Douglas Partners
Geotechnics | Environment | Groundwater

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Lion-Beer, Spirits & Wine Pty Ltd
L 7 68 York St Sydney
Sydney 2000

[illegible]1021.15
[illegible] 2020
R.001.R[illegible]0

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May 2020 Groundwater Monitoring
Tooheys Brewery
29 Nyrang Street, Lidcombe

1. Introduction

[illegible] May 2020 [illegible] 29 [illegible]

[illegible] 200[illegible] *Environmental Planning and Assessment Act 1979*. [illegible] 2014. [illegible]

[illegible] DP's [illegible] *First Round of 2011 Groundwater Monitoring, Tooheys Brewery - 29 Nyrang Street, Lidcombe,* [illegible] 2011 [illegible]1021.0[illegible] 1 [illegible] 200[illegible] 200[illegible] 1[illegible]

[illegible] *Field Investigation Phase 1 Contamination Assessment, 29 Nyrang Street, Lidcombe,* M[illegible] 200[illegible]44[illegible]59[illegible]

- *Groundwater Monitoring Report, 29 Nyrang Street, Lidcombe* [illegible] 2010 [illegible]1021.00[illegible]
- *Groundwater Monitoring Report, 29 Nyrang Street, Lidcombe* [illegible] 2011 [illegible]1021.01[illegible]

- *First Round of Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □□□□ 2011 r□□□□1021.0□□
- *Second Round of Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □ □□□□ b□r 2011 r□□□□1021.0□□
- *First Round of Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □□□□ 2012 r□□□□1021.0□□
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- *First Round of Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* M□□201□ r□□□□1021.0□□
- *Second Round of Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □ □□□□ b□r 201□ r□□□□1021.0□□
- *2014 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □□□□ 2014 r□□□□1021.0□□
- *2015 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* D□□□□ b□r 2015 r□□□□1021.10□
- *January 2016 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □□br□□r□ 201□ r□□□□1021.10□
- *January / February 2017 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* □M□r□□ 201□ r□□□□1021.11.R.001.R□□0□
- *March 2017 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* 1□ □□r□□201□ r□□□□1021.11.R.002.R□□□
- *August 2017 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* 15 □□□□□ b□r 201□ r□□□□1021.12.R001.R□□0□
- *November 2017 Groundwater Monitoring, Tooheys Brewery - 29 Nyrang Street, Lidcombe,* 1 D□□□□ b□r 201□ r□□□□1021.12.R.002.R□□0□
- *August 2018 Groundwater Monitoring Tooheys Brewery - 29 Nyrang Street, Lidcombe,* 12 □□□□□ b□r 201□ r□□□□1021.1□.R.001.R□□0□
- *Groundwater Monitoring - November 2018, 29 Nyrang Street, Lidcombe,* 12 D□□□□ b□r 201□ r□□□ □1021.1□.R.002.R□□0□
- *August / September 2019 Groundwater Monitoring Round, 29 Nyrang Street, Lidcombe,* 1 □□□□□ b□r 2019 r□□□□1021.14.R.001.R□□0□□□d
- *November 2019 Groundwater Monitoring, Tooheys Brewery - 29 Nyrang Street, Lidcombe,* 11 D□□□□ b□r 2019 r□□□□1021.14.R.002.R□0.

2. Site Information

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[illegible] B [illegible] .5 [illegible]

[illegible] 1 [illegible]

[illegible] 1 [illegible] 200 [illegible] *in situ* [illegible]

[illegible] B 1 [illegible] B 2 [illegible] *in situ* [illegible] 20 [illegible]

D [illegible] R [illegible] *Remediation Action Plan, 29 Nyrang Street, Lidcombe,* [illegible] 2011 [illegible] 1021.02 R [illegible] 2. [illegible] 2011 [illegible] 21 [illegible] 2011. [illegible] *UPSS Validation Assessment, Tooheys Brewery, 29 Nyrang Street, Lidcombe* [illegible] 1021.04 [illegible] 2012. [illegible] R [illegible]

3. Groundwater Default Guideline Values

[illegible] D [illegible] *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* [illegible] 201 [illegible] 95 [illegible] 201 [illegible]

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000 [illegible] 95 [illegible].

[illegible] 29 [illegible] 201[illegible] *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* [illegible] 201[illegible]

- [illegible] 1992 [illegible]
- [illegible] 2000 [illegible]

[illegible] 2000 [illegible] 2011 [illegible]

[illegible] 1 [illegible]

Table 1: Groundwater Default Guideline Values (DGV) and Rationale

Contaminant	Adopted Criteria (DGV) µg/L	Source
M[illegible]		[illegible] 201[illegible] 95 [illegible]
[illegible]	1[illegible]0	[illegible] 500 [illegible] 2000 [illegible]
[illegible]	2.4	
[illegible]	[illegible].1	
[illegible]	1.4	
[illegible]	121.1	
M[illegible]	0.[illegible]	
[illegible]	120.2	
[illegible]	[illegible].4	
[illegible]R[illegible]		[illegible]
[illegible] – [illegible]9	10	
[illegible]9	250	
[illegible]10 – [illegible]	50	
B[illegible]		[illegible] 201[illegible] 95 [illegible]
B[illegible]	950	R[illegible] D[illegible]
[illegible]	1[illegible]0	D[illegible]
[illegible]	[illegible]0	
[illegible]	550	

4. Groundwater Monitoring Methodology and Field Observations

4.1 Identification of Wells

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4.2 Frequency of Sampling

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4.3 Well Development

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4.4 Collection of Groundwater Samples

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4.5 Quality Assurance and Quality Control (QA / QC)

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Table 2: RPD Results - Intra-laboratory Results

Well	Analyte	BH1	BD1/202005133*	Difference	RPD (%)
□ □□□□ M□□□□□□	□□	□1	2	1	□□
	□d	□0.1	□0.1	0	0
	□r	□1	□1	0	0
	□□	**7**	□1	□	140
	□b	□1	□1	0	0
	□□	□0.05	□0.05	0	0
	□□	□	2	1	50
	□□	□1	□1	0	0
□R□	□ □□□9	□10	□10	0	0
	□10□□ □□	□250	□250	0	0
	□□10□□1□	□50	□50	0	0
B□□□□□□□		□1	□1	0	0
□□□□□□□		□1	□1	0	0
□□□□□B□□□□□□		□1	□1	0	0
□□□□□□ □□□□□		□□	□□	0	0

□BD1□2020051□ □ B□□d r□□□□□□□ □□□ □□□ □□B □1

□□□ □□□□□□□□□d R□D □□r□ □□□□ □□□□□ □□□ □□□□□□□b□□ r□□□□ □□± □0 □□r □□□r□□□□□ □□□□□□□□ □□d ± 50□ □□r □r□□□□□□ □ □□□ □□□ □□□□□□□□□ □□□□□□□ □□□d□d. □ □□ □□□□r□□□□ □□□□□□□d□□□r□□□□ □ □□ □□□. □□□r□□□r□□□□□ □□□r□□□b□r□□□r□ r□□□□□□□□ □□□ □□r□□□□ □□d□□□□□□ □□□□□ □□□ □□□□ □□□□□□□□□□ □ □□ □□□□r□□□ □□□□□□□□□□ □d r□□□□□□b□□□□□d □□□ □b□r□□□r□ □□□ □□□□ □□□d□□□ □d □□□□□□□□□□ □□□□d□ □r□ □□□ □□r□b□.

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4.6 Laboratory Analysis

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Table 3: Analytical Scheme for Groundwater Samples

Sample ID	Heavy Metals	TRH	BTEX
B□1□2□□□□□□9□10	✓	✓	✓
BD1□2020051□□	✓	✓	✓
□□□□□ □B□□□□			✓

□BD1□2020051□ □ B□□d d□□□□□□□ □□□ □□□ □□B□1

5. Results

5.1 Field Testing Results

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Table 4: Piezometric Levels

Monitoring Well	m AHD (surface)	Date			
		12/05/2020 (well development)		13/05/2020 (groundwater sampling)	
		m bgl	m AHD	m bgl	m AHD
1	□.4□	2.45	□.95	2.41	4.05
2	□.25	2.□□	□.52	2.44	□.□1
□	□.□□	0.□□	5.51	2.□□	□.51
□	□.50	4.4□	2.02	4.5□	1.94
9	□.00	4.15	1.□5	4.15	1.□5
10	5.12	1.45	□.□2	4.00	1.12

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□ □□D □□□□□□□ □ □□r□□ □b□□□ □ □□□r□□□□ □ □□□□□D□□□□

□□□ □ □□□r □□□□□□□□□□r□d □□ □□□□ r□□□□r□d □□ □□□ □□□□□br□□□ □□□□□□r □□□□□ □□ □□□ □□□□□br□□□ □□□□□□□□r d□□□□□□□ □□□□□ □□□□ □□□□□ □ □□□.

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Table 5: Groundwater Readings Prior to Sampling

Monitoring Well	Temperature (ºC)	Dissolved Oxygen (% saturation)	Conductivity (µS/cm)	pH	Turbidity (NTU)	Redox (mV)
1	22.□	1.22	2115	□.24	4□.2	□22
2	22.4	1.29	12□□0	□.45	54.□	□
□	21.9	0.□1	□92	5.9□	12.□	□15
□	2□.□	1.□□	21□50	5.90	220	11
9	22.1	2.□0	10420	□.1□	□□.□	12
10	21.□	2.5□	□540	□.□2	11□.□	□22

5.2 Analytical Results

[illegible] 1 [illegible] 2014 [illegible] 2015 [illegible] 201 [illegible] M [illegible] 201 [illegible] 201 [illegible] 2019 [illegible] 1 [illegible].

6. Discussion

[illegible] R [illegible] B [illegible] R [illegible] 15 [illegible] 2 [illegible] 110 [illegible] 1 [illegible] 4 [illegible] 100 [illegible]). [illegible] R [illegible].

[illegible] D [illegible] 2 [illegible] µ [illegible] D [illegible] 1.4 [illegible].

7. Conclusion

B[illegible].

[illegible] B[illegible] R [illegible].

8. Limitations

D[illegible] 29 [illegible] in accordance with DP's proposal ([illegible]D200554 [illegible] 25 M[illegible] 2020 [illegible] Mr D[illegible] B[illegible] of Tooheys Pty Ltd. The work was carried out under DP's Conditions of Engagement. [illegible] D [illegible] D [illegible] D [illegible].

[illegible] and also as a result of human influences. Such changes may occur after DP's field testing has been [illegible]

DP's advice is based upon the conditions encountered dur[illegible]

[illegible]

[illegible]

[illegible]

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Paul Gorman
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About this Report

Douglas Partners

Introduction

[illegible]

[illegible]

Copyright

[illegible]

Borehole and Test Pit Logs

[illegible]

[illegible]

Groundwater

[illegible]

- [illegible]
- [illegible]
- [illegible]
- [illegible]

[illegible]

Reports

[illegible]

[illegible]

- [illegible]
- [illegible]
- [illegible]

[illegible]

About this Report

Site Anomalies

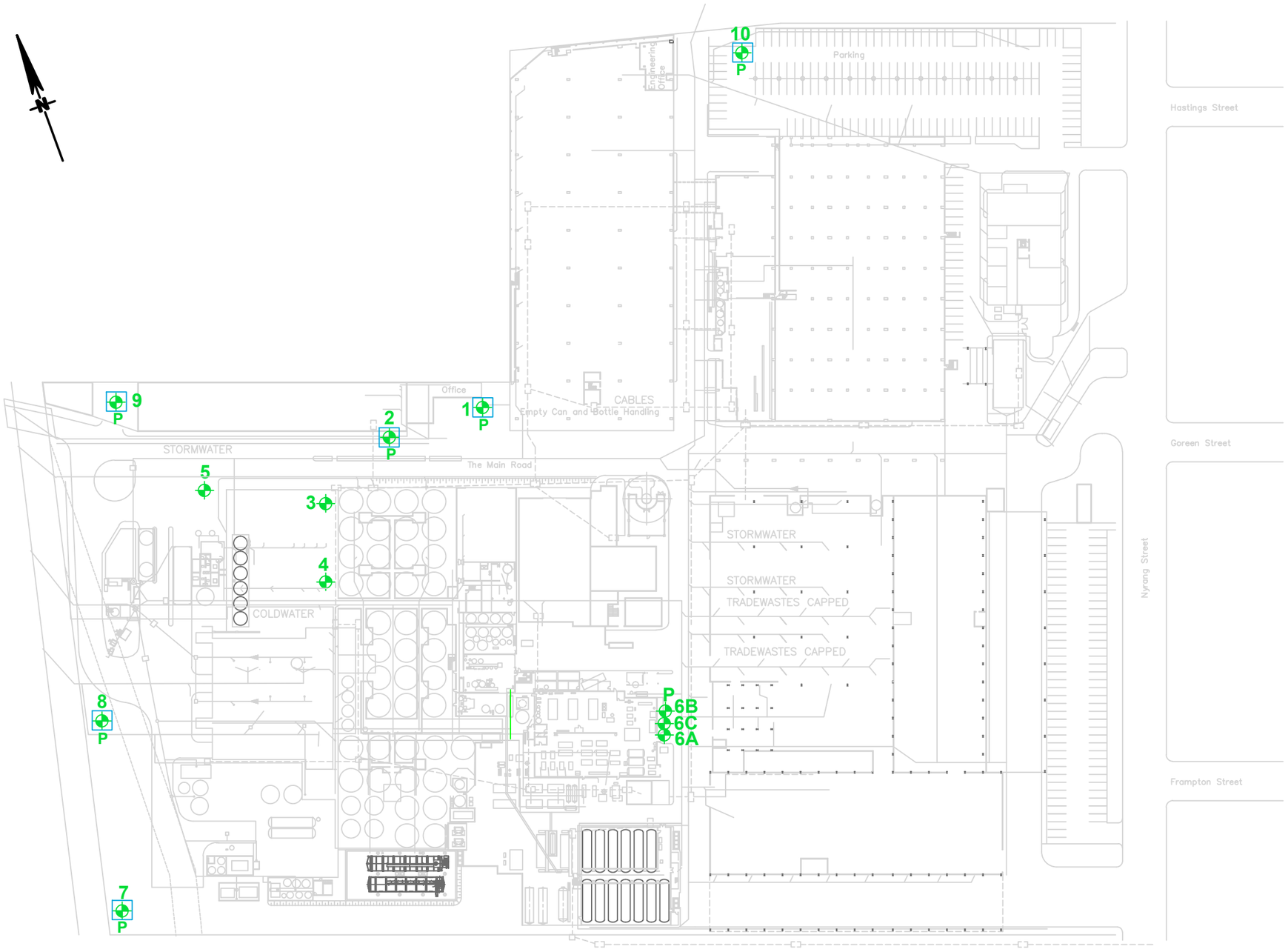
[illegible]

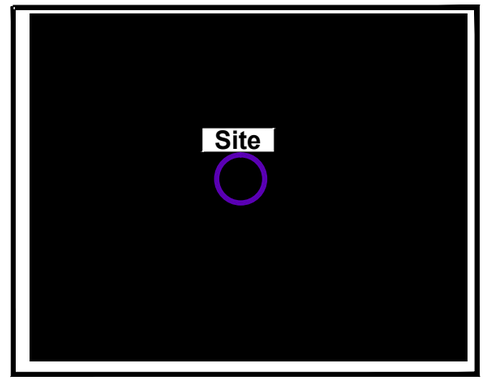
Information for Contractual Purposes

[illegible]

Site Inspection

[illegible]





Locality Plan

LEGEND

- Test Bore Location
- P Piezometer
- Monitoring Well

SCALE
0 50 100m
1:1500

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CLIENT: Tooheys Pty Ltd			TITLE: **Location of Monitoring Wells**	PROJECT No: 71021.14
DRAWN BY: PSCH	SCALE: As shown	OFFICE: Sydney	**Groundwater Monitoring**	DRAWING No: 1
APPROVED BY:		DATE: 5.12.2019	**29 Nyrang Street, LIDCOMBE**	REVISION: 0

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	BH1		
Project Name:	Tooheys August 2020 Monitoring		
Project Number:	71021.15		
Site Location:	29 Nymag Street, Lidcombe		
Bore RL	6.5 m AHD		
Bore Easting:		Northing:	
Installation Date:	24-Oct-16		
GW Level (during drilling):	m bgl		
Well Depth:	14.2 m bgl		
Screened Interval:	2.0-14.2 m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:	Tuesday 11 May 2020 12MAY		
Purged By:	LT		
GW Level (pre-purge):	2.45 m bgl		
GW Level (post-purge):	2.46 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	14.19 m bgl		
Estimated Bore Volume:	85 L		
Total Volume Purged:	220 L		
Equipment:	12 Volt pump		
Micropurge and Sampling Details			
Date/Time:	Wednesday 12 May 2020 13MAY		
Sampled By:	LT		
Weather Conditions:	overcast		
GW Level (pre-purge):	2.41 m bgl		
GW Level (post sample):	2.44 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	14.19 m bgl		
Estimated Bore Volume:	85 L		
Total Volume Purged:	3 L		
Equipment:	peristaltic pump and TPS multimeter		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
10:36	20.0	4.28	2074	6.11	–	-31
10:37	20.7	2.35	1961	6.19	–	-27
10:38	21.3	1.48	1967	6.23	75	-24
10:39	21.7	1.21	2017	6.24	53.9	-22
10:40	21.9	1.19	2074	6.24	52.4	-21
10:41	22.2	1.30	2104	6.24	49.1	-22
10:42	22.2	1.10	2110	6.24	49.9	-22
10:43	22.3	1.22	2115	6.24	48.2	-22
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	6 m bgl, mid vol + tubing won't go further
Sample Appearance (e.g. colour, siltiness, odour):	clear
Sample ID:	BH1
QA/QC Samples:	BD1 / 20200513
Sampling Containers and filtration:	3x125mL 500mL glass, 2x 40mL glass vials (HCl), 1x 100mL plastic (HNO3 (filtered)
Comments / Observations:	—

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	BH2		
Project Name:	Tooheys August 2020 Monitoring		
Project Number:	71021.15		
Site Location:	29 Nyrnag Street, Lidcombe		
Bore RL	6.2 m AHD		
Bore Easting:		Northing:	
Installation Date:	20-Oct-16		
GW Level (during drilling):	m bgl		
Well Depth:	14.5 m bgl		
Screened Interval:	2.0-14.5 m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:	Tuesday 11 May 2020		
Purged By:	Lisa Teng		
GW Level (pre-purge):	2.73 m bgl		
GW Level (post-purge):	2.74 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	14.08 m bgl		
Estimated Bore Volume:	81.7 L		
Total Volume Purged:	040 L		
Equipment:	12 Volt pump		
Micropurge and Sampling Details			
Date/Time:	Wednesday 12 May 2020		
Sampled By:	Lisa Teng		
Weather Conditions:	overcast		
GW Level (pre-purge):	2.44 m bgl		
GW Level (post sample):	2.62 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	14.05 m bgl		
Estimated Bore Volume:	84 L		
Total Volume Purged:	4 L		
Equipment:	peristaltic pump and TPS multimeter		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
10:03	19.7	11.02	11.69	6.13		3
10:04	20.4	3.23	12.22	6.32	63	5
10:05	21.4	1.87	12.32	6.37	55.8	6
10:06	21.9	1.35	12.39	6.40	56	6.7
10:07	22.2	1.41	12.38	6.41	59.9	8
10:08	22.4	1.29	12.36	6.42	54.7	8
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	8 m bgl, mid up
Sample Appearance (e.g. colour, siltiness, odour):	slightly cloudy
Sample ID:	BH2
QA/QC Samples:	—
Sampling Containers and filtration:	2x125mL 500mL glass, 2x 40mL glass vials (HCl) , 1x 100mL plastic (HNO3 (filtered)
Comments / Observations:	—

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH7**		
Project Name:	Tooheys August 2020 Monitoring		
Project Number:	71021.15		
Site Location:	29 Nyrnag Street, Lidcombe		
Bore RL	6.4 m AHD		
Bore Easting:		Northing:	
Installation Date:	7-Dec-16		
GW Level (during drilling):	m bgl		
Well Depth:	6.5 m bgl		
Screened Interval:	1.5-6.5 m bgl		
Contaminants/Comments:	Bend in pipe - development requires peristaltic pump		
Bore Development Details			
Date/Time:	Tuesday ~~11 May~~ 12 MAY 2020		
Purged By:	Lisa Teng		
GW Level (pre-purge):	0.81 m bgl		
GW Level (post-purge):	1.49 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	3 m bgl	1.49 with interface, 3m with tubing due to bend in pipe	
Estimated Bore Volume:	15 L		
Total Volume Purged:	10 L		
Equipment:	12 Volt pump		
Micropurge and Sampling Details			
Date/Time:	Wednesday ~~12 May~~ 13 MAY 2020		
Sampled By:	Lisa Teng		
Weather Conditions:	overcast		
GW Level (pre-purge):	2.87 m bgl		
GW Level (post sample):	3.43 m bgl		
PSH observed:	Yes / ~~No~~ (interface/visual). ? mm thick	NO (interface)	
Observed Well Depth:	5.50 m bgl		
Estimated Bore Volume:	19 L		
Total Volume Purged:	2 L		
Equipment:	peristaltic pump and TPS multimeter		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
7:55	18.9	2.62	980	5.24	—	-2
7:56	19.8	1.33	985	5.37	—	-12
7:57	20.7	1.15	934	5.58	—	-17
7:58	21.1	1.00	939	5.72	—	-19
7:59	21.4	0.88	923	5.84	260	-18
8:00	21.7	0.86	908	5.89	241	-18
8:01	21.9	0.71	892	5.93	12.7	-15
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	4 m bgl, mid sol
Sample Appearance (e.g. colour, siltiness, odour):	clear, slightly yellow.
Sample ID:	BH7
QA/QC Samples:	—
Sampling Containers and filtration:	2x125ml 500mL glass, 2x 40mL glass vials (HCl) , 1x 100mL plastic (HNO3 (filtered)
Comments / Observations:	blocked bend, tubing pushed down with interface meter

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	BH8		
Project Name:	Tooheys August 2020 Monitoring		
Project Number:	71021.15		
Site Location:	29 Nyrnag Street, Lidcombe		
Bore RL	6.5 m AHD		
Bore Easting:		Northing:	
Installation Date:	7-Dec-06		
GW Level (during drilling):	m bgl		
Well Depth:	8.25 m bgl		
Screened Interval:	2.0-8.25 m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:	Tuesday 11 May 2020 12 May		
Purged By:	Lisa Teng		
GW Level (pre-purge):	4.48 m bgl		
GW Level (post-purge):	4.60 m bgl		
PSH observed:	Yes / (No) (interface/visual). ? mm thick		
Observed Well Depth:	8.25 m bgl		
Estimated Bore Volume:	27.5 L		
Total Volume Purged:	87.5 L		
Equipment:	12 Volt pump		
Micropurge and Sampling Details			
Date/Time:	Wednesday 12 May 2020 13 May		
Sampled By:	Lisa Teng		
Weather Conditions:	overcast - cool		
GW Level (pre-purge):	4.56 m bgl		
GW Level (post sample):	4.60 m bgl		
PSH observed:	Yes / (No) (interface/visual). ? mm thick		
Observed Well Depth:	8.27 m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	2 L		
Equipment:	peristaltic pump and TPS multimeter		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
8:38	21.1	2.44	21.78	5.79	—	6
8:39	22.2	2.06	21.64	5.86	—	8
8:40	23.1	1.97	21.67	5.88	—	9
8:41	23.8	1.88	21.75	5.90	220	11
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	6 m bgl, mid cl
Sample Appearance (e.g. colour, siltiness, odour):	clear
Sample ID:	BH8
QA/QC Samples:	
Sampling Containers and filtration:	2x125ml 500mL glass, 2x 40mL glass vials (HCl) , 1x 100mL plastic (HNO3 (filtered)
Comments / Observations:	

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH9**		
Project Name:	Tooheys August 2020 Monitoring		
Project Number:	71021.15		
Site Location:	29 Nyrnag Street, Lidcombe		
Bore RL	6.0 m AHD		
Bore Easting:		Northing:	
Installation Date:	7 December 20016		
GW Level (during drilling):	m bgl		
Well Depth:	6.5 m bgl		
Screened Interval:	1.5-6.5 m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:	Tuesday ~~11~~ May 2020 12 May		
Purged By:	Lisa Teng		
GW Level (pre-purge):	4.15 m bgl		
GW Level (post-purge):	5.93 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	6.63 m bgl		
Estimated Bore Volume:	17.8 L		
Total Volume Purged:	15 L		
Equipment:	12 Volt pump		
Micropurge and Sampling Details			
Date/Time:	Wednesday ~~12 May 2020~~ 13 May		
Sampled By:	Lisa Teng		
Weather Conditions:			
GW Level (pre-purge):	4.15 m bgl		
GW Level (post sample):	4.45 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	6.65 m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	3 L		
Equipment:	peristaltic pump and TPS multimeter		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
9:25	19.3	5.18	5.56	5.54		0
9:26	20.1	4.08	5.95	5.74		2
9:27	21.2	3.99	5.91	5.82		3
9:28	20.8	4.30	6.92	6.01		11
9:35	21.0	3.88	8.62	6.07		13
9:36	21.2	3.56	9.09	6.10	12.9	12
9:37	21.5	3.20	9.52	6.13	95	12
9:38	21.7	3.09	9.95	6.15	81.3	12
9:39	21.9	2.85	10.24	6.16	76.6	12
9:40	22.1	2.73	10.35	6.17	64.4	12
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
9:41	22.1	2.70	10.42	6.17	68.7	12

Sample collected

Sample Details

Sampling Depth (rationale):	5.5 m bgl, mid screen
Sample Appearance (e.g. colour, siltiness, odour):	clear, slightly yellow
Sample ID:	BH9
QA/QC Samples:	
Sampling Containers and filtration:	500mL glass, 2x 40mL glass vials (HCl) , 1x 100mL plastic (HNO3 (filtered)
Comments / Observations:	Sampled first to lowest expected water volume

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH10**		
Project Name:	Tooheys August 2020 Monitoring		
Project Number:	71021.15		
Site Location:	29 Nyrnag Street, Lidcombe		
Bore RL	5.1 m AHD		
Bore Easting:		Northing:	
Installation Date:	7-Dec-06		
GW Level (during drilling):	m bgl		
Well Depth:	5 m bgl		
Screened Interval:	1.5-5.0 m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:	Tuesday 11 May 2020		
Purged By:	Lisa Teng		
GW Level (pre-purge):	1.45 m bgl		
GW Level (post-purge):	4.45 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	5.15 m bgl		
Estimated Bore Volume:	27 L		
Total Volume Purged:	30 L		
Equipment:	12 Volt pump		
Micropurge and Sampling Details			
Date/Time:	Wednesday 12 May 2020		
Sampled By:	Lisa Teng		
Weather Conditions:	cloudy		
GW Level (pre-purge):	4.00 m bgl		
GW Level (post sample):	4.89 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	5.15 m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	5 L		
Equipment:	peristaltic pump and TPS multimeter		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
11:20	20.5	5.39	4.36	6.60	—	-71
11:21	20.8	2.80	4.26	6.60	—	-72
11:22	21.0	1.54	4.13	6.63	-	-68
11:23	21.2	1.24	3.96	6.67	272	-55
11:24	21.4	1.61	3.76	6.70	204	-45
11:25	21.5	2.24	3.60	6.70	162	-34
11:26	21.6	2.53	3.56	6.69	144.9	-30
11:27	21.7	2.63	3.54	6.65	132.8	-24
11:28	21.7	2.58	3.54	6.62	114.7	-22
11:29						
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	5 m bgl, mid screen
Sample Appearance (e.g. colour, siltiness, odour):	clear slightly silty yellow-brown
Sample ID:	BH10
QA/QC Samples:	—
Sampling Containers and filtration:	500mL glass, 2x 40mL glass vials (HCl) , 1x 100mL plastic (HNO3 (filtered) 2x 250mL
Comments / Observations:	—

Table 6: Results of Laboratory Analysis in July 2014 (µg/L)

Well	Hardness (mg $CaCO_3$ /L)	Heavy Metals[1]								TRH		Benzene	Toluene	Ethyl-benzene	Total Xylene
		As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{36}				
1	130	<1	<0.1	□1	1	<1	<0.05	4	□2	□10	□250	<1	□1	□1	□□
[2]BD1□ 180□14		<1	<0.1	□1	□1	<1	<0.05	3	□4	□10	□250	<1	□1	□1	□□
2	890	<1	0.2	□1	4	<1	<0.05	9	110	□10	□250	<1	□1	□1	□□
□	100	<1	<0.1	□1	3	<1	<0.05	6	28	□10	□250	<1	□1	□1	□□
□	1900	<1	0.2	□1	3	<1	<0.05	4	18	□10	□250	<1	□1	□1	□□
9	350	<1	<0.1	□1	1	<1	<0.05	2	18	□10	□250	<1	□1	□1	□□
10	380	<1	<0.1	□1	4	<1	<0.05	6	24	□10	□250	<1	□1	□1	□□
□□	□	-	□	□	□	□	□	-	-	-	□	101□	104□	102□	105% [4]
□B	□	-	□	□	□	□	□	-	-	-	□	<1	□1	□1	□□
□ □□		1□	□.5	14.1	21.□	205	0.6	171	124.3	10	250	950	1□0	80	550

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Table 7: Results of Laboratory Analysis in October 2015 (µg/L)

Well	Hardness (mg $CaCO_3$ /L)	Heavy Metals[1]								TRH		Benzene	Toluene	Ethyl-benzene	Total Xylene
		As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{36}				
1	670	2	<0.1	□1	4	□1	□0.05	□	55	<10	□250	□1	□1	□1	□□
[2]BD1□3□1015		2	<0.1	□1	<1	□1	□0.05	1	19	<10	□250	□1	□1	□1	□□
2	1000	<1	0.2	□1	2	□1	□0.05	10	50	<10	□250	□1	□1	□1	□□
7	180	□	<0.1	□1	<1	□1	□0.05	□	14	<10	□250	□1	□1	□1	□□
8	2□00	<1	0.□	□1	4	□1	□0.05	4	1□	<10	□250	□1	□1	□1	□□
9	420	<1	<0.1	□1	2	□1	□0.05	□	3□	<10	□250	□1	□1	□1	□□
10	160	5	<0.1	□1	<1	□1	□0.05	9	□	<10	**520**	□1	□1	□1	□□
□□	-	-	-	□	□	□	-	□	□	□	□	□1 %	92□	9□%	104□ [4]
□B	-	-	-	□	□	□	-	□	□	<10	□	□1	□1	□1	□□
□ □□		13	□.5	14.1	21.7	205	0.□	1□1	124.□	10	250	950	180	□0	550

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Table 8: Results of Laboratory Analysis in January 2016 (µg/L)

Well	Hardness (mg $CaCO_3$ /L)	Heavy Metals[1]								TRH			Benzene	Toluene	Ethyl-benzene	Total Xylene
		As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{36}	>C_{10}-C_{16}				
1	□□0	□	□0.1	□1	□1	□1	□0.05	□1	12	□10	□250	□□	□1	□1	□1	□□
[2]BD1□ 1□0□14		2	□0.1	□1	□1	□1	□0.05	□1	15	□10	□250	□9	□1	□1	□1	□□
2	□20	□1	0.2	□1	□	□1	□0.05	14	120	□10	□250	□50	□1	□1	□1	□□
□	110	□	□0.1	□1	□1	□1	□0.05	□	1□	□10	□250	□50	□1	□1	□1	□□
□	1900	□1	0.□	□1	4	□1	□0.05	4	1□	□10	□250	□50	□1	□1	□1	□□
9	4□0	□1	□0.1	□1	2	□1	□0.05	5	4□	□10	□250	□50	□1	□1	□1	□□
10	1□0	4	□0.1	□1	□1	□1	□0.05	2	5	□10	□250	□50	□1	□1	□1	□□
□□	□	□	□	□	□	□	□	□	□	□	□	□	94□	95□	92□	9□□[4]
□B	□	□	□	□	□	□	□	□	□	□10	□	□	□1	□1	□1	□□
GIL		1□	□.5	14.1	21.□	205	0.□	1□1	124.□	10	250	50	950	1□0	□0	550

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Table 9: Results of Laboratory Analysis in January / February 2017 (µg/L)

Well	Heavy Metals[1]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene
	As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C36	>C_{10}-C_{16}				
1	1	<0.1	<1	1	<1	<0.05	4	28	<10	<50	<100	<100	<50	<1	<1	<1	<3
2	<1	0.2	<1	<1	<1	<0.05	5	20	<10	<50	<100	<100	<50	<1	<1	<1	<3
[illegible]	[illegible]	<0.1	<1	<1	<1	<0.05	[illegible]	1	<10	<50	<100	<100	<50	<1	<1	<1	<3
[illegible]	<1	0.5	<1	[illegible]	<1	<0.05	4	14	<10	<50	<100	<100	<50	<1	<1	<1	<3
9	<1	<0.1	<1	2	<1	<0.05	[illegible]	[illegible]8	<10	<50	<100	<100	<50	<1	<1	<1	<3
BD1	<1	<0.1	<1	1	<1	<0.05	[illegible]	[illegible]4	<10	<50	<100	<100	<50	<1	<1	<1	<3
10	[illegible]	<0.1	<1	[illegible]	<1	<0.05	50	**150**	<10	<50	**220**	<100	**98**	<1	<1	<1	<3
GIL	13	3.5	14.1	21.7	205	0.[illegible]	1[illegible]1	124.3	10	250			50	950	180	80	550

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Table 10: Results of Laboratory Analysis in March 2017 (µg/L)

Well	Heavy Metals[1]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene
	As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C36	>C_{10}-C_{16}				
1	2	□0.1	□1	1	□1	□0.05	10	90	□10	□50	□100	□100	□50	□1	□1	□1	□□
BD1	2	□0.1	□1	□1	□1	□0.05	11	92	□10	□50	□100	□100	□50	□1	□1	□1	□□
2	□1	□0.1	□1	□	□1	□0.05	5	□□	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	□	□0.1	□1	□1	□1	□0.05	□	2	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	□1	□0.1	□1	4	□1	□0.05	4	1□	□10	□50	□100	□100	□50	□1	□1	□1	□□
9	1	□0.1	□1	□	□1	□0.05	□	42	□10	□50	□100	□100	□50	□1	□1	□1	□□
10	2	□0.1	□1	2	□1	□0.05	4	□□	□10	□50	□100	□100	□50	□1	□1	□1	□□
GIL	1□	□.5	14.1	21.□	205	0.□	1□1	124.□	10	250			50	950	1□0	□0	550

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Table 11: Results of Laboratory Analysis in August 2017 (µg/L)

Well	Heavy Metals[1]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene
	As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C36	>C_{10}-C_{16}				
1	1	□0.1	<1	<1	□1	□0.05	5	19	<10	<50	□100	<100	□50	□1	<1	□1	<3
2	□1	□0.1	<1	<1	□1	□0.05	4	12	<10	<50	□100	<100	□50	□1	<1	□1	<3
BD1	□1	□0.1	<1	<1	□1	□0.05	4	13	<10	<50	□100	<100	□50	□1	<1	□1	<3
□	9	□0.1	<1	<1	□1	□0.05	1□	19	<10	<50	□100	<100	□50	□1	<1	□1	<3
□	□1	1	<1	**27**	□1	□0.05	4	20	<10	<50	□100	<100	□50	□1	<1	□1	<3
9	5	□0.1	<1	4	□1	□0.05	30	**420**	<10	<50	□100	<100	□50	□1	<1	□1	<3
10	5	□0.1	<1	2	□1	□0.05	1□	44	<10	<50	□100	<100	□50	□1	<1	□1	<3
GIL	13	3.5	14.1	21.7	205	0.□	1□1	124.3	10	250			50	950	180	80	550

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Table 12: Results of Laboratory Analysis in November 2017 (µg/L)

Well	Heavy Metals[1]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene
	As	Cd	Cr[3]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C36	>C_{10}-C_{16}				
1	□1	□0.1	□1	2	□1	□0.05	2	10	□10	□50	□100	□100	□50	□1	□1	□1	□□
2	□1	□0.1	□1	□1	□1	□0.05	□	□	□10	□50	□100	□100	□50	□1	□1	□1	□□
BD1□15 11201□	□1	□0.1	□1	□1	□1	□0.05	□	5	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	**17**	□0.1	□1	□1	□1	□0.05	24	□9	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	□1	0.4	□1	11	□1	□0.05	□	14	□10	□50	□100	□100	□50	□1	□1	□1	□□
9	1	□0.1	□1	□1	□1	□0.05	□	□2	□10	□50	□100	□100	□50	□1	□1	□1	□□
10	□	□0.1	□1	□1	□1	□0.05	□	12	□10	□50	□100	□100	□50	□1	□1	□1	□□
GIL	1□	□5	14.1	21.□	205	0.□	1□1	124.□	10	250			50	950	1□0	□0	550

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Table 13: Results of Laboratory Analysis in August 2018 (µg/L)

Well	Heavy Metals[2]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene[5]
	As	Cd	Cr[4]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	>C_{10}-C_{16}				
1	1	□0.1	□1	**3**	□1	□0.05	5	□0	□10	□50	□100	□100	□50	□1	□1	□1	□□
2	□1	□0.1	□1	**3**	□1	□0.05	□	12	□10	□50	□100	□100	□50	□1	□1	□1	□□
BD1□20 1□0□2□ □	□1	□0.1	□1	□1	□1	□0.05	□	9	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	11	0.□	□1	**4**	1	□0.05	□□	**670**	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	□1	1.□	□1	**10**	□1	□0.05	□	21	□10	□50	□100	□100	□50	□1	□1	□1	□□
9	2	□0.1	□1	**5**	□1	□0.05	□	110	□10	□50	□100	□100	□50	□1	□1	□1	□□
10	4	□0.1	□1	**3**	□1	□0.05	□	59	**22**	**190**	**610**	**<100**	**230**	□	□1	□1	□□
DGV[1]	1□	2.4	□□.1	1.4	121.1	0.□	120.2	□□.4	10	250			50	950	1□0	□0	550[5]

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Table 14: Results of Laboratory Analysis in November 2018 (µg/L)

Well	Heavy Metals[2]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene[5]
	As	Cd	Cr[4]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	>C_{10}-C_{16}				
1	□1	□0.1	□1	**2**	□1	□0.05	□	45	□10	□50	□100	□100	□50	□1	□1	□1	□□
2	□1	□0.1	□1	1	□1	□0.05	4	19	□10	□50	□100	□100	□50	□1	□1	□1	□□
BD1□201□[3]	□1	□0.1	□1	□1	□1	□0.05	4	1□	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	**15**	□0.1	□1	1	□1	□0.05	9	10	□10	□50	□100	□100	□50	□1	□1	□1	□□
□	□1	0.□	□1	**5**	□1	□0.05	4	24	□10	□50	□100	□100	□50	□1	□1	□1	□□
9	□	□0.1	1	**14**	□1	□0.05	1□	**250**	□10	□50	□100	□100	□50	□1	□1	□1	□□
10	4	□0.1	□1	**6**	□1	□0.05	□	□0	□10	□50	□100	□100	□50	□1	□1	□1	□□
DGV[1]	1□	2.4	□□.1	1.4	121.1	0.□	120.2	□□.4	10	250			50	950	1□0	□0	550[5]

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Table 15: Results of Laboratory Analysis in August / September 2019 (µg/L)

Well	Heavy Metals[2]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene[5]
	As	Cd	Cr[4]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	>C_{10}-C_{16}				
1	□1	<0.1	<1	**2**	<1	<0.05	3	69	□10	□50	□100	□100	□50	<1	<1	<1	<3
2	□1	0.2	<1	**2**	<1	<0.05	4	1□	□10	□50	□100	□100	□50	<1	<1	<1	<3
BD1/ 20190902□	□1	0.2	<1	**2**	<1	<0.05	4	19	□10	□50	□100	□100	□50	<1	<1	<1	<3
7	**42**	<0.1	<1	1	<1	<0.05	22	14	□10	□50	□100	□100	□50	<1	<1	<1	<3
8	□1	0.□	<1	**8**	<1	<0.05	4	1□	□10	□50	□100	□100	□50	<1	<1	<1	<3
9	□	<0.1	<1	**2**	<1	<0.05	3	39	□10	□50	□100	□100	□50	<1	<1	<1	<3
10	□	<0.1	<1	**2**	<1	<0.05	22	34	□10	□50	□100	□100	□50	<1	<1	<1	<3
DGV[1]	13	2.4	□□.1	1.4	121.1	0.6	120.2	8□.4	10	250			50	950	180	80	550[5]

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Table 16: Results of Laboratory Analysis in November 2019 (µg/L)

Well	Heavy Metals[2]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene[5]
	As	Cd	Cr[4]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	>C_{10}-C_{16}				
1	□1	□0.1	□1	□1	□1	□0.05	□	40	□10	□50	<100	<100	□50	<1	□1	□1	□□
BD1/ 20191125□	□1	□0.1	□1	1	□1	□0.05	□	40	□10	□50	<100	<100	□50	<1	□1	□1	□□
2	□1	□0.1	□1	1	□1	□0.05	5	25	□10	□50	<100	<100	□50	<1	□1	□1	□□
□	8	□0.1	□1	1	□1	□0.05	22	□9	□10	□50	<100	<100	□50	<1	□1	□1	□□
□	□1	0.□	□1	1	□1	□0.05	4	21	□10	□50	<100	<100	□50	<1	□1	□1	□□
9	3	□0.1	□1	**2**	□1	□0.05	□	42	□10	□50	<100	<100	□50	<1	□1	□1	□□
10	3	□0.1	□1	□1	□1	□0.05	5	24	□10	□50	<100	<100	□50	<1	□1	□1	□□
DGV[1]	1□	2.4	3□1	1.4[1]	121.1	0.□	120.2	□7.4	10	250			50	950	1□0	□0	550[5]

□ □□□□□

1 D□□ □r□□ □□□ d□□□□□□□□d□□□□ □□□□□□ □r□□d□d □□ □□□ □ustral a□ □□d □□□ □□□□□□d □ □d□□□□□ □□r Fr□sh □□d M□r□□□ □ □□□r □ □□□□□ □□□□, □□□□□□2018□

2 H□□vy □ □□□□□□r□□□□□d □ □r□ □d□□□□d □□r a □□rd□□□□ □□500 □g/L

3 □□□d r□□□□□□□ of □□□ □□□ □□□□d □□ □ □d□□□□□ abov□

4 A□l □□r□□ □□□ □r□ □□□□□ □d □□ □□□□□□ □□□ □□□b□□ □r □□□□□□d□□□□ sta□□, □□ □r □□ □□wi l □□ □□□r□□□□□□ □□d □□□□b□□ □□d□r □□□ □□r□ □□□□□□r□□□□ □□□.

5 m+p □□ □□□□□□

bold exce□□ds □ □□

Table 17: Results of Laboratory Analysis in May 2020 (µg/L)

Well	Heavy Metals[2]								TRH					Benzene	Toluene	Ethyl-benzene	Total Xylene[5]
	As	Cd	Cr[4]	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	>C_{10}-C_{16}				
1	<1	<0.1	<1	**7**	<1	<0.05	[illegible]	<1	<10	<50	<100	<100	<50	<1	<1	<1	[illegible]
BD1/ 2020051[illegible]	2	<0.1	<1	<1	<1	<0.05	2	<1	<10	<50	<100	<100	<50	<1	<1	<1	[illegible]
2	<1	<0.1	<1	**17**	<1	<0.05	5	3	<10	<50	<100	<100	<50	<1	<1	<1	[illegible]
[illegible]	3	<0.1	<1	**19**	<1	<0.05	1[illegible]	16	<10	<50	<100	<100	<50	<1	<1	<1	[illegible]
[illegible]	<1	1.9	<1	**26**	<1	<0.05	11	[illegible]8	<10	<50	<100	<100	<50	<1	<1	<1	[illegible]
9	5	<0.1	<1	**20**	<1	<0.05	9	49	<10	<50	<100	<100	<50	<1	<1	<1	[illegible]
10	2	<0.1	<1	**9**	<1	<0.05	[illegible]	14	<10	<50	110	<100	<50	<1	<1	<1	[illegible]
DGV[1]	1[illegible]	2.4	3[illegible].1	1.4[1]	121.1	0.[illegible]	120.2	[illegible]7.4	10	250			50	950	1[illegible]0	[illegible]0	550[5]

[illegible]

1 D[illegible] r[illegible] [illegible]d[illegible]d[illegible] r[illegible]d[illegible]d [illegible] ustral a[illegible] [illegible]d [illegible] [illegible]d [illegible]d[illegible] r Fr[illegible]sh [illegible]d M[illegible]r[illegible] [illegible]r [illegible], [illegible]2018[illegible]

2 H[illegible]vy [illegible]r[illegible]d[illegible] r[illegible] d[illegible]d [illegible]r a [illegible]rd[illegible] [illegible]500 [illegible] g/L

3 [illegible]d r[illegible] of [illegible]d [illegible]d[illegible] abov[illegible]

4 A[illegible]l [illegible]r[illegible] r[illegible] [illegible]d [illegible]b[illegible] r [illegible]d[illegible] sta[illegible], [illegible]r [illegible]wi l [illegible] r[illegible] [illegible]d [illegible]b[illegible] [illegible]d[illegible]r [illegible]r[illegible] [illegible]r[illegible].

5 m+p [illegible]

bold	exce[illegible]ds [illegible]

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 242897

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck, Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**71021.15, Tooheys, Lidcombe**
Number of Samples	9 Water
Date samples received	14/05/2020
Date completed instructions received	14/05/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	21/05/2020
Date of Issue	21/05/2020

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Results Approved By
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water						
Our Reference		242897-1	242897-2	242897-3	242897-4	242897-5
Your Reference	UNITS	BH1	BH2	BH7	BH8	BH9
Date Sampled		13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	16/05/2020	16/05/2020	16/05/2020	16/05/2020	16/05/2020
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	121	121	123	122	123
Surrogate toluene-d8	%	99	98	98	98	99
Surrogate 4-BFB	%	107	105	107	111	110

vTRH(C6-C10)/BTEXN in Water					
Our Reference		242897-6	242897-7	242897-8	242897-9
Your Reference	UNITS	BH10	BD1/20181125	Spike	Blank
Date Sampled		13/05/2020	13/05/2020	13/05/2020	13/05/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	16/05/2020	16/05/2020	16/05/2020	16/05/2020
TRH C_6 - C_9	µg/L	<10	<10	[NA]	[NA]
TRH C_6 - C_{10}	µg/L	<10	<10	[NA]	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	[NA]	[NA]
Benzene	µg/L	<1	<1	102%	<1
Toluene	µg/L	<1	<1	97%	<1
Ethylbenzene	µg/L	<1	<1	88%	<1
m+p-xylene	µg/L	<2	<2	85%	<2
o-xylene	µg/L	<1	<1	91%	<1
Naphthalene	µg/L	<1	<1	[NA]	<1
Surrogate Dibromofluoromethane	%	124	124	123	121
Surrogate toluene-d8	%	98	98	99	103
Surrogate 4-BFB	%	111	107	110	109

svTRH (C10-C40) in Water						
Our Reference		242897-1	242897-2	242897-3	242897-4	242897-5
Your Reference	UNITS	BH1	BH2	BH7	BH8	BH9
Date Sampled		13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	16/05/2020	16/05/2020	16/05/2020	16/05/2020	16/05/2020
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	92	96	82	78	82

svTRH (C10-C40) in Water			
Our Reference		242897-6	242897-7
Your Reference	UNITS	BH10	BD1/20181125
Date Sampled		13/05/2020	13/05/2020
Type of sample		Water	Water
Date extracted	-	15/05/2020	15/05/2020
Date analysed	-	16/05/2020	16/05/2020
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	110	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50
TRH >C_{16} - C_{34}	µg/L	100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Surrogate o-Terphenyl	%	88	81

HM in water - dissolved						
Our Reference		242897-1	242897-2	242897-3	242897-4	242897-5
Your Reference	UNITS	BH1	BH2	BH7	BH8	BH9
Date Sampled		13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Arsenic-Dissolved	µg/L	1	<1	3	<1	5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	1.9	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	7	17	19	26	20
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	3	5	13	11	9
Zinc-Dissolved	µg/L	<1	3	16	68	49

HM in water - dissolved			
Our Reference		242897-6	242897-7
Your Reference	UNITS	BH10	BD1/20181125
Date Sampled		13/05/2020	13/05/2020
Type of sample		Water	Water
Date prepared	-	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020
Arsenic-Dissolved	µg/L	2	2
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	9	<1
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	6	2
Zinc-Dissolved	µg/L	14	<1

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W5	[NT]
Date extracted	-			15/05/2020	1	15/05/2020	18/05/2020		15/05/2020	[NT]
Date analysed	-			16/05/2020	1	16/05/2020	19/05/2020		16/05/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	100	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	100	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	100	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	102	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	113	1	121	125	3	106	[NT]
Surrogate toluene-d8	%		Org-023	99	1	99	99	0	100	[NT]
Surrogate 4-BFB	%		Org-023	107	1	107	109	2	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			16/05/2020	1	16/05/2020	16/05/2020		16/05/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	94	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	130	26	93	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	59	17	94	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	100	0	93	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
Surrogate o-Terphenyl	%		Org-020	91	1	92	107	15	120	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			15/05/2020	[NT]	[NT]	[NT]	[NT]	15/05/2020	[NT]
Date analysed	-			15/05/2020	[NT]	[NT]	[NT]	[NT]	15/05/2020	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	71021.15	**Suburb:** Lidcombe	**To:** Envirolab
Project Name:	Tooheys	**Order Number**	12 Ashley Street, Chatswood
Project Manager:	Kurt Plambeck	**Sampler:** LT	**Attn:** Aileen Hie
Emails:	kurt.plambeck@douglaspartners.com.au lisa.teng@douglaspartners.com.au		**Phone:**
Date Required:	Standard ☐		**Email:**
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐	No ☐ (If YES, then handle, transport and store in accordance with FPM I

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	TRH	BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservatio
BH1	1	13-May-20	W	G/P	X	X	X							
BH2	2	13-May-20	W	G/P	X	X	X							
BH7	3	13-May-20	W	G/P	X	X	X							
BH8	4	13-May-20	W	G/P	X	X	X							
BH9	5	13-May-20	W	G/P	X	X	X							
BH10	6	13-May-20	W	G/P	X	X	X							
BD1/20200513	7	13-May-20	W	G/P	X	X	X							
Spike	8	13-May-20	W	G/P			X							
Blank	9	13-May-20	W	G/P			X							
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analyt**	

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 24897
Date Received: 14/5/20
Time Received: 14:30
Received By: RE
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** LT **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: Lisa Teng 13/5/2020 2pm **Received by:** **Date & Time:**

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck, Lisa Teng

Sample Login Details

Your reference	71021.15, Tooheys, Lidcombe
Envirolab Reference	242897
Date Sample Received	14/05/2020
Date Instructions Received	14/05/2020
Date Results Expected to be Reported	21/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	9 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12.4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	HM in water - dissolved
BH1	✓	✓	✓
BH2	✓	✓	✓
BH7	✓	✓	✓
BH8	✓	✓	✓
BH9	✓	✓	✓
BH10	✓	✓	✓
BD1/20181125	✓	✓	✓
Spike	✓		
Blank	✓		

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Douglas Partners
Geotechnics | Environment | Groundwater

TPS FLT90 CALIBRATION RECORD

Serial Number: 428561

DP Identification No. DP595

Project: TOOHEYS

Project Number: 71021.15

PARAMETER	STANDARD	PRE CALIBRATION READING		POST CALIBRATION READING	
Temperature	* ~~23.0~~ 21.4	21.5	degrees C	21.4	degrees C
pH	10.05	10.05	pH units	10.05	pH units
	7	7.04	pH units	7.01	pH units
	4	3.99	pH units	4.00	pH units
Conductivity	0.0** uS/cm	—	µS/cm	—	µS/cm
	2.76 mS/cm	2.91	mS/cm	2.75	mS/cm
TDS	0.0** ppm		ppm	=	ppm
	36.0 ppk		ppk	=	ppk
Dissolved Oxygen	0.0% sat	~~—~~	ppm		
		-1.8%	%	0.0%	%
	100.0**% sat	—	ppm		
		101.9	%	100.0%	%
Turbidity	0*** NTU		NTU		NTU
	90 NTU	83.7	NTU	90.0	NTU
ORP #	240 mV	233	mV	-	mV

Calibrated by: LT

Date: 12/5/2020

* use NATA certified reference thermometer from soils clean lab
** air
*** distilled water
# factory calibrated – do a bump test

NOTES:

Form Updated
21Mar2011