 N*=18	-4 -3 -2	3.0 4.0 			becoming pale brown, mottled dark brown		D		
		SPT 4, 8, 12 N*=20 SPT 9, 10, 6 N*=16	- -1 -0 1	5.0			becoming dark brown, trace of fines	M	MD		
AS auge HA hand W wash HA hand NDD non o	nown by - < bit it	ing* ive drilling	M C per	► 10- leve	1	al ater e shown	Samples & neuro tess B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered W Wc	soil d based Classific		n ed	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



ATETR	RA TECH	COMP	ANY						Bore	hole ID.	CHEL-BH01
۲r	nai	no	orin	a I		а_	Ro	rehole	shee	t:	2 of 6
	igi			<u> </u>		_			proje	ct no.	GEOTABTF10294AA
clier	nt:	Ме	tro Tra	ins l	Melb	ourn	ie Pty	. Ltd.	date	started:	06 Feb 2017
prind	cipal:							thority	date	complet	ed: 08 Feb 2017
proje	ect:		drogeo elsea	ologi	cal a	nd G	Geote	chnical Investigation, Aspendale and	logge	ed by:	BP
loca	tion:		tion S	treet	. Che	elsea	a		chec	ked by:	KJ
			7; N: 578		-			surface elevation: 6.63 m (AHD) angl		orizontal:	
drill n	nodel: X	plora	50, Truck	moun	ted	·				er : 100 mr	
drill	ing info	rmati	on		-	mate	erial sub	stance			1
ళ	penetration		samples &		Ê	log	cation	material description	ncy / density	hand penetro-	structure and additional observations
method & support	1 2 penet	water	field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components or point of the provided of the provi	consistency / relative density	meter (kPa) ତିର୍ବ୍ଦର ଜୁବ	
				-	-		SP	SAND: fine to coarse grained, grey, dark grey. M (continued)	MD		QUATERNARY SANDS
			SPT	_	-			becoming grey, mottled black		<u>liii</u>	-
			7, 9, 9 N*=18	2	-						
				-	9.0-						
				-	9.0					liii	
					-			becoming grey, trace of shell fragments	D		-
				3	-			becoming grey, trace of sheir nagments			-
			SPT	-	10.0-					liii	-
			10, 17, 18 N*=35	-	-						-
				-	-						-
				4	-					liii	-
					- 11.0		 	SAND: fine to coarse grained, grey, trace of fine			-
				-	-			grained gravel.			-
			SPT	_	-						-
			15, 16, 13 N*=29	5	-						-
 > 0				_	12.0-						
ÍÌ				-	-					liii	-
					-		·				
				6	-		SP	SAND: fine to medium grained, pale grey, trace of fines.	D - VD	P	TERTIARY BRIGHTON GROUP
			SPT	-	13.0-]					
			15, 27, 5/25mm	-	-						-
			HB N*=R	/	-						
				7	-						
					- 14.0			Sandy CLAY: low plasticity, grey, fine to coarse	VSt		
				-	-	¥///		grained sand, trace of sand pockets.			-
			U63	_	-	V///	1				
				8	-	V///					
				-	15.0-	¥////				i i i i i i i i i i i i i i i i i i i	HP 300 - 375 kPa
				-	-	V///					
					-	<i>\////</i>	сі-сн	CLAY: medium to high plasticity, dark grey, with some sand, with some pockets of sandy clay.	F		
				9	-	¥////		sense ound, mai come poorete er oundy day.			
						V////	1		-41-		
meth AD	auger o			M	port mud	Ν	l nil	B bulk disturbed sample soil of	ation sym descriptio	on	consistency / relative density VS very soft
AS HA	auger s hand a	uger	ng*		casing			D disturbed sample base E environmental sample Classifi	d on Unifie cation Sys		S soft F firm
W HA	washbo hand a	uger	a de ^{nne}	· _			sistance	SS split spoon sample U## undisturbed sample ##mm diameter moisture			St stiff VSt very stiff
NUD	non de	structiv	/e drilling			rangir refus	ng to	HP hand penetrometer (kPa) D dry N standard penetration test (SPT) M moist			H hard Fb friable
* e.g.	bit sho AD/T	wn by s	suffix	wat	v 10-	Oct-12 w el on date		N* SPT - sample recovered W wet Nc SPT with solid cone Wp plastic			VL very loose L loose
e.g. B T	blank b TC bit	oit			- wat	ter inflow		VS vane shear; peak/remouded (kPa) WI liquid I R refusal	imit		MD medium dense D dense
V	V bit			-	- wat	ter outflow	w	HB hammer bouncing			VD very dense



	A TECH						_				Boreh sheet	nole ID.	CHEL-BH01 3 of 6
Er	۱gi	ne	erin	g l	LO	g -	Во	rehole			proje		GEOTABTF10294AA
clien	- t:	Ме	tro Trai	ins l	Nelb	ourn	e Ptv	. Ltd.				started:	06 Feb 2017
							-	thority				complet	
								chnical Investigation, Aspendal	e and	d			
proje	ect:	Ch	elsea	-				0 1			logge	d by:	BP
locat	tion:	Sta	tion St	reet	, Ch	elsea	1				check	ked by:	KJ
•			7; N: 5786)		surface elevation: 6.63 m (AHD)		0		orizontal:	
	ing info		50, Truck	mount	ed	mate	erial sub	drilling fluid: Polymer		hole of	liametei	r : 100 mr	n
uriii	-	linau						material description			ī. Į	hand	structure and
method & support	1 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components		moisture condition	consistency / relative density	penetro- meter (kPa) ୁ ଝ୍ଲ ଝ୍ଲ ଙ୍କ	additional observations
			SPT 2, 1, 3	-			CI-CH	CLAY: medium to high plasticity, dark grey, with some sand, with some pockets of sandy clay.	1	М	F		TERTIARY BRIGHTON GROUP
			N*=4 U63	-		<i>V///</i>		(continued)	_		C+	<u>iiii</u>	
				10		<i>V////</i>		becoming pale grey, with some pockets of gree low plasticity fines	11,		St		
				1	17.0	V///							- HP 150 - 250 kPa
				\vdash	17.0-		SP	SAND: medium to coarse grained, grey, with so fines.	me		VD		
			1 SPT	r r									-
			10/60mm HB	11	.	-							
			N=R		18.0-								-
				-	10.0								-
						-							inferred clay band, 300mm thick
	j.			12		-							
			SPT		19.0 -		SP	SAND: medium to coarse grained, grey, with so fines.	me				
			13/80mm HB	-	13.0								
			N=R			-							-
				13									-
 < 0	L i				20.0-		сн	CLAY : high plasticity, grey, trace of fine to medi			St - VSt	l i i i i	-
× 0 				-	20.0-	\mathbb{V}/\mathbb{V}		grained sand.	um		51- 751		-
			ODT	-		\mathbb{V}/\mathbb{V}							-
			SP1 5, 5, 7 N*=12	14				becoming grey, mottled orange-brown, trace of	fine				-
			11 12	-	21.0-			to medium grained cemented sand gravels					
				-	21.0								-
					.	<i>\////</i>							
				15	·	<i>V////</i>		becoming orange-brown, mottled brown, with so	ome				
			SPT	-	22.0-	¥////		pockets of coarse grained sand					- - -
			4, 6, 6 N*=12	-		<i>V///</i>	CI-CH	CLAV: modium to high planticity and and with					
				1	.	<i>V///</i>	CI-CH	CLAY : medium to high plasticity, pale grey, with some fine grained sand.					-
				16	·	V////							-
					23.0-	<i>[////</i>							5
				-			SP	SAND: medium to coarse grained, brown, trace shell fragments.	of		VD		
	1 T		SPT	r	.			layer of iron cemented sand					
			6/10mm HB N=R	17			SC						
						$\langle \ \rangle$				accifi	ion or mail		
Meth AD	auger o			M	port mud	N	nil	samples & field tests B bulk disturbed sample	Cla	soil d	scriptio	n	consistency / relative density VS very soft
AS HA W	auger s hand a	uger	iy"		casing etratio	n		D disturbed sample E environmental sample	(on Unifie ation Sys		S soft F firm
W HA NDD	washbo hand a	uger	/e drilling			no res	sistance	SS split spoon sample U## undisturbed sample ##mm diameter	mois				St stiff VSt very stiff
טטאי	non de	ou uCU	re uniing	wat	er	rangin ⊲ refusa	ng to	HP hand penetrometer (kPa) N standard penetration test (SPT)	D M	dry moist			H hard Fb friable
* e.g.	bit shov AD/T	wn by s	suffix		V 10	-Oct-12 wa		N* SPT - sample recovered Nc SPT with solid cone	Wp	wet plastic li liquid lin			VL very loose L loose
В Т	blank b TC bit	it				ter inflow ter outflov	v	VS vane shear; peak/remouded (kPa) R refusal	411	"Yulu III			MD medium dense D dense
V	V bit				■ wa		•	HB hammer bouncing					VD very dense



ATETR	RATECH	COMP	ANY							Borel	nole ID.	CHEL-BH01
с.	aai	no	orin	~ I	~	2	Po	rabala		sheet	t:	4 of 6
	igi	ne	enn	<u>y I</u>	-0(<u>y -</u>		rehole		proje	ct no.	GEOTABTF10294AA
clier	nt:	Ме	tro Tra	ins I	Nelb	ourn	e Pty	. Ltd.		date	started:	06 Feb 2017
prine	cipal:							thority		date	complet	ted: 08 Feb 2017
proje	ect:			logi	cal a	nd G	ieote	chnical Investigation, Aspendale and	1	logge	ed by:	BP
	tion:		elsea ation St	reet	. Ch	elsea	,				ked by:	KJ
			77; N: 5786		-			surface elevation: 6.63 m (AHD)	angle		orizontal:	
			50, Truck			,		drilling fluid: Polymer	-		r : 100 m	
drill	ling info	ormati	ion	1		mate	erial sub	stance				
ళ	ation		samples &		Ê	bol	ation	material description	a C	ncy / ensity	hand penetro-	structure and additional observations
method & support	1 2 penetration 3	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	meter (kPa) ♀ ਲ਼ ਲ਼ ♀	
			SPT 9, 15, 22 N*=37 SPT 7, 18, 20 N*=38		25.0 - - - 26.0 - - - - - - - - - - - - - - - - - - -		SC	CLAYEY SAND: fine to medium grained, pale grey, pale red, brown, low plasticity, with some cemented sand recovered as medium to coarse grained gravel. <i>(continued)</i> becoming pale green-brown, mottled pale red, trace of fine grained gravel	Μ	D		TERTIARY BRIGHTON GROUP
: 0			SPT 11, 18, 16 N*=34		- 28.0 - - 29.0			becoming pale green-brown, bands of pale grey, mottled pale red				- - No recovery in U63
			U63	23 24 24 25	30.0 - - - - - - - - - - - - - - - - - -		SM	SILTY SAND: fine to coarse grained, green-grey, low plasticity, with some pockets of fine to medium grained gravel & high plasticity clay.				GELLIBRAND MARL
metr AD AS HA W HA NDD * e.g. B T V	auger auger hand a washb hand a	screwin auger ore auger estruction wn by	ng* ve drilling	M I C d pen wat	etration etration er er ↓ lev wa	ı	ater e shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) D N standard penetration test (SPT) M N* SPT - sample recovered W Nc SPT with solid cone Wp	soil de based Classifica		n ed	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

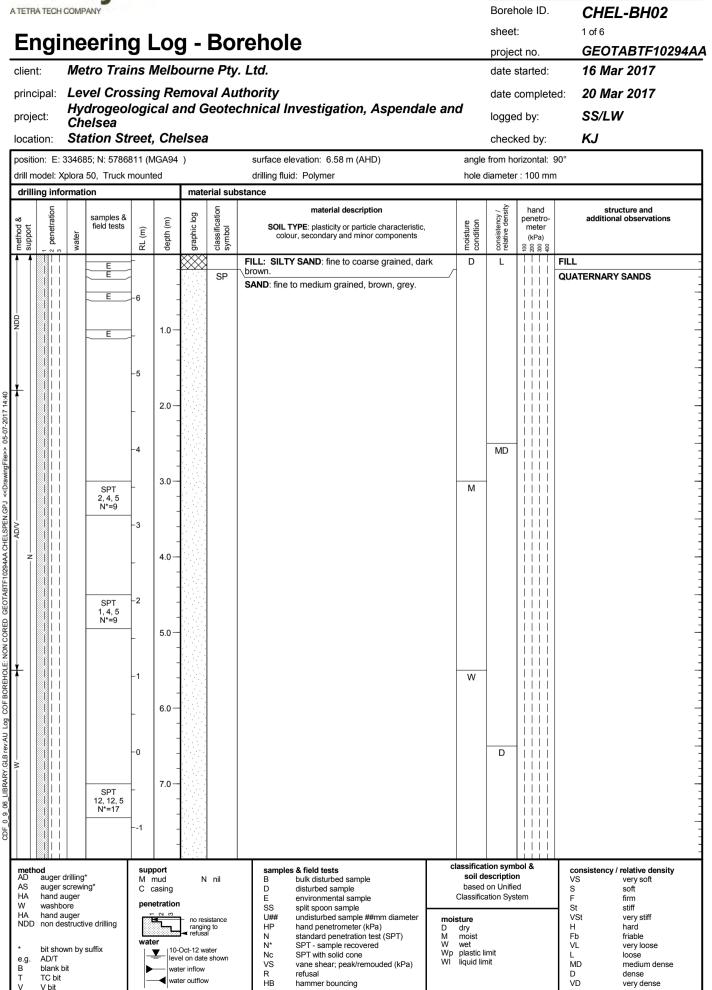


Eng			g L	-0(J -	Во	rehole		Boreh sheet projec		CHEL-BH01 5 of 6 GEOTABTF10294A
client: principal: project: location:	Lev Hyd Che	tro Trai vel Cros drogeo elsea ntion St	ssing logic	g Re cal a	mov nd G	al Au ieote		nd	date s date o logge	started: complet	ted: 06 Feb 2017 BP
position: E			,				surface elevation: 6.63 m (AHD)	angle		orizontal:	
drill model: drilling in		50, Truck	mounte	ed	mate	rial sub	drilling fluid: Polymer	hole	diameter	r : 100 mi	m
method & support 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	hand penetro- meter (kPa)	
	∑ 3 	SPT 8, 10, 15/70mm HB N*=R N*=R SPT 7, 11, 3 N*=14	26 27		6	SM	SILTY SAND: fine to coarse grained, green-grey, low plasticity, with some pockets of fine to medium grained gravel & high plasticity clay. <i>(continued)</i>	M	MD		GELLIBRAND MARL
		U63	28 29 -	- 35.0 — - - 36.0 — - -		SC	CLAYEY SAND: fine to coarse grained, grey, low plasticity, with some pockets of fine to medium grained gravel.		D		
; z		SPT 4, 6, 26 N*=32	- 31 -	- 37.0 — - - 38.0 — - - -		SM	becoming green-grey trace of clay bands, <20mm thick SILTY SAND: fine to coarse grained, green-grey, medium plasticity.		MD		
method AD auge	 		32 33 supj M r			nil	samples & field tests B bulk disturbed sample		escriptio	 	consistency / relative density VS very soft
HA hand W wash HA hand NDD non o	auger destructiv nown by s c bit it	ve drilling	C c pene vate	etration	I	istance g to l ater e shown	D disturbed sample E environmental sample SS split spoon sample	Classific bisture dry moist wet b plastic l			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



TETRA TECH	Me Lev Ch Sta	erin tro Trai vel Cros drogeo elsea ation St 77; N: 5786	ins l ssin logi reet	Melbo g Re cal a , Che //GA94	ourn mov nd G elsea	e Pty al Au Geote		angle	shee proje date date logge check	hole ID. t: ct no. started: completed ed by: ked by: orizontal: 90 r : 100 mm	BP KJ
method & support penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	stance material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa)	structure and additional observations
		SPT 10, 12, 18 N*=30	34 35 36 37 38 39 40 41			SM	SILTY SAND: fine to coarse grained, green-grey, medium plasticity. <i>(continued)</i> becoming green-grey, mottled green-brown Borehole CHEL-BH01 terminated at 40.75 m Target depth Standpipe installation Backfill details 0.0m-0.5m: grout 9.5m-10.5m: bentonite 10.5m-14.0m: sand 14.0-40.75m: grout Standpipe details 0.0m-11.0m: unslotted 50mm PVC, Class 18 11.0m-14.0m: machine slotted, 50mm PVC, Class 18 End caps and flush mounted gatic cover	M	MD		GELLIBRAND MARL
AS auge HA hand W wash HA hand NDD non c	r drilling r screwi auger bore auger lestructi own by bit	ng* ve drilling	M C pen	etration		al ater e shown	HP hand penetrometer (kPa) D N standard penetration test (SPT) M N* SPT - sample recovered W Nc SPT with solid cone W	based Classific noisture dry moist / wet	escriptio on Unifie ation Sys	ed	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

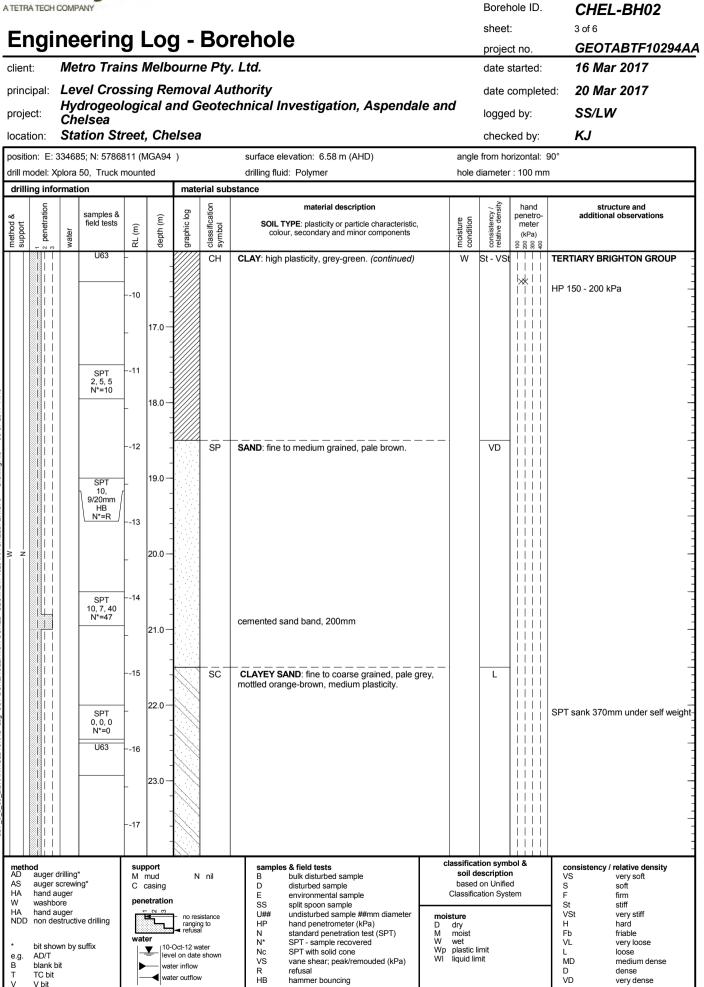






	RA TECH		ANY							Bore	hole ID.	CHEL-BH02
۲	nai	no	orin	а I		N _	R۸	rehole		shee	t:	2 of 6
	iyi			_		_				proje	ct no.	GEOTABTF10294AA
clien	nt:		tro Trai				-			date	started:	16 Mar 2017
princ	cipal:							thority	_	date	complet	ed: 20 Mar 2017
proje	ect:		drogeo. elsea	logi	cal a	nd G	ieote	chnical Investigation, Aspendale	and	logge	ed by:	SS/LW
loca	tion:		tion St	reet	, Che	elsea	1			chec	ked by:	KJ
positi	ion: E:	33468	5; N: 5786	811 (N	/IGA94)		surface elevation: 6.58 m (AHD)	angl	e from h	orizontal:	90°
drill m	nodel: X	(plora	50, Truck	mount	ed			drilling fluid: Polymer	hole	diamete	r : 100 mr	n
drill	ing info	ormati	on			mate	erial sub					
method & support	penetration	water	samples & field tests	r (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	hand penetro- meter (kPa)	structure and additional observations
ຣ ສ	3 5 7	ž		- -	ğ	5	ວິດີ SP	SAND: fine to medium grained, brown, grey.	E 8 W	8 e D	100 400	QUATERNARY SANDS -
			SPT 7, 12, 9 N*=21		- - - 9.0 - -			(continued)				
			SPT 5, 4, 6 N*=10		- - 10.0 - - - - - - - - - - - - - - - - -					MD		
> z			U63 SPT 2, 3, 5 N*=8	5	- - - 12.0		CL	Sandy CLAY: low plasticity, grey-green, fine grained sand.		F		TERTIARY BRIGHTON GROUP
			SPT 17, 32, 36 N*=68	6	- - - 13.0 - - -		 SP	SAND: fine to medium grained, yellow-brown.		VD		
			U63 SPT 3, 3, 4 N*=7					Sandy CLAY: medium plasticity, grey, fine grained sand.		St		HP 150 - 200 kPa
				9	-		 СН	CLAY: high plasticity, grey-green.				
meth AD AS HA NDD ★ e.g. B T >	method s AD auger drilling* AD auger screwing* HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T B blank bit T TC bit					1	ater shown	HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	soil o base		ed	consistency / relative densityVSvery softSsoftFfirmStstiffVStvery stiffHhardFbfriableVLvery looseLlooseMDmedium denseDdenseVDvery dense







TETR	A TECH	COMP	ANY								nole ID.	CHEL-BH02
Er	nai	ne	erin	a l	_00	a -	Bo	rehole		shee		4 of 6
											ct no.	GEOTABTF10294A
lien			tro Trai				-			date	started:	16 Mar 2017
orinc	cipal:		el Cro						and	date	complet	ed: 20 Mar 2017
oroje	ect:		elsea	iogi	cai a	na G	eolei	hnical Investigation, Aspendale	anu	logge	ed by:	SS/LW
ocat	tion:		tion St	reet,	, Che	elsea				chec	ked by:	KJ
ositi	on: E:	33468	5; N: 5786	811 (N	1GA94)		surface elevation: 6.58 m (AHD)	ang	le from h	orizontal:	90°
			50, Truck	mount	ed			drilling fluid: Polymer	hole	diamete	r : 100 mr	n
drilli	ing info	rmati	on			mate	rial sub			>		
support &	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	hand penetro- meter (kPa)	structure and additional observations
s	3 2 1	\$		-	-	б	SC	CLAYEY SAND: fine to coarse grained, pale grey mottled orange-brown, medium plasticity. (continued)		L	400 400 400 400 400 400 400 400	TERTIARY BRIGHTON GROUP
			SPT 0, 0, 0 N*=0	18	-		sc	band of fragmented cemented sands CLAYEY SAND: fine to medium grained, pale grey, with some brown, low plasticity.		VL		SPT sank 500mm under self weight, possibly disturbed during drilling
			SPT 4, 9, 11 N*=20	-	25.0 — -			becoming fine grained, orange-brown		MD		
				19	- - 26.0-							
			SPT 7, 18/110mm HB N*=R	20	- - - 27.0-			gravel band, fine to coarse grained				SPT refusal on gravel band
Z			0.07	21	- - - 28.0 —							
			SPT 3, 5, 5 N*=10	22	- - - 29.0-		SM	SILTY SAND: fine to medium grained, grey,		L		GELLIBRAND MARL
			SPT 4, 2, 4 N*=6	23 	- - - 30.0 —			green, low plasticity.				
			SPT 4, 0, 2 N*=2	24 	- - 31.0 -			with some cemented sand nodules				
D S A / A	nod auger a hand a washb hand a	screwir uger ore uger	ıg*	Mi Co pen	port mud casing etration		nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter	soil base	ation sym descriptic d on Unifie ication Sys	n ed	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff
DD g.	bit sho AD/T blank t TC bit V bit	wn by s	ve drilling suffix	wate	■ 10- leve	Oct-12 wa el on date er inflow	g to Iter shown	HP hand penetrometer (kPa) N standard penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	D dry M moist W wet Wp plastic WI liquid			H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



TETR	RA TECH	COMP	ANY						•	Boreł	nole ID.	CHEL-BH02
с,	adi	no	orin	~ I	~	N	B o	rabala		sheet		5 of 6
	igi	ne	enn	<u>y ı</u>	<u>-0(</u>	<u>J -</u>	DU	rehole		proje	ct no.	GEOTABTF10294AA
clier	nt:	Ме	tro Trai	ins I	<i>Melb</i>	ourn	e Pty	. Ltd.		date	started:	16 Mar 2017
princ	cipal:							thority		date	complete	ed: 20 Mar 2017
proje	ect:			logi	cal a	nd G	Geote	chnical Investigation, Aspendale and		logge	d by:	SS/LW
loca			elsea tion St	reet	. Che	lsea	,				ked by:	KJ
			5; N: 5786				-	surface elevation: 6.58 m (AHD)	angle		prizontal:	
			50, Truck i			,			-		r : 100 mr	
drill	ing info	rmati	on	1		mate	erial sub	stance				
ళ	ation		samples &		(L	boj	ation	material description	ес	ncy / lensity	hand penetro-	structure and additional observations
method	1 2 penetration	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	meter (kPa) କୁ ରୁ ରୁ କୁ	
				-	_		SM	SILTY SAND: fine to medium grained, grey, green, low plasticity. (continued)	W	MD		GELLIBRAND MARL
				_	-							-
			SPT 8, 6, 12 N*=18	26	-							-
			IN = 10	-	33.0							_
				F	-							-
				0-	-							-
				27				with some medium grained gravel				
					34.0							
			SPT 9, 6, 6	_	-						liii	
			N*=12	20	-							
				28								
					35.0							_
				_	-		SC	CLAYEY SAND: dark green-grey, medium plasticity, trace of fine grained gravel & shell		L		
			SPT	29	-			fragments.				-
			0, 0, 4 N*=4	29								
: z					36.0							_
					-							
				30							liii	-
					-							
				_	37.0 —							-
					-							
			U63	31				with some cemented sand nodules				-
				-	-		 	SILTY SAND: fine to medium grained, dark green,	М	MD		
	- -			F	38.0 —			grey, green-brown, low plasticity, trace of shell fragments and bands of cemented sand.				-
			SPT	1								
			8, 9, 22 N*=31	32								-
	Ì				-							
				-	39.0 —							-
				33	-							
			SPT 8, 8, 10	1	-			N	/I - W			
meth	nod			sup	port		I			ion sym		consistency / relative density
AD AS	auger o auger s		Mi		N	nil	Bbulk disturbed sampleDdisturbed sample	based	on Unifie	d	VS very soft S soft	
HA W	hand a washbo	ore		pen	etration			SS split spoon sample	assifica	ation Sys	tem	F firm St stiff
HA NDD	hand a non de		ve drilling	Ď	- 3 3 3 3	rangin	sistance ig to	U## undisturbed sample ##mm diameter moistu HP hand penetrometer (kPa) D di	ry			VSt very stiff H hard
*	bit sho	wn by •	suffix	wat		refusa	al	N standard penetration test (SPT) M m N* SPT - sample recovered W W	noist vet	mait		Fb friable VL very loose
e.g. B	AD/T blank b				- leve	el on date		VS vane shear; peak/remouded (kPa) Wi lic	lastic lii quid lim			L loose MD medium dense
T V	TC bit V bit	•		-		er outflov	v	R refusal HB hammer bouncing				D dense VD very dense



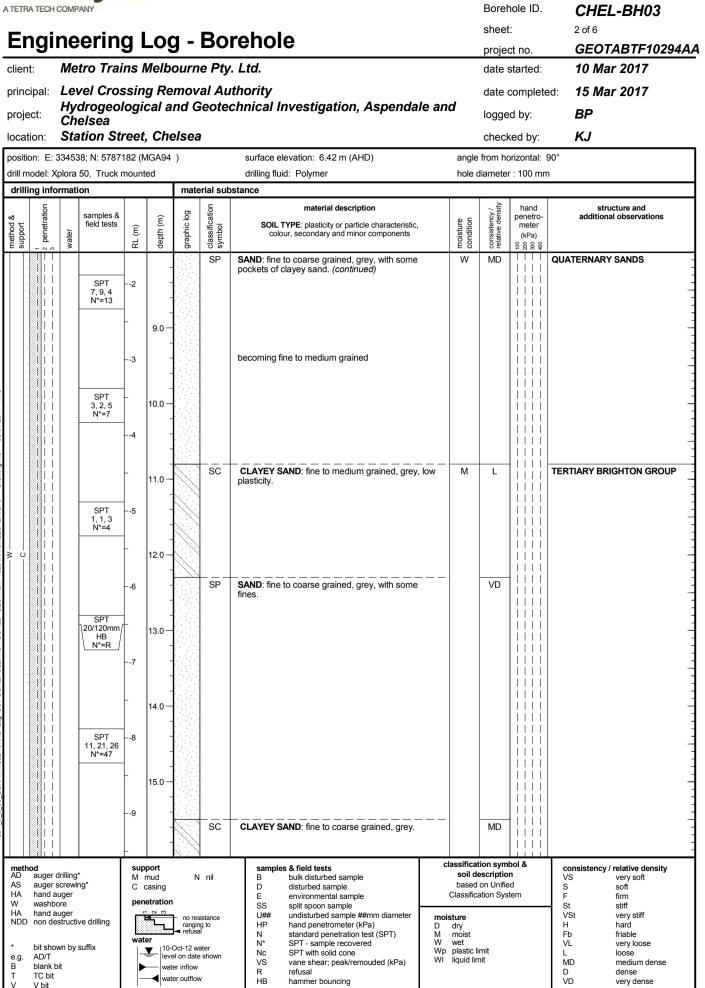
	A TECH	COMP		n I	0	N _	Bo	rehole			Boreh sheet	ole ID.	CHEL-BH02 6 of 6
	iyi			_		-		rehole			proje	ct no.	GEOTABTF10294AA
clien	t:	Ме	tro Trai	ns I	Velb	ourn	e Pty	. Ltd.			date s	started:	16 Mar 2017
princ	cipal:		el Cros						_		date o	completed:	20 Mar 2017
proje	ect:	Hy	drogeol elsea	ogi	cal a	nd G	eote	chnical Investigation, Aspendal	e and		logge	d by:	SS/LW
locat	tion:		tion St	reet	, Che	elsea	1				check	ed by:	KJ
positi	on: E:	33468	5; N: 5786	311 (N	/IGA94)		surface elevation: 6.58 m (AHD)		angle	from ho	rizontal: 90°	
drill m	nodel: X	(plora	50, Truck r	nount	ed			drilling fluid: Polymer	I	hole d	liametei	: 100 mm	
drilli	ing info	ormati	on			mate	rial sub	ostance					
method & support	penetration	water	samples & field tests	r (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	hand penetro- meter (kPa)	structure and additional observations
uns ∧ v	- N Θ	Š	N*=18	RL -	de	g	sy cla		1	Ē 8	8 <u>e</u>	100 200 400	
<u> </u>				34	- - 41.0	<u>, - 1. </u>		Borehole CHEL-BH02 terminated at 40.15 m Target depth Standpipe installation Backfill details 0.0m-5.0m: grout 5.0m-7.4m: bentonite 7.4m-11.0m: sand 11.0-40.15m: grout					
				35	-			Standpipe details 0.0m-8.0m: unslotted 50mm PVC, Class 18 8.0m-11.0m: machine slotted, 50mm PVC, Class End caps and flush mounted gatic cover	s 18				
				-	42.0								
				36 -	- 43.0								
				37	-								
				- 38	44.0 -								
				_	- 45.0 — -								
				39	-								
				- 40	46.0								
				_	- 47.0								
				41	-								
AD AS HA W HA	AS auger screwing* HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T						ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal	t Cla moistu D dr M m W w Wp pl	soil de based assifica ure ry ioist		n d	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

CDF 0 9 06 LIBRARY.GLB rev.AU Log COF BOREHOLE: NON CORED GEOTABTF10294AA CHELSPEN.GPJ <</br>



client:	Engineering						e Pty al Au eote	. Ltd.	nd	sheet proje date date logge	ct no. started: complete	CHEL-BH03 ^{1 of 6} GEOTABTF10294A 10 Mar 2017 ed: 15 Mar 2017 BP KJ
)		surface elevation: 6.42 m (AHD) drilling fluid: Polymer	0		orizontal: r : 100 mr	
						mate	rial sub	, ,				
method & support 1 2 penetration			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	hand penetro- meter (kPa)	structure and additional observations
	Ť		E		-			FILL: SAND: fine to coarse grained, dark brown, with some fines, trace of concrete, trace of rootlets.	М	MD		FILL
			E E E SPT	-5			SP	SAND: fine to coarse grained, pale grey, grey.		MD		QUATERNARY SANDS
			SPT 2, 4, 6 N*=10	-4				becoming pale brown, pale grey				
		_		-3	3.0			becoming fine to medium grained, brown, mottled orange-brown		D		
		_	SPT 5, 11, 8 N*=19	-2				becoming dark brown, trace of fines	W	MD		
			SPT 3, 6, 9 N*=15	-1								
		_	SPT 4, 4, 12 N*=16	1	7.0		SP	SAND : fine to coarse grained, grey, with some pockets of clayey sand.	_			
method AD auge AS auge HA hand W wash HA hand NDD non o * bit sh e.g. AD/T B blanh T TC b V V bit	er scre d auge hbore d auge destru nown k bit k bit	ewing er er uctive	e drilling	M C pen	■ 10- leve wat	ı	i ater shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	based Classific isture dry moist wet plastic li	escriptio on Unifie ation Sys	n ed	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







TETR	RATECH	H COMF	ANY								nole ID.	CHEL-BH03
Eı	nai	ine	erin	a l		a -	Bo	rehole		sheet		3 of 6
	-			-		-				proje		GEOTABTF10294A
clier	nt:		tro Tra				-			date	started:	10 Mar 2017
prin	cipal:							thority		date	complet	ted: 15 Mar 2017
proj	ect:		drogeo elsea	logi	cal a	and G	Seote	chnical Investigation, Aspendale and	d	logge	d by:	BP
loca	tion:	-	ation Si	treet	. Ch	elsea				checł	ked by:	KJ
posit	ion: E		38; N: 5787		-			surface elevation: 6.42 m (AHD)	angle		prizontal:	
-			50, Truck			,		drilling fluid: Polymer	-		r : 100 mi	
drill	ling inf	ormati	ion			mate	erial sub	stance				
৵	ation		samples 8		Ê	bo	ation	material description	ωĘ	ncy / lensity	hand penetro-	structure and additional observations
method & support	1 2 penetration	° water	field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	meter (kPa) ୁକ ରୁ ଚ୍ଚି ବ୍	
			SPT 2, 5, 9				SC	CLAYEY SAND: fine to coarse grained, grey. (continued)	М	MD		TERTIARY BRIGHTON GROUP
			N*=14	10			\$	(-
		i										-
				F	17.0-							
							SP	SAND: fine to medium grained, brown-grey, with some fines.		VD		
		i		11								_
			SPT 16, 24, 25				•					
		i I	N*=49	-	18.0-						liii	_
					10.0							
				12								
		i						with some pockets of grey, high plasticity clay		D		-
				_	10.0	1						
		i	SPT 5, 19, 15		19.0-						liii	-
			N*=34	13		-						
						-						-
		i		_		1						
≥ 0 					20.0-		СН	CLAY: high plasticity, grey, mottled brown.		VSt		-
				14		¥///						
		i	U63			$\mathbb{V}//\mathbb{V}$; ; ; ; ;	-
				_		V///					 x*	
		i			21.0-	V///						HP 350 - 400 kPa
				15		¥///						
						¥///		trace of sand				-
		i		_		¥////					liii	
			SPT		22.0-							-
			4, 5, 14 N*=19	16			SC	CLAYEY SAND: medium to coarse grained, orange-brown.		MD		
		i					5 2					-
				Ļ								
					23.0-		sc	CLAYEY SAND: fine to medium grained, pale				-
		1 		17				grey, orange-brown, bands of red, low plasticity.				
			SPT			/ .						-
		i	10, 12, 11 N*=23	Ļ								
meti	hod	<u>ر الم</u>	*		port			samples & neid tests		tion sym		consistency / relative density
AD AS	auge	r drilling r screwi			mud casing	Ν	l nil	B bulk disturbed sample D disturbed sample	based	on Unifie	d	VS very soft S soft
HA W	wash			pen		n		SS split spoon sample	Classifica	ation Sys	lem	F firm St stiff
HA NDE		auger lestructi	ve drilling			no re rangir	sistance ng to	U## undisturbed sample ##mm diameter mois HP hand penetrometer (kPa) D	dry			VSt very stiff H hard
*	bit sh	own by	suffix	wat	. 40	-Oct-12 w		N standard penetration test (SPT) M N* SPT - sample recovered W	moist wet	mit		Fb friable VL very loose
e.g. B	AD/T blank				- lev	vel on date	e shown	VS vane shear; peak/remouded (kPa) WI	plastic li liquid lin			L loose MD medium dense
T V	TC bi V bit			-		ter outflo		R refusal HB hammer bouncing				D dense VD very dense



TETR	RATECH	COMP		al		2	Bo	rabala		Borel shee	hole IE t:).	CHEL-BH03 4 of 6	
	iyi			<u> </u>				rehole		proje	ct no.		GEOTABTF10294	1A/
clier	nt:	Ме	tro Tra	ins l	Nelb	ourn	ie Pty	r. Ltd.		date	starteo	d:	10 Mar 2017	
prin	cipal:							Ithority		date	compl	eted:	15 Mar 2017	
proj	ect:	Hy	drogeo elsea	logi	cal a	nd G	Geote	chnical Investigation, Aspendale a	and	logge	ed by:		BP	
	tion:	-	eisea ition St	root	Ch	مادمه	9				ked by	, .	KJ	
							<i>.</i>						7.5	
-			8; N: 5787 50, Truck			•)		surface elevation: 6.42 m (AHD) drilling fluid: Polymer	-	e from he diamete				
	ing info	-				mate	erial su	ostance						_
	ion						ion	material description		// Isity	hand		structure and	
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	penetr mete (kPa) ୁ ଛୁ ଛୁ	r	additional observations	
				18	-		SC	CLAYEY SAND: fine to medium grained, pale grey, orange-brown, bands of red, low plasticity. (continued)	м	MD			RTIARY BRIGHTON GROUP	
				_				becoming mottled red, mottled orange-brown		L	- 			
			SPT	-	25.0									-
			0, 1, 1 N*=2	19										-
			U63				× -					1	recovery in U63	-
				-	26.0-		SM	SILTY SAND: fine to coarse grained, dark green-grey, medium plasticity, grading to clayey		VL - L			LLIBRAND MARL	
				20	-			sand in parts. becoming dark grey, dark green-grey						_
			SPT 2, 0, 1					becoming dank groy, dank groon groy						
			N*=1	-	27.0-		•							_
					-									
				21	-						liii	i		_
					-	1		becoming fine grained, dark grey, black						
: 0				-	28.0-	1								_
			SPT 0, 0, 4		-		• •				liii	i		
			N*=4	22	-									_
					-	1	•							
				-	29.0-]					111	i		_
					-		•							
			1100	23	-							i		_
			U63		-	1					111			
				-	30.0-]								_
											111	1.1		
				24	-									_
					-	1		becoming dark green-brown						
				F	31.0-	1					lii	;		_
			SPT 0, 0, 0		-									
			N*=0	25	-									_
		3			-						liii	i		
				-		1								
meti AD	nod auger	drillina			port mud		N nil	samples & field tests B bulk disturbed sample		ation sym descriptio			consistency / relative density VS very soft	
AS HA	auger : hand a	screwir		Co	casing			D disturbed sample E environmental sample	base	d on Unifie cation Sys	ed		S soft F firm	
W HA	washb hand a	ore			etration			SS split spoon sample					St stiff VSt very stiff	
NDE			ve drilling		-	no res rangir	sistance ng to al	HP hand penetrometer (kPa) D N standard penetration test (SPT) N					H hard Fb friable	
*	bit sho	wn by	suffix	wat	▼ 10-	– -Oct-12 w	/ater	N* SPT - sample recovered V		limit			VL very loose L loose	
e.g. B	AD/T blank b	bit			- lev	el on date ter inflow			VI liquid I				MD medium dense D dense	
T V	TC bit V bit			-	- d wa	ter outflow	w	HB hammer bouncing					VD very dense	



-			- y									
TETRA	TECH C	OMP	ANY							Bore	hole ID.	CHEL-BH03
-	! -		!	- I						shee	t:	5 of 6
En	gır	1e	ering	gι	-0(J -	RO	rehole		proje	ct no.	GEOTABTF10294AA
client:		Met	tro Trai	ns I	Nelb	ourn	e Pty	Ltd.			started:	10 Mar 2017
princip			vel Cros				-			data	complet	ed: 15 Mar 2017
								chnical Investigation, Aspendale a	and			
projec	τ.	Che	elsea	-						logge	ed by:	BP
locatio	on:	Sta	tion St	reet,	, Che	elsea	1			chec	ked by:	KJ
position	n: E:3	3453	8; N: 5787	182 (N	1GA94)		surface elevation: 6.42 m (AHD)	angle	e from h	orizontal:	90°
	-		50, Truck r	nount	ed			drilling fluid: Polymer	hole	diamete	er : 100 mr	n
drilling	-	matio	on			mate	erial sub			~		
× ×	penetration		samples & field tests		Ê	bol 0	catior	material description SOIL TYPE: plasticity or particle characteristic,	e G	ency / densit	hand penetro- meter	structure and additional observations
method & support	² pene	water		RL (m)	depth (m)	graphic log	classification symbol	colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	
		-	<u>U63</u>	26 27	- - - 33.0 — - -		SM	SILTY SAND: fine to coarse grained, dark green-grey, medium plasticity, grading to clayey sand in parts. <i>(continued)</i>	М	VL - L		GELLIBRAND MARL
		-	SPT 0, 0, 3 N*=3 U63		- 34.0 — - - - 35.0 — -			with some pockets of fine to coarse grained gravel		L		no recovery in U63 -
		-	SPT 12, 7, 1 N*=8		- - 36.0 — - - - -			becoming green-grey				
		-	SPT 1, 3, 6 N*=9	31	37.0 — - - -			with some pockets of clayey sand				
		-	SPT 0, 0, 3 N*=3	32	38.0 — - - 39.0 —		SC	CLAYEY SAND: fine to medium grained, dark green-grey, medium plasticity. becoming dark green-grey				-
				33	-			with some pockets of gravel				
AS a HA h W v HA h NDD r * b e.g. A B b T T	auger d auger so nand au washbo nand au	crewin ger ger tructiv n by s	ıg* ve drilling	M n C c pen Wate	etration	I	ater e shown	HP hand penetrometer (kPa) [] N standard penetration test (SPT) N N* SPT - sample recovered N Nc SPT with solid cone N	based	lescriptic d on Unifie cation Sys	o n ed	consistency / relative densityVSvery softSsoftFfirmStstiffVStvery stiffHhardFbfriableVLvery looseLlooseMDmedium denseDdenseVDvery dense



TETR	A TECH	COMP					Da				Boreh sheet		e ID.		CHEL-BH03
Eľ	ıgı	ne	erin	gl	L0(J -	R 0	rehole			proje	ct n	0.	0	GEOTABTF10294
clien	t:	Ме	tro Tra	ins l	Melb	ourn	e Pty	. Ltd.			date	star	ted:	1	0 Mar 2017
princ	ipal:							thority			date	com	nplet	ted: 1	5 Mar 2017
proje	ect:	Hy	drogeo	logi	cal a	nd G	eote	chnical Investigation, Aspendale	and		logge	ed b	v:	E	3P
locat			elsēa ntion St	reef	Ch	olsez	,				check		-		κJ
			38; N: 5787		-			surface elevation: 6.42 m (AHD)		anale	from ho		,		
			50, Truck			/		drilling fluid: Polymer		•	liamete				
drilli	ng inf	ormati	on			mate	erial sul	ostance							
method & support	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	ion ion	condition	consistency / relative density	per m	and netro- neter kPa)	. ;	structure and additional observations
	3 5 7		U63	R	de	uß	ਤੋਂ ਨੇ SC	CLAYEY SAND: fine to medium grained, dark		≣ 8 M	8 <u>e</u> L	Т	8 8 9		BRAND MARL
: 0				34	-			green-grey, medium plasticity. <i>(continued)</i> Borehole CHEL-BH03 terminated at 40.35 m	_			++			
					-			Target depth Standpipe installation Backfill details 0.0m-5.5m: grout							
				35	41.0-			5.5m-6.5m: bentonite 6.5m-10.0m: sand 10.0-40.35m: grout				li.			
				-00	-	-		Standpipe details 0.0m-7.0m: unslotted 50mm PVC, Class 18 7.0m-10.0m: machine slotted, 50mm PVC, Class	18						
					42.0-	-		End caps and flush mounted gatic cover				li.			
				36	-							Lį.			
				-	43.0-										
				37	-							li.			
				-	44.0-										
				38	-										
				-	45.0 — -	-									
				39	-										
				-	46.0 —										
				40	-										
				-	47.0 <i>-</i> -							İ			
				41	-	-						İ			
meth AD AS HA W HA NDD * e.g. B T	support Dauger drilling* Sauger screwing* IA hand auger V washbore IA hand auger IDD non destructive drilling bit shown by suffix .g. AD/T blank bit						sistance ig to al ater ∌ shown	HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	t Cla moistu D dr M m W we Wp pla	soil de based assifica re y oist		bol & n ed		Cons VS F St VSt H Fb VL L MD D	istency / relative density very soft soft firm stiff very stiff hard friable very loose loose medium dense dense



TETRA TECH		2			_			Borel	nole ID.	CHEL-BH04 1 of 6
Engi	neerin	<u>g</u> L	-0(<u>J -</u>	BO	renole		proje	ct no.	GEOTABTF10294AA
client:	Metro Tra	ins N	/lelbo	ourn	e Pty	Ltd.		date	started:	09 Feb 2017
principal:	Level Cro							date	complete	ed: 14 Feb 2017
project:		logic	al a	nd G	eoteo	chnical Investigation, Aspendale an	d	logge	d by:	AO/BP
location:	Chelsea Station St	reet.	Che	elsea	1				ked by:	КJ
	334853; N: 5786					surface elevation: 5.80 m (AHD)	angle		prizontal:	
	Xplora 50, Truck			,		drilling fluid: Polymer	-		r : 100 mm	
drilling inf	ormation			mate	rial sub	stance				
& ation	samples &		(r	boj	ation	material description		hcy / ensity	hand penetro-	structure and additional observations
method & support 1 2 penetration	, s field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	meter (kPa) ତୁ ରୁ ରୁ ରୁ ତ୍ୱ	
		-5	- - - 1.0 - - -		SP	FILL: ASPHALT: 50mm. // FILL: Sandy GRAVEL: fine to coarse grained, angular, grey, brown, fine grained sand. // SAND: fine to medium grained, grey, pale grey, pale brown-grey.	D D-M	D MD		FILL QUATERNARY SANDS
	E 2,3,5 №*=8 SPT 2,8,10 №*=18	-4 				becoming fine to coarse grained, brown, pale brown		D		-
	N*=18 2 4.0					becoming brown, trace of shell fragments	M - W W	VD		-
	SPT 12, 25, 30 N*=55	- -0	5.0 - - 6.0 -		SP	SAND: fine grained, pale grey, trace of fines, trace of shell fragments.				-
1 1 1 1 1 1 1 1					SP	SAND: fine to medium grained, pale grey, mottled pale brown, trace of fines, trace of shell fragments.				-
e.g. AD/T B blank bit					i ater shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	based Classifica isture dry moist wet	on Unifie ation Sys	n ed	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



ATETR	RA TECH	COMP	ANY							Borel	nole ID.	CHEL-BH04
Fr	incipal: Level Crossin Hydrogeologi					- n	Bo	rehole		sheet	t:	2 of 6
										proje		GEOTABTF10294AA
clier							-			date	started:	09 Feb 2017
prino	cipal:							thority chnical Investigation, Aspendale an	ad	date	complet	ed: 14 Feb 2017
proje	ect:	Ch	elsea	logi	cai a	nu e	eole	chinical investigation, Aspendale al	lu	logge	ed by:	AO/BP
loca	tion:	Sta	tion St	reet	, Che	elsea	1			check	ked by:	KJ
· ·			i3; N: 5786)		surface elevation: 5.80 m (AHD)	-		orizontal:	
	nodel: X ling info		50, Truck i	mount	ed	mate	erial sub	drilling fluid: Polymer	hole o	liamete	r : 100 mr	n
	ы							material description		sity	hand	structure and
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) € & & & &	additional observations
			SPT 13, 22, 19 N*=41		- - - 9.0-		SP	SAND: fine to medium grained, pale grey, mottled pale brown, trace of fines, trace of shell fragments. (continued)		VD		QUATERNARY SANDS
	SPT 0, 0, 1 N*=1				- - - 10.0 — -		SC	CLAYEY SAND: fine to medium grained, dark grey, high plasticity, trace of shell fragments.	M	VL		
	N*=1 U63						СН	CLAY: high plasticity, dark grey, black, trace of shell fragments.	M - W	S - F		
				5	11.0		ML	Clayey SILT: low liquid limit, dark grey, black, with some fine grained sand, trace of shell fragments.			×	HP 40 kPa
- C			SPT 10, 8, 9 N*=17	_ - - - -	- - - 12.0 — -		SM	SILTY SAND: fine to medium grained, grey, trace of fine to coarse grained, sub-angular gravel.		MD		
			SPT 13/100mm HB N*=R	7 	- 13.0 - - - 14.0-		SP	SAND: fine to coarse grained, sub-rounded to sub-angular, pale grey.	M	VD		
	SPT 		- - - 15.0 - - - -		СН	CLAY: high plasticity, pale grey, with some coarse grained sand.		VSt				
AD AS HA W HA	AS auger screwing* HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T B blank bit T TC bit			ı	ater e shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	based Classifica bisture dry moist wet plastic li	escriptio on Unifie ation Sys	n ed	consistency / relative densityVSvery softSsoftFfirmStstiffVStvery stiffHhardFbfriableVLvery looseLlooseMDmedium denseDdenseVDvery dense		



	ncipal: Level Crossing Remo						Rم	rahola		Borel shee	nole ID. ::	CHEL-BH04 3 of 6
	<u> </u>			<u> </u>						proje		GEOTABTF10294AA
client							-			date	started:	09 Feb 2017
princ	ipal:							thority chnical Investigation, Aspendale a	nd	date	complete	ed: 14 Feb 2017
proje	ct:		elsea	Jyn	cai d	110 0	GOLG	chincar investigation, Aspeniuale a		logge	ed by:	AO/BP
locati	ion:	Sta	tion St	reet	, Che	elsea				chec	ked by:	KJ
·			3; N: 5786)		surface elevation: 5.80 m (AHD)	-		orizontal:	
	odel: X ng info		50, Truck r	nount	ed	mate	rial sub	drilling fluid: Polymer	hole	diamete	r : 100 mn	n
	-	Samples & field tests						material description		sity	hand	structure and
method & support		water		RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) ୁ ଛି ଛି ଛି	additional observations
					-		СН		M	VSt		TERTIARY BRIGHTON GROUP
				-	-		SP	SAND : fine to medium grained, grey, pale grey, with some fines.		D		
				11	- 17.0-							-
				_	-		CH	CLAY: high plasticity, grey, mottled orange, with some pockets of coarse grained sand.	_ !	VSt		
					-							-
	SPT 4, 6, 11 N*=17											-
					18.0							-
					-							-
				13	-			becoming grey, medium to high plasticity, trace of coarse grained sand		St		-
				-	19.0							-
			SPT 0, 3, 3 N*=6	-	-							-
					-							-
 ≥ 0				14	- 20.0							-
				_	-			becoming grey, mottled orange		St - VS		-
					-							-
			SPT 0, 5, 5	15	-							-
			N*=10		21.0-							
				-	-							-
					-		sc_	CLAYEY SAND: fine grained, pale grey, mottled	-	D		
				16	- 22.0			brown, low, with some pockets of fine to medium grained gravel.				
			SPT 14, 12, 10/115mm	1	-							
			10/115mm HB N*=R /									SPT refusal on coarse grained – gravel
			/	17	-							
					23.0			becoming medium plasticity		MD		
				-	-							-
					-			becoming green-brown			liii.	-
	7, 16, 13 18 N*=29 18							becoming yellow-brown	classifica	tion sum	 bol &	
metho AD AS						N	nil	samples & field tests B bulk disturbed sample D disturbed sample	soil d	escription on Unifie	n	consistency / relative density VS very soft S soft
HA W	HA hand auger					1		E environmental sample SS split spoon sample		ation Sys		F firm St stiff
HA NDD		and auger on destructive drilling						VSt very stiff H hard				
*		wn by s	suffix	wat	▼ 10-	- Oct-12 wa	iter	N standard penetration test (SPT) M N* SPT - sample recovered W Nc SPT with solid cone W	wet	limit		Fb friable VL very loose L loose
e.g. B T		oit			- leve - wat	el on date er inflow		VS vane shear; peak/remouded (kPa) W R refusal				MD medium dense D dense
T V	AD/T level						,	HB hammer bouncing				VD very dense



ATETR	ETRA TECH COMPANY Engineering Lo ient: Metro Trains Mel						•	Boreh	nole ID.	CHEL-BH04		
с,	nai	no	orin	~ I		2	B۵	rabala		sheet	:	4 of 6
	iyi	ne	enn	<u>y</u> ı	-0	<u>y -</u>		Tellole		projec	ct no.	GEOTABTF10294AA
clier	it:	Ме	tro Tra	ins l	Velb	ourn	e Pty	. Ltd.		date s	started:	09 Feb 2017
prind	cipal:							thority		date o	complet	ed: 14 Feb 2017
proje	ect:			logi	cal a	nd G	eote	chnical Investigation, Aspendale and		logge	d by:	AO/BP
loca		-	elsea tion St	reet	Ch	elsea	,				ed by:	KJ
			3; N: 5786		-			surface elevation: 5.80 m (AHD)	anale		orizontal:	
			50, Truck			,			-		: 100 mr	
drill	ing info	ormati	on			mate	rial sub	stance				
~	ation		samples &			D _D	ation	material description	_	cy / ensity	hand penetro-	structure and additional observations
method & support	1 2 penetration	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	condition	consistency / relative density	(kPa)	
	19 19 25.0 - 19 19 25.0 - 19 25.0 - 20 26.0 -						SC	CLAYEY SAND: fine grained, pale grey, mottled brown, low, with some pockets of fine to medium grained gravel. <i>(continued)</i> with some bands of cemented sand, up to 300mm thick, recovered as fine to coarse grained gravel	Μ	VD		TERTIARY BRIGHTON GROUP
ະ ບ			SPT 5/10mm HB N*=R 15/130mm HB N*=R		- - - - - - - - - - - - - - - - - - -			becoming mottled brown, mottled red, with some cemented sand, recovered as fine to medium grained gravel				
				-		SC	CLAYEY SAND: fine to medium grained, grey, green-grey, pale grey, low plasticity, trace of fine grained gravel.		L		GELLIBRAND MARL	
method AD auger drilling* AS support M mud C casing				- - - - - - - - -	R	nil	samples & field tests class B bulk disturbed sample b D disturbed sample b	soil de	ion syml sscription on Unifie	 	consistency / relative density VS very soft S soft	
HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T B blank bit T TO bit				etration		l ater shown	E environmental sample Cla SS split spoon sample moistur U## undisturbed sample ##mm diameter moistur HP hand penetrometer (KPa) D dr N standard penetration test (SPT) M m N* SPT - sample recovered W w Nc SPT with solid cone Wp pla	re y oist		tem	F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	



TETRA TECH			g L	og	- B	orehole		Boreh sheet projed		CHEL-BH04 5 of 6 GEOTABTF10294A
client: principal: project: location:	Met Lev Hyc Che	tro Trai rel Cros	ins Me ssing logica	elbou Rem al and	rne P oval A I Geoi			date s date o logge	started: complete	09 Feb 2017
position: E drill model:	: 33485	3; N: 5786	206 (MG	A94)			-	from ho	orizontal: 9	90°
drilling int	formatio					ubstance material description		sity	hand	structure and
method & support 2 penetration	3 water	samples & field tests	RL (m)	depth (m)	graphic log classification	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	condition	consistency / relative density	penetro- meter (kPa) ୁର ଛୁ ଛୁ କୁ	additional observations
		U63	27 27		SN		И	L		GELLIBRAND MARL
		SPT 6, 6, 4 N*=10	28 - 34 29							
¥		U63		5.0						
		SPT 5, 11/135mm HB	- r	7.0-		becoming medium plasticity		VD		
		N*=R N*=R N*=R		3.0		trace of fine grained becoming green-grey, mottled green-brown, with				
AS auge HA hand W wash HA hand NDD non c	r drilling* r screwin auger bore auger destructiv	g* ve drilling	34 suppo M mu C cas penetr water	d sing ration	date show flow	some pockets of coarse grained sand samples & field tests classi B bulk disturbed sample ba D disturbed sample ba E environmental sample Classi SS split spoon sample ba U## undisturbed sample ##mm diameter moistur HP hand penetrometer (kPa) D dry N standard penetration test (SPT) M mo Nc SPT with solid cone W W	oil de ased sifica e ist		n d	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



	A TECH		ANY							Bore	hole ID.	CHEL-BH04
Fr	nai	ne	erin	u I	0	л - Г	B٥	rehole		shee	et:	6 of 6
	_			_		-				proje	ect no.	GEOTABTF10294AA
clien			tro Trai				-			date	started:	09 Feb 2017
princ	ipal:							thority		date	complete	ed: 14 Feb 2017
proje	ect:	Hy Ch	arogeo elsea	ogi	cai a	na G	eote	chnical Investigation, Aspendale	and	logg	ed by:	AO/BP
locat	ion:		tion St	reet,	, Che	elsea				chec	ked by:	KJ
positi	on: E:	33485	i3; N: 5786	206 (N	1GA94)		surface elevation: 5.80 m (AHD)	anç	gle from h	orizontal: 9	90°
			50, Truck i	nount	ed			drilling fluid: Polymer	hol	e diamete	er : 100 mm	1
drilli	ng info	ormati	on			mate		stance material description		ţ	hand	structure and
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture	consistency / consistency / relative density	penetro- meter (kPa)	additional observations
			SPT 1,7,20 N*=27		41.0		SM	SILTY SAND: fine to coarse grained, dark grey, low plasticity. <i>(continued)</i> Borehole CHEL-BH04 terminated at 40.75 m Target depth Standpipe installation Backfill details 0.0m-3.5m: grout 3.5m-4.5m: bentonite 4.5m-8.0m: sand 8.0-40.75m: grout Standpipe details 0.0m-5.0m: unslotted 50mm PVC, Class 18 5.0m-8.0m: machine slotted, 50mm PVC, Class 1 End caps and flush mounted gatic cover	M	VD		GELLIBRAND MARL
AD AS HA W HA NDD * e.g. B T	AS auger screwing* HA hand auger W washbore HA hand auger NDD non destructive drilling * bit shown by suffix e.g. AD/T B blank bit						shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U### undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	soil bas Classi moisture D dry M moisi W wet	ic limit	on ied	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



ATETR	A TECH	COMPAN						Hole ID.	ASPEN-BH01
Di	~7/		tor I	notallatio				sheet:	1 of 1
	ez	Sille	eler	nstallation				project no.	GEOTABTF10294AA
clien	t:	Metro	o Trains	s Melbourne Pty.	Ltd.			date started:	20 Feb 2017
princ	ipal:			ing Removal Aut				date completed:	22 Feb 2017
proje	ect:	Hydr Chels	ogeolo	gical and Geotec	hnical In	vestigation, Aspe	endale and	logged by:	BP
locat	tion:			et, Aspendale				checked by:	KJ
positi	on: E:			(MGA94)	surface ele	vation: 6.56 m (AHD)	a	ngle from horizontal: 90°	,
equip	ment ty	/pe: Xplo	ra 50, Truc	k mounted	drilling fluid	: Polymer	Ca	asing diameter : HW	
drillin	g infor	mation	material	substance		piezometer construction		boro construction	n license:WRK098881
method & support	water	RL (m) depth (m)	graphic log	material name			ASPEN-BH0	drilling company: driller: driller's permit no	EARTHCORE L. Adolphson
		5 1 2 2 4 3 2 5 6 7 8 12 6 13 14 12 6 13 14 12 6 13 14 15 ppport ering log fit retorn date shininflow inflow il drilling fit ressure test	File File	ERTIARY BRIGHTON GRC	y ID ASPEN-I	10.00 m 13.00 m 13.00 m EH01		Gravel	rel Relative Levels (AHD) stickup tip water level -6.44
25		s) for dept							



A TETRA TECH COMPANY					Hole ID.	ASPEN-BH02
Diazomot	or Installation				sheet:	1 of 1
Plezomet	er Installation	LOG			project no.	GEOTABTF10294AA
client: Metro T	rains Melbourne Pty. L	.td.			date started:	02 Mar 2017
principal: Level C	rossing Removal Auth	ority			date completed:	08 Mar 2017
project: Hydrogo Chelsea	eological and Geotech	nical Inve	stigation, Aspe	ndale and	logged by:	BP
	Street, Aspendale				checked by:	KJ
position: E: 333586; N: 5	789170 (MGA94)	surface elevati	on: 6.72 m (AHD)	an	gle from horizontal: 90°	
equipment type: Xplora 50	0, Truck mounted	drilling fluid: Po	olymer	ho	le diameter : 150 mm	
drilling information n	naterial substance	pi	ezometer construction		bore construction lic	
method & support water RL (m) depth (m)	b o o o c c c c c c c c c c c c c c c c			ASPEN-BH02	drilling company: driller: driller's permit no.:	EARTHCORE L. Adolphson 738
	FILL					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	QUATERNARY SANDS	14	1.00 m		Gravel	
						-
method & support see engineering log for de	etails graphic log / core recovery	ID	type		tickup tip depth water level (m) (m) (m)	(AHD)
water ↓ 10-Oct-12, water level on date shown water inflow complete drilling fluid lo partial drilling fluid lo water pressure test res (lugeons) for depth interval shown	d loss ss	ASPEN-BH0	2 standpipe piezo.	0	.00 m 14.00 m	stickup tip water level



ATETR	ATECH	COMPANY						Hole ID.	CHEL-BH01
Di	070	m	tor	Installation I	00			sheet:	1 of 1
				Installation L	.0y			project no.	GEOTABTF10294AA
clien	it:	Metro	o Trair	ns Melbourne Pty. Ltd.				date started:	06 Feb 2017
princ				sing Removal Authori		<i></i>		date completed:	08 Feb 2017
proje	ect:	Hydr Chels	ogeolo sea	ogical and Geotechnic	al Inve	estigation, Aspe	ndale and	logged by:	BP
locat	tion:			eet, Chelsea				checked by:	KJ
positi	on: E::	334777;	N: 578659	94 (MGA94) surfa	ace elevat	ion: 6.63 m (AHD)	an	gle from horizontal: 90°	
	oment ty		-	uck mounted drillin	ng fluid: P	olymer		le diameter : 100 mm	
				material name	P			bore construction li	cense:WRK098878
method & support	water	KL (m) depth (m)	graphic log				CHEL-BH01	drilling company: driller: driller's permit no.:	EARTHCORE L. Adolphson 738
				FILL				Ś	
- DDN-	-6	1.		QUATERNARY SANDS]
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		2							_
									_
	-4	3.						X	-
			-					×.	-
- AD/V	_	4							_
	-2							Ž	-
		5						Grout	-
	06/02/17								-
	- 8	6							-
	-0							×	-
		7.							-
10 70									-
		8						×	-
de o	2	2							-
		9.							-
	-								-
		10						Bentonite	-
	4						°0 °°0 °0 °	0	-
× 0		11.			1	1.00 m			-
	-							0	-
n n n n n n n n n n n n n n n n n n n		12						Gravel	-
	(TERTIARY BRIGHTON GROUP			000000]
		13	1					0	
		14	1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1	4.00 m		ġ	
									-
	8	B 15-							-
5									-
μ				1					
		pport ering log fo	or details		D	type		tickup tip depth water level (m) (m) (m)	Relative Levels (AHD) stickup tip water level
	10-Oc	t-12, wate on date sh		(graphic symbols indicate material)	CHEL-BH01	standpipe piezo.	0	.00 m 14.00 m	6.63 -7.37
	 water compl 		fluid loss	no core recovered					
		drilling flu							
2		essure tes							
25	(lugeons interval :	s) for dept shown							



A TETRA TECH COMPANY				Hole ID.	CHEL-BH02
Diazomatarl	notallation L	24		sheet:	1 of 1
Plezometer	nstallation Lo	bg		project no.	GEOTABTF10294AA
client: Metro Trains	Melbourne Pty. Ltd.			date started:	16 Mar 2017
	ing Removal Authority			date completed:	20 Mar 2017
project: Hydrogeolog	gical and Geotechnica	I Investigation, Aspe	ndale and	logged by:	SS/LW
location: Station Stree	et, Chelsea			checked by:	KJ
position: E: 334685; N: 5786811		e elevation: 6.58 m (AHD)	angle	from horizontal: 90°	
equipment type: Xplora 50, Truck	k mounted drilling	fluid: Polymer	hole c	liameter : 100 mm	
drilling information material	substance	piezometer construction		bore construction lic	20000-1WDK009970
method & support water RL (m) depth (m) graphic log	material name		CHEL-BH02	drilling company: driller: driller's permit no.:	EARTHCORE L. Adolphson 738
	LL UATERNARY SANDS			Grout	-
		8.00 m		Bentonite Sand	-
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ERTIARY BRIGHTON GROUP	<u>11.00 m</u>			- - - - - - - - - - - - - - - - - - -
	graphic log / core recovery ID		installation	in tindenth water lovel	Relative Levels
method & support see engineering log for details water	graphic log / core recovery ID	type	installation sticku date (m)		Relative Levels (AHD) stickup tip water level
Water 10-Oct-12, water level on date shown water inflow complete drilling fluid loss partial drilling fluid loss water pressure test result (lugeons) for depth	core recovered (graphic symbols indicate material) no core recovered	EL-BH02 standpipe piezo.	0.00	m 11.00 m	6.58 -4.42



A TETRA TE	ECH CON	PANY							Но	ole ID.		CHEI	BH03
Dia	70r	200	tor	Inctallati	onla	20			sh	eet:		1 of 1	
rie/	201	ne	lei	Installati		Jy			pr	oject no.		GEOT	ABTF10294AA
client:	M	etro	Trai	ns Melbourne F	ty. Ltd.				da	ate starte	d:	10 Ma	r 2017
principa	al: <i>L</i> e	evel	Cros	sing Removal /	Authority	,			da	ate comp	leted:	15 Ma	r 2017
project:	Hy	ydro hels	geol	ogical and Geo	technica	l Inves	stigation, Aspe	endale and	log	gged by:		BP	
location				eet, Chelsea					ch	ecked b	y:	KJ	
position:				82 (MGA94)	surface	e elevatio	n: 6.42 m (AHD)	a		n horizont			
equipmer	nt type:	Xplora	50, Tr	uck mounted	drilling	fluid: Po	lymer	h	ole diam	neter : 100	mm		
drilling in	nformati	ion	mater	ial substance		pie	zometer construction			boro con	truction lie	ense:WRK0	00000
method & support water	RL (m)	depth (m)	graphic log	material n	ame			CHEL-BH03		drilling co driller: driller's pe	mpany:	EARTH L. Adol 738	CORE
▲ ▲ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	-6 -4 -2 -0 -0 2 -0 2 4 4 6 8 - 8 - 8 8 8	1		FILL QUATERNARY SANDS TERTIARY BRIGHTON graphic log / core re core recove	GROUP		0 m 20 m		stickup	Grout Bentonite Sand		Ri	
water	0-Oct-12	, water		core recove		EL-BH03	standpipe piezo.		0.00 m		\·'''	stickup 6.42	
	evel on da vater inflor omplete o artial drill	ate shov w drilling fl	uid loss	no core reco	al)		כשויטאיאס אוכבט.		0.00 11	.0.00 11		0.72	
ເຊິ (lug	er pressu jeons) for erval show	depth	result										



A TETRA TECH COMPANY											ole ID.		CHEL-BH04			
Di	07	on	201	for	Inctallatio		N			sł	neet:		1 of 1			
	Piezometer Installation Log									рг	roject no.		GE01	ABTF1	0294AA	
clien	ient: Metro Trains Melbourne Pty. Ltd.									da	date started: 09 Feb 2			b 2017		
principal: Level Crossing Removal Authority											ate comple	eted:	14 Feb 2017			
project: Hydrogeological and Geotechnical Investigation Chelsea								tion, Aspe	endale and	lo	gged by:		AO/BI	D		
location: Station Street, Chelsea										cł	necked by:	:	KJ			
											le from horizontal: 90°					
equip	oment t	ype: >	(plora	50, Tr	ruck mounted	drilling fluid	: Polymer		h	nole dian	neter : 100 n	nm				
drilling information material substance							piezomete	er construction	details		boro constr	uction lie	onoo:\W/BK0	00077		
method & support	water	RL (m)	depth (m)	graphic log	material name				CHEL-BH04		drilling com driller: driller's per	pany:	ense:WRK0 EARTI L. Ado 738	ICORE		
		<u>r</u> 4 2 2 -2 -4 -6 -8	************************************		FILL QUATERNARY SANDS	ROUP	5.00 m				Grout Bentonite Gravel					
Ш	nod & s	-10 upport			graphic log / core recov	ery ID		type	installation	stickup	tip depth wa	ter level	R	elative Levels	-	
se	see engineering log for details water							-	date	(m) [·]	. (m)	(m)	stickup	(AHD)	ater level	
	 level wate com parti 	r inflow plete d al drillir	te show / rilling fl ng fluid	uid loss loss	(graphic symbols indicate material) no core recover	CHEL-E		tandpipe piezo.		0.00 m	8.00 m		5.80	-2.20		
25	water p (lugeoi interva	ns) for	depth	esult												