



Bi-Annual Construction Monitoring Report - December 2021 – June 2022

SMWSTCTP-AFJ-1NL-EN-RPT-000016 Revision 00

Sydney Metro West – Central Tunnelling Package



DOCUMENT APPROVAL

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Table of Contents

DOCUMENT APPROVAL	1
REVISION HISTORY	1
COMPLIANCE MATRIX.....	1
1. INTRODUCTION	1
2. NOISE AND VIBRATION.....	2
2.1 MONITORING LOCATIONS	2
2.1.1 ATTENDED MONITORING	2
2.1.2 UNATTENDED MONITORING.....	2
2.2 NOISE AND VIBRATION MONITORING RESULTS	2
2.2.3 ATTENDED MONITORING	2
2.2.4 UNATTENDED MONITORING.....	2
2.3 CONCLUSIONS	2
3. SURFACE WATER	4
3.1 MONITORING SITES.....	4
3.2 SURFACE WATER QUALITY RESULTS	5
3.3 CONCLUSIONS	6
4. GROUNDWATER	7
4.1 MONITORING LOCATIONS	7
4.2 GROUNDWATER QUALITY RESULTS.....	8
4.2.1 GROUNDWATER LEVELS	8
4.3 CONCLUSIONS	8
APPENDIX A - ATTENDED NOISE AND VIBRATION MONITORING LOCATIONS.....	10
APPENDIX B - UNATTENDED NOISE AND VIBRATION MONITORING LOCATIONS.....	14
APPENDIX C - ATTENDED NOISE MONITORING SUMMARY	15
APPENDIX D - UNATTENDED VIBRATION MONITORING EXCEEDANCES	16
APPENDIX E - SURFACE WATER MONITORING LOCATIONS	17
APPENDIX F - SURFACE WATER QUALITY RESULTS	20
APPENDIX G - GROUNDWATER MONITORING LOCATIONS	21
APPENDIX H - GROUNDWATER MONITORING DATA.....	22
APPENDIX I HISTORICAL GROUNDWATER GAUGING DATA	23

COMPLIANCE MATRIX

Condition Reference	Condition Requirement	Reference
C14	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of construction of Stage 1 of the CSSI against the performance predicted in the documents listed in Condition A1 of this schedule or in the CEMP:</p> <p>(a) Noise and vibration Monitoring Program; consult with EPA, SOPA (in respect of Sydney Olympic Park), Place Management NSW (in respect of The Bays) and Relevant Council(s)</p> <p>(c) Surface water quality Monitoring program; consult with DPIE Water, Relevant Council(s) and Sydney Water (if any Sydney Water assets are impacted)</p> <p>(d) Groundwater Monitoring Program; consult with DPE Water, Relevant Council(s) and Sydney Water (if any Sydney Water assets are impacted)</p>	<p>(a) Section 3 of the Noise and Vibration Monitoring Program (SMWSTCTP-AFJ-1NL-NV-PLN-000001)</p> <p>Section 3 of the Surface Water Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PRG-000001)</p> <p>Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)</p>
C23	<p>The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, ER and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.</p>	This Report

1. INTRODUCTION

This bi-annual construction monitoring report (B-ACMR) has been prepared to address Condition of Approval (CoA) C23 of the planning approval. This B-ACMR presents monitoring data for the reporting period for all works undertaken on the Central Tunnelling Package (CTP) from **20 December 2021 to 20 June 2022**. This report will highlight the results from the construction phase of the monitoring programs and compare these results against established baseline data where available. Please note this report will only highlight exceedances and additional data may be requested.

In accordance with each relevant Construction Monitoring Program, monitoring data will be made available to relevant authorities within 40 business days of the monitoring period ending.

2. NOISE AND VIBRATION

The purpose of the Noise and Vibration Monitoring Program (NVMP) is to identify potential impacts of the Central Tunnelling Package (CTP) Works for noise and vibration within the local environments surrounding the construction sites. The data presented in the bi-annual construction monitoring report (this report) is submitted in accordance with Condition C23 of the Project Planning Approval, which requires reporting of the results of the CTP Works to the to the Planning Secretary, ER and relevant regulatory agencies.

This report details the results during the construction phase of the NVMP. This will investigate the baseline noise and vibration impacts against operational monitoring data undertaken during the specified stage of the project.

2.1 MONITORING LOCATIONS

2.1.1 ATTENDED MONITORING

Attended airborne noise monitoring was completed using a handheld sound level meter fixed to a tripod. Noise monitoring was completed as required, generally for verification purposes at the location of Out of Hours Works (OOHW). Attended monitoring locations where LAeq exceedances were detected are provided in Appendix A.

2.1.2 UNATTENDED MONITORING

Unattended (real time) airborne noise and vibration monitoring has been completed with noise loggers and vibration meters deployed across all CTP construction sites to obtain noise and vibration data over longer periods to satisfy CoA C16(c). The unattended monitoring locations are identified in Appendix B.

2.2 NOISE AND VIBRATION MONITORING RESULTS

2.2.3 ATTENDED MONITORING

There was only one attended vibration monitoring event recorded during the reporting period at Five Dock, however monitoring demonstrated that vibration outcomes were consistent with impacts assessed within the Detailed Noise and Vibration Impact Statement (DNVIS).

There were a total of eight attending noise monitoring events conducted during the monitoring period. A summary of these is provided within Appendix C. Of these events, four OOHW works recorded LAeq exceedances when compared to OOHW Permit modelling. The greatest exceedance was identified at The Bays site on 15/03/2022, which registered a measured LAeq of 61 dB compared to the model predicted 48 dB. Within the monitoring report (21028-20220315-0) it was noted that all activities were inaudible at the most affected residential locations during the monitoring period. Furthermore, the report concluded that it is expected that the activities, as measured, are NML compliant at the representative receiver locations.

2.2.4 UNATTENDED MONITORING

There were a total of ten vibration related exceedances recorded during the reporting period, summarised in Appendix D. The highest recorded exceedance was experienced at the Burwood North, West site on 28/04/2022. This exceedance was investigated and determined to be a result a 20T vibratory roller clipping the concrete hardstand, resulting in a Peak Particle Velocity (PPV) of 13mm/s. The Burwood site team were later toolboxed in response to this exceedance regarding the use of static rolling as opposed to vibratory rolling. There was a spike in the PPV at the St Albans Church during the demolition period of 6.2mm/s but this did not exceed the 7.5mm/s limit of the building.

2.3 CONCLUSIONS

Noise and vibration monitoring undertaken on the CTP Project during the reporting period was in accordance with the NVMP. Attended monitoring events were conducted in line with the AFJV OOHW

protocol. Four attended noise monitoring events resulted in LAeq exceedances against permit modelling however, heightened ambient noise levels generally appear to be the catalyst for these exceedances. Conversely, attended vibration monitoring did not result in any measured exceedances. Unattended vibration monitoring recorded ten PPV exceedances. As a management response to these incidents, the site teams were toolboxed to ensure construction methodology considers vibration impact and mitigation strategies where appropriate.

Noise and vibration monitoring will continue in accordance with the NVMP.

3. SURFACE WATER

The purpose of the Surface Water Monitoring Program (SWMP) is to identify potential impacts of the Central Tunnelling Package (CTP) Works on water quality within local receiving waters. The data presented in the bi-annual construction monitoring report (this report) is submitted in accordance with Condition C23 of the Project Planning Approval, which requires reporting of the results of the CTP Works to the to the Planning Secretary, ER and relevant regulatory agencies.

This report details the results during the construction phase of the SWMP. This will investigate the baseline water quality against operational monitoring data undertaken during the specified stage of the project.

3.1 MONITORING SITES

During construction surface water quality monitoring was undertaken monthly, both in dry weather and wet weather conditions in accordance with the SWMP. Table 3-A: SURFACE WATER MONITORING LOCATIONS provides a summary of the monitoring locations and a monitoring location map is included in Appendix E. Surface water quality was measured at eight locations during the reporting period. Monitoring locations were identified as being representative of the surrounding receiving waters and sufficient to identify potential project impacts should there be any quality exceedances. Monitoring on the CTP project for the reporting period was completed at the frequency depicted in Figure 3-1: SURFACE WATER MONITORING CALENDAR. There were a total of six monthly monitoring events (two of which formed part of the pre-construction monitoring rounds) as well as three post-rainfall event monitoring rounds.

TABLE 3-A: SURFACE WATER MONITORING LOCATIONS

Name	Waterway	Nearest Project Site	Location	Distance From Site to Creek
WB-D/S	White Bay	The Bays	-33.866245°S, 151.180450° E	Immediately adjacent to water
DC-U/S	Dobroyd Canal / Iron Cove Creek	Five Dock	-33.873828 ° S, 151.128243° E	600m
DC-D/S	Dobroyd Canal / Iron Cove Creek	Five Dock	-33.870604° S, 151.141474° E	600m
SLP-D/S	St Lukes Park Canal	Burwood North	-33.861571°S , 151.113347° E	230m
PC-U/S	Powells Creek	North Strathfield	-33.862145°S, 151.086294° E	350m
PC-D/S	Powells Creek	North Strathfield	-33.852589°S, 151.082359° E	350m
SC-D/S	Saleyards Creek	Sydney Olympic Park	-33.852282°S, 151.081934° E	1km
HC-D/S	Haslams Creek	Sydney Olympic Park	-33.834564°S, 151.075772° E	1km

LEGEND	
	Pre-Construction Monitoring
	Post-rainfall Monitoring
	Monthly Monitoring

2022

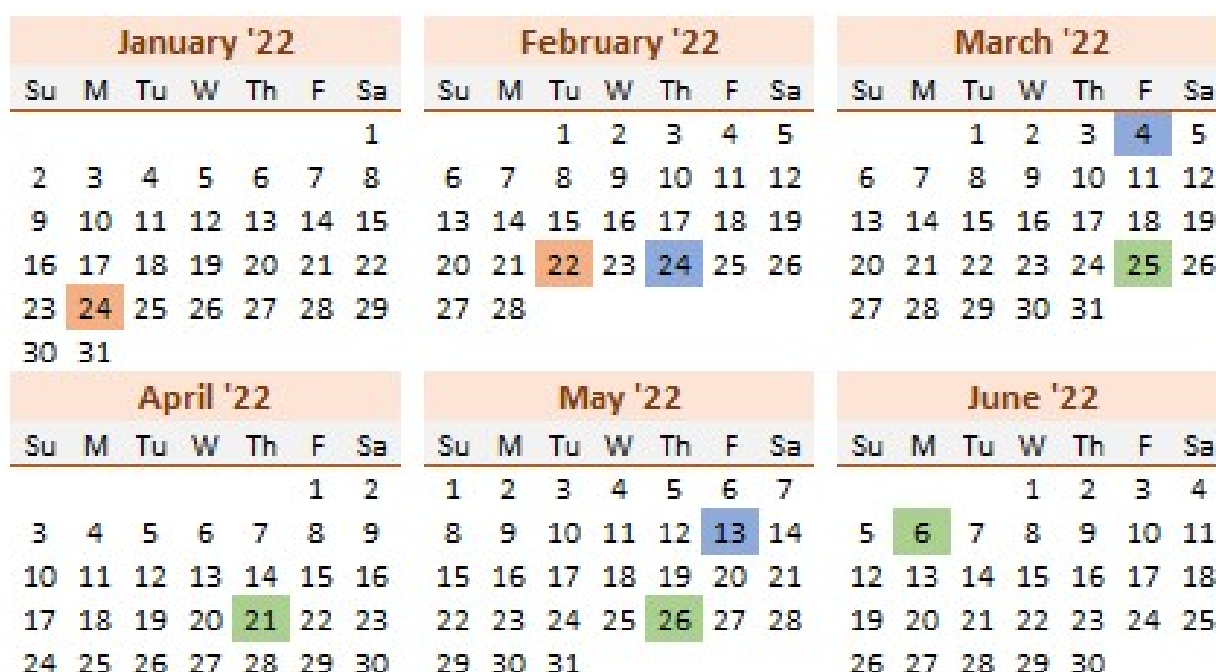


FIGURE 3-1: SURFACE WATER MONITORING CALENDAR

3.2 SURFACE WATER QUALITY RESULTS

When comparing the pre-construction monitoring results in 20 to the preliminary trigger values identified within Table 3-B, there are a large range of discrepancies. Exceedances were identified within all measurable water quality characteristics, at every monitoring location. This is especially prominent within the baseline construction monitoring rounds. The existing condition of the waterways is generally poor, with all waterways situated in highly urbanised settings. This results in natural variability in water quality at the receiving waters due to the multiple potential urban runoff sources in the catchment.

There was no detailed pre-project baseline surface water monitoring data identified in the Sydney Metro West EIS documentation. This presents a challenge when establishing accurate trigger values for receiving water quality exceedances. Therefore, the trigger values will be amended from preliminary values to site specific values extrapolated following the completion of the first reporting period since construction commencement.

TABLE 3-B: PELIMINARY TRIGGER VALUES TO MAINTAIN WATER QUALITY OBJECTIVES

Receiving watercourse type (WQO)	Turbidity	pH	Dissolved Oxygen	Oil and grease	Electrical conductivity/Salinity
Aquatic Ecosystem (Estuaries)	0.5–10 NTU	7.0-8.5	80-110%	None visible on surface	Lowland rivers: 125–2200 $\mu\text{S}/\text{cm}$

Water quality would also have undoubtedly been affected by the unprecedented rainfall experienced during the reporting period. Figure 3-1 depicts the total monthly rainfall for the monitoring period against the long-term average for the same reporting period. During this reporting period, significantly higher than average rainfall was recorded in March (550.6mm) compared with the historic average (207.9mm). Higher than average rainfall was also recorded in the months of February, April and May.

January recorded comparable to mean rainfall whilst June recorded less than mean rainfall. Overall rainfall volumes for the monitoring period were above the historic mean with a total of 1,230.8mm of rain received, compared to a historic mean rainfall volume of 736.6mm, representing a 167% increase.

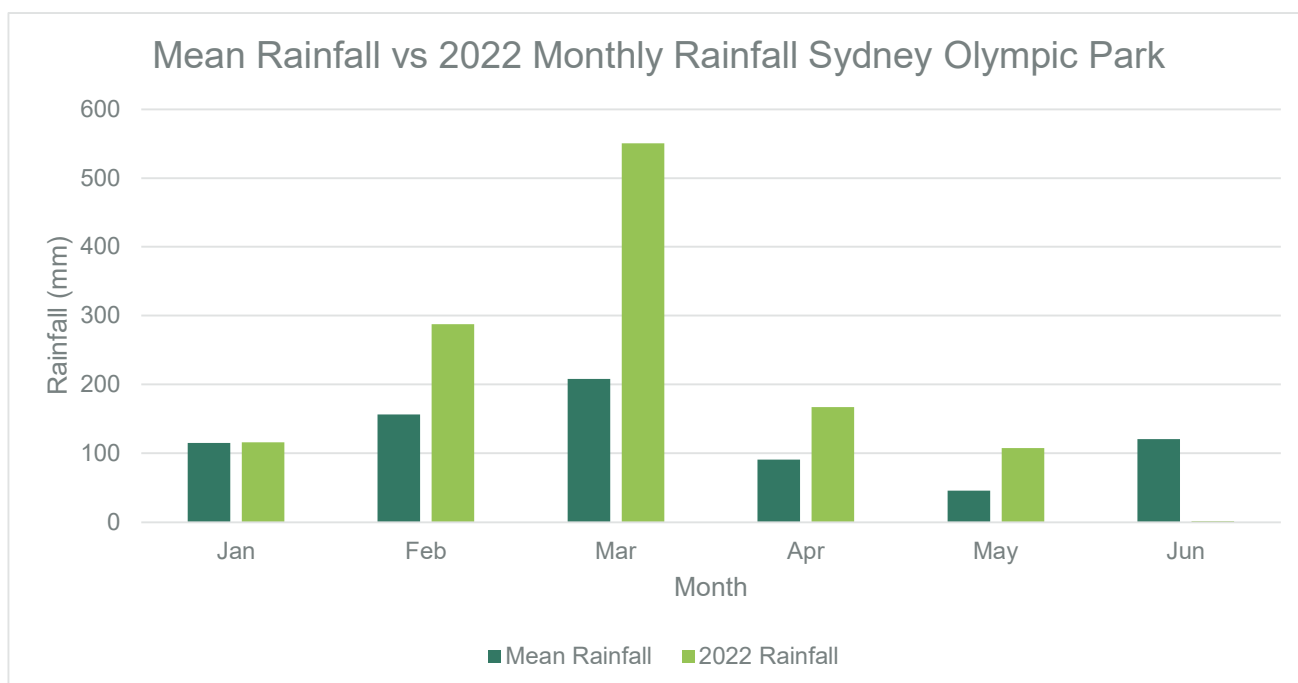


FIGURE 3-2: MEAN RAINFALL VS 2022 MONTHLY RAINFALL DATA - SYDNEY OLYMPIC PARK (BOM, 2022)

3.3 CONCLUSIONS

Results of the pre-construction water quality monitoring data highlight that the receiving waterways are affected by external influences from surrounding residential and industrial sites, as well as other construction projects. The 167% increase in monthly rainfall compared with long-term mean suggests that rainfall too contributed to the variance in monitoring data between sites and against the preliminary trigger values identified within the SWMP. It is, therefore, not possible to identify the exact influence on water quality as a result of the CTP Works. However, AFJV's process for testing water prior to discharge off site ensures water quality is within the required Environmental Protection Licence (EPL) parameters.

In addition to the inspections conducted as part of the SWMP discussed in this report, AFJV conduct daily and weekly environmental inspections of each site. The Environment Representative also conducts weekly inspections, and any observations are closed out within agreed timeframes. AFJV likewise, has engaged a Soil Conservationist to assist in erosion and sediment control planning and inspecting active sites, providing input on controls.

Surface water quality monitoring will continue in accordance with the SWMP.

4. GROUNDWATER

The purpose of the Groundwater Monitoring Program (GWMP) is to identify potential impacts of the Central Tunnelling Package (CTP) Works on groundwater quality within the local environments. The data presented in the bi-annual construction monitoring report (this report) is submitted in accordance with Condition C23 of the Project Planning Approval, which requires reporting of the results of the CTP Works to the Planning Secretary, ER and relevant regulatory agencies.

This report details the results during the construction phase of the GWMP. This will investigate the baseline groundwater quality against operational monitoring data undertaken during the specified stage of the project.

4.1 MONITORING LOCATIONS

In accordance with the GWMP there were 39 boreholes identified that would be utilised throughout the project to monitor and sample from. However, during construction, a number of boreholes required removal due to construction activities occurring in that location. Borehole monitoring locations utilised during the reporting period are summarised in Appendix G.

Between January and March 2022 ERM were engaged to complete three monthly baseline 'pre-construction' monitoring rounds. Following the completion of this, monitoring in the 'construction' phase of the project- was undertaken by AFJV as each site commenced ground disturbance activities likely to intercept with groundwater ie Piling, refer to Table 4-A for a summary of monitoring completed within the reporting period.

TABLE 4-A: GROUNDWATER MONITORING SUMMARY

Site	Ground Disturbance Trigger Date	Monitoring Status		
		Baseline Monitoring (3 Months)	Construction Monitoring (first 3 months of construction)	Quarterly Monitoring
The Bays	05/04/2022	Round 1: January 21 Round 2: February 22 Round 3: March 16	Round 1: May 5 ¹ Round 2 May 25 Round 3: June 21	N/A
Five Dock	23/05/2022		Scheduled for Round 1: June 21	N/A
Burwood North	1/06/2022		Scheduled for Round 1: June 21	N/A
North Strathfield	N/A		N/A	N/A
Sydney Olympic Park	21/06/2022		Round 1: Scheduled for July 18	N/A

1. Groundwater monitoring was scheduled to be completed the week proceeding (commencing 25 April) however due to staff COVID shortages, monitoring was postponed till May 5.

4.2 GROUNDWATER QUALITY RESULTS

During the baseline monitoring rounds conducted by ERM, there were some variations regarding accessing boreholes from the GWMP due to a combination of construction and accessibility issues. However, ERM considered that the data obtained during these monitoring events are sufficient to provide an adequate baseline assessment of most locations/sites. The exceptions to this are the tunnel location NW of SOP and the tunnel SOP to NS locations, however both of which have been to date unaffected by construction works.

Exceedances of trigger levels adopted for assessing groundwater were noted predominately for metals and inorganics for borehole SMW_BH054. This monitoring event was conducted on the 27th of May, however importantly, May received double the mean rain for the month in 2022. This increase in rainfall influenced the quality and or levels of groundwater present due to increased volumes of surface water interacting with the water table during period.

Monitoring rounds were completed for The Bays on May 5th and May 26th (Round 1 & 2 respectively), following the commencement of piling. Monitoring was completed using the AFJV well development, gauging and sampling data sheet. See Figure 4-1 for an example of this data sheet completed on borehole S54 during The Bays round 2 monitoring.

These monitoring rounds were limited in nature due to constraints relating to access. Many of the boreholes were either not accessible. This has since been rectified; however, this data is captured after the 20th of June and as such will be analysed as part of reporting period 2. The data captured from these monitoring events is available in Appendix H.

4.2.1 GROUNDWATER LEVELS

During the reporting period, groundwater levels in boreholes tunnel alignment and at surrounding the construction sites, changed slightly over time. However, given that during the reporting period, bulk excavation of the station boxes at all sites had not commenced, any variances cannot be attributed to the CTP Works. Refer to Appendix I for a summary of all groundwater level data compiled during the reporting period.

4.3 CONCLUSIONS

Following the completion of the baseline monitoring rounds, The Bays was the only site which had triggered construction monitoring within the reporting period. Burwood and Five Dock monitoring round 1 was scheduled to commence on June 21st, and as such those results will be analysed in a subsequent B-ACMR. The 167% increase in monthly rainfall compared with long-term mean during the reporting period suggests that rainfall could have contributed to the variances in groundwater levels/quality. Groundwater drawdown predictions will also be reviewed and updated following the completion of all construction monitoring rounds. Subsequently monitoring data will be evaluated against the revised predictions and a management response initiated where required.

Groundwater quality monitoring will continue in accordance with the GWMP.

WELL No : 554

Project Name :

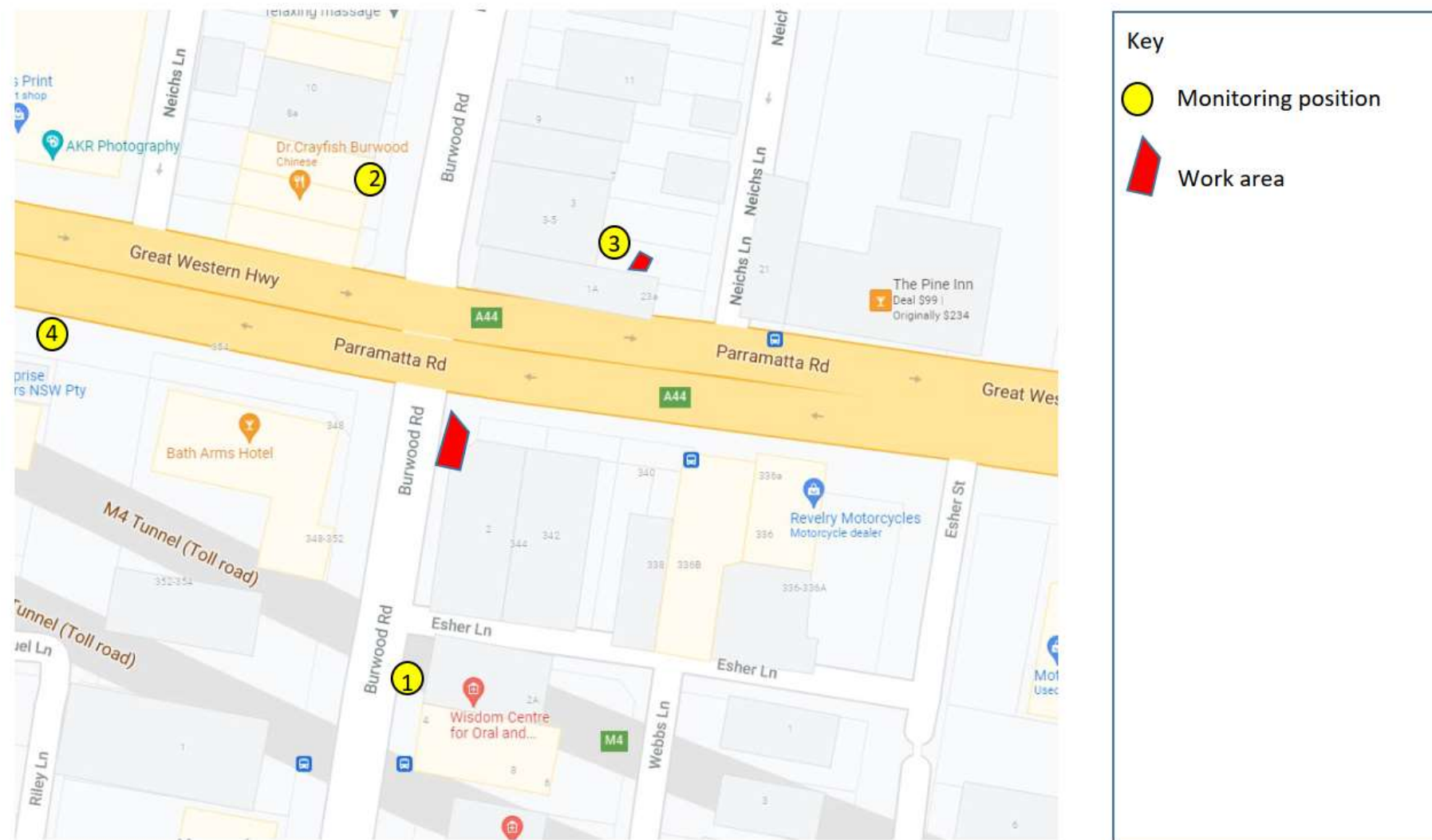
Well Volume Calculations								
Gasing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor	0.98	1.96	7.85	31.4	49.1	70.7	125.7	188.6

WATER COLUMN (X) CONVERSION FACTOR (=) LITRES PER WELL VOLUME
 13.33 (X) 2642.96 (=) 26.12 L

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APPENDIX A - ATTENDED NOISE AND VIBRATION MONITORING LOCATIONS

A.1 BURWOOD NORTH – 24/01/2022 (21028-20220124-01)



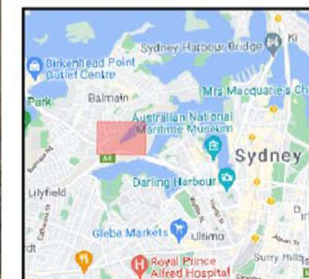
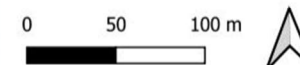
A.2 THE BAYS – 15/03/2022 (21028-20220315-01)



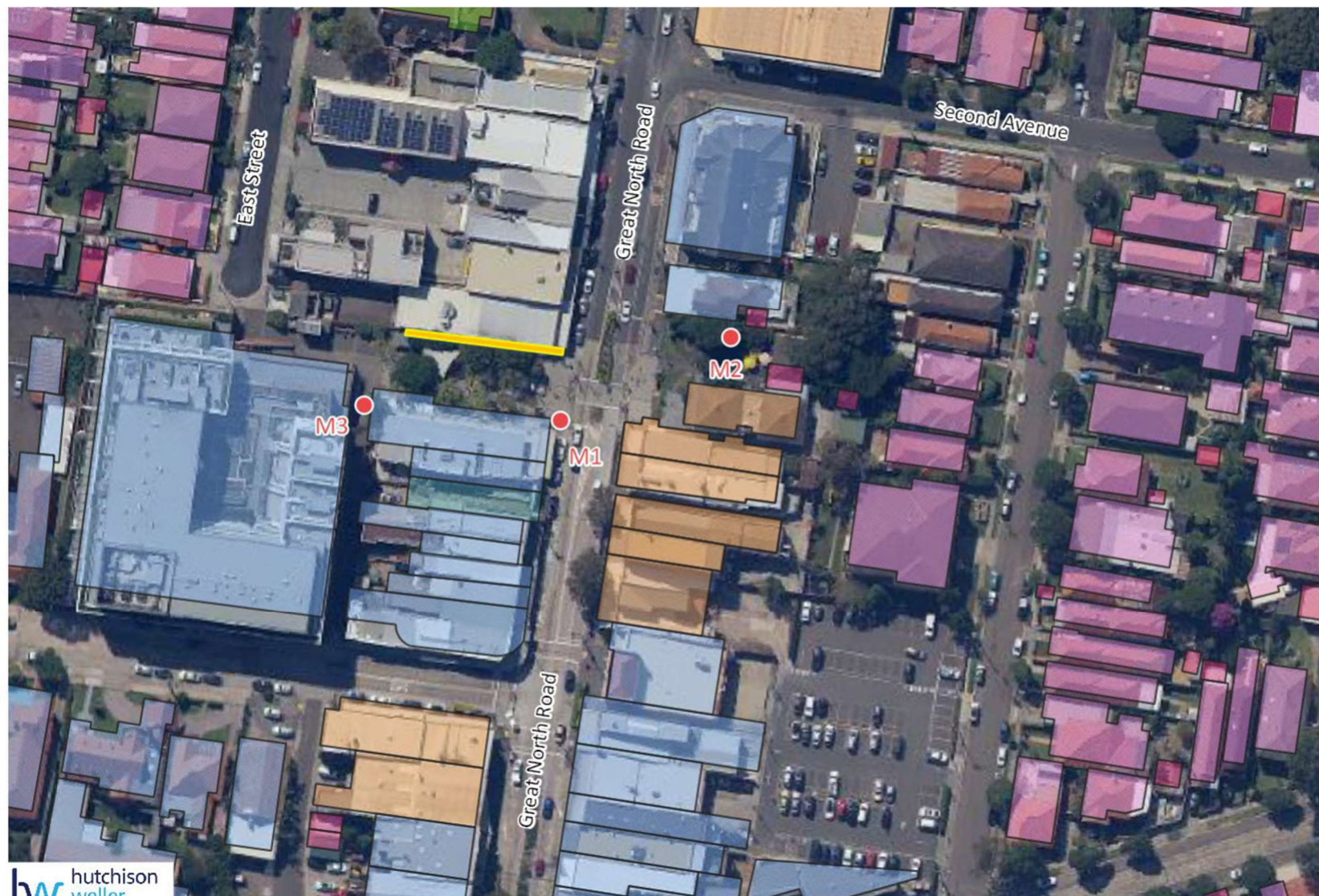
Sydney Metro West-
The Bays
Noise Monitoring
15 March 2022

Legend

- Work Location
- Monitoring Locations



A.3 FIVE DOCK – 02/05/2022 (21028-20220205-01)

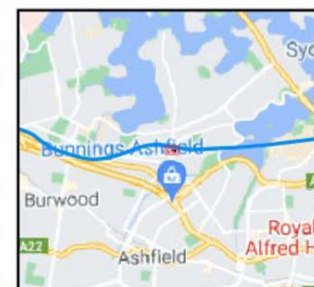


Sydney Metro West-
Five Dock
Noise Monitoring
2 May 2022

Legend

- Monitoring Locations
- Work Locations

0 5 10 15 20 25 30 35 m



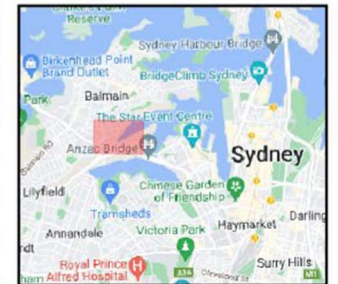
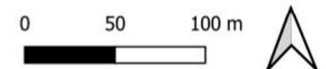
A.4 THE BAYS – 13/05/2022 (21028-20220513-01)



Sydney Metro West-
The Bays
Noise Monitoring
13 May 2022

Legend

- Work Location
- Monitoring Locations



APPENDIX B - UNATTENDED NOISE AND VIBRATION MONITORING LOCATIONS



Sydney Metro West - CTP

The Bays

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

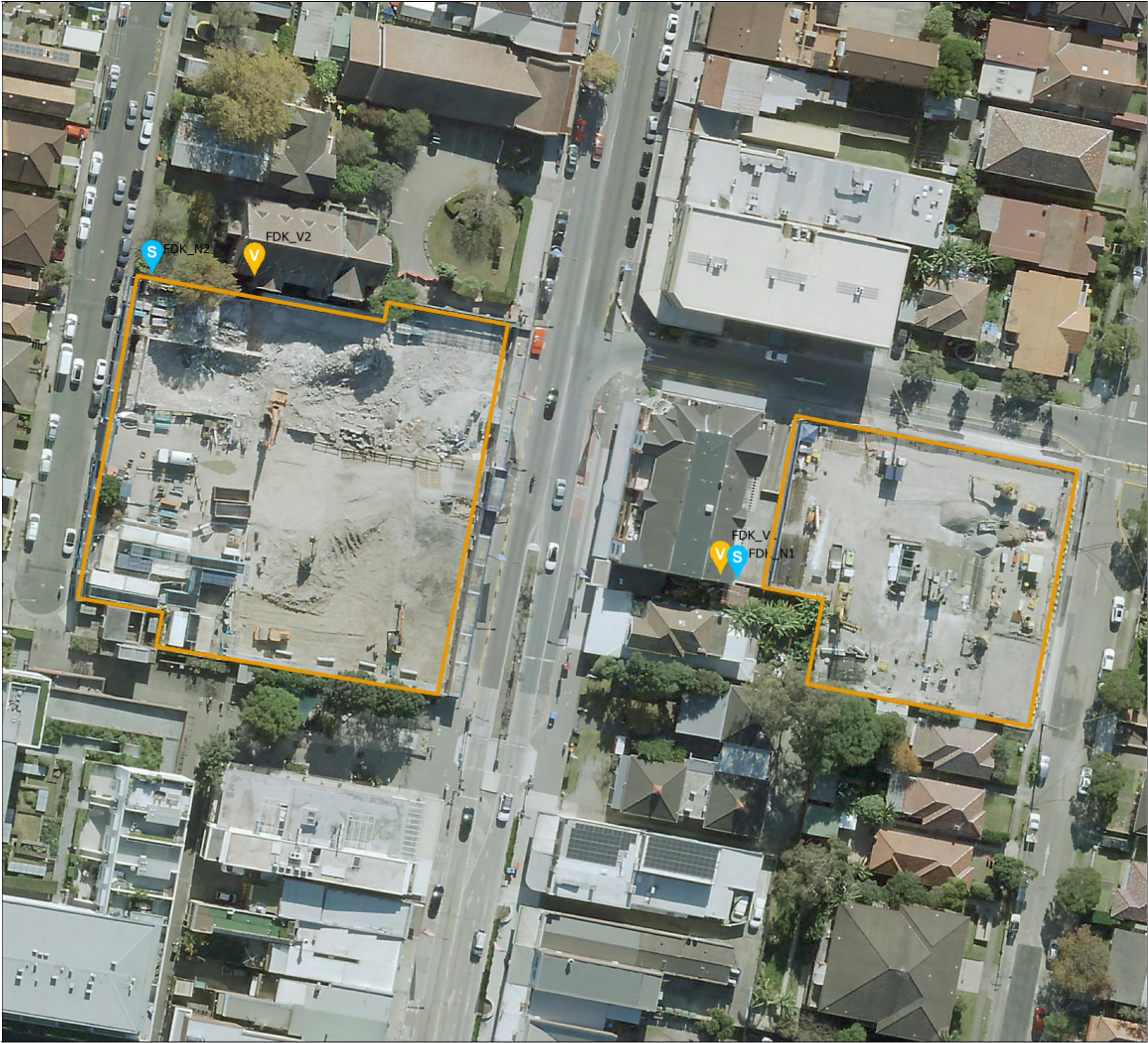


Vibration



This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.





Sydney Metro West - CTP

Five Dock

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

S Sound

V Vibration



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Sydney Metro West - CTP

Burwood North

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration



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Sydney Metro West - CTP

North Strathfield

Legend

CONSTRUCTION

Site Schedule Boundary / EPL



MONITORING

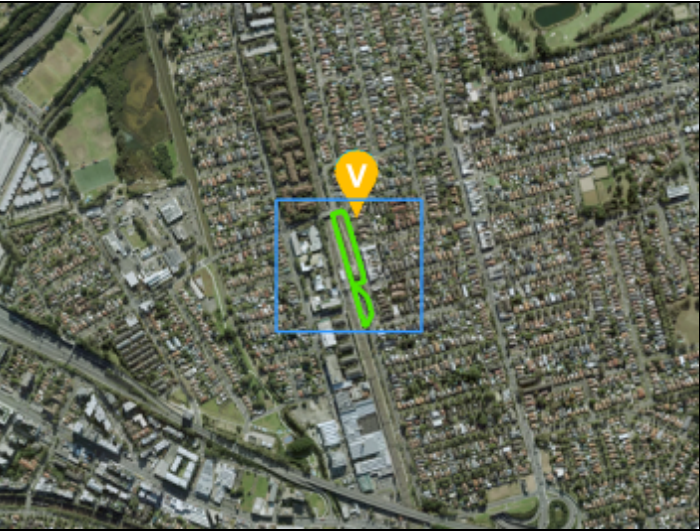
Noise and Vibration



Sound



Vibration



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Sydney Metro West - CTP

Sydney Olympic Park

Legend

CONSTRUCTION

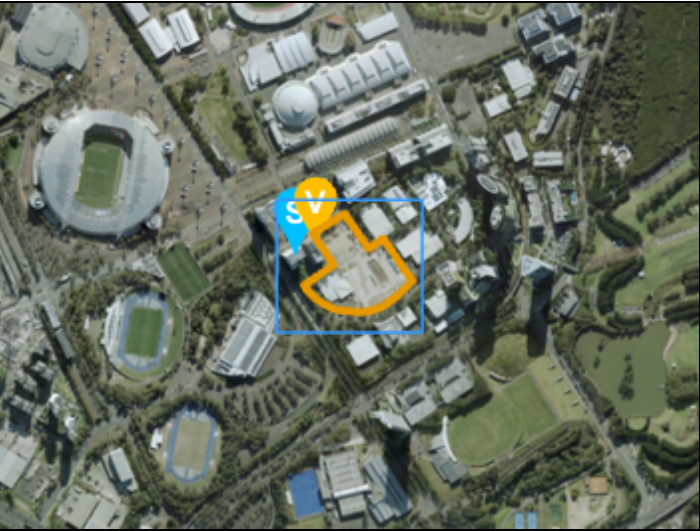
Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration



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APPENDIX C - ATTENDED NOISE MONITORING SUMMARY

Noise Monitoring Register

Date	Report No.	Conducted by	Site	Purpose	OOHW Permit No.	Location	Works	Model Prediction (LAeq)	LAeq	LA90	LAmaz	Exceed prediction?	Notes
11/01/2022	21028-20220111-01	S.Hughes	Burwood	OOHW	8	.Corner Neichs Ln and Burwood Rd	Combined Utilities investigation	87	69	67	79	No	While the works were audible at all locations, the highest noise levels were from road traffic on Burwood Road and Parramatta Road. Continuous noise levels from trucks and vehicles generally masked the noise emissions from construction however, construction noise was observed during any lulls in traffic.
						Front of 1 Escher Street		82	63	57	80	No	
						Corner Escher Ln and Burwood Rd		75	67	58	88	No	
						Corner Neichs Ln and Parramatta Rd)		74	68	59	85	No	
24/01/2022	21028-20220124-01	J.Hutchison	Burwood	OOHW	8	8 Burwood Rd	Removal of awning at corner of commercial property	65	67	60.7	84.2	Yes	The activity was still audible but not overly intrusive above the traffic. Exceedance of NMLs observed but within range of predicted levels at monitoring locations. LAmaz levels frequently above the awakening criterion of 65 dBA; however, traffic was more frequently above this threshold.
						4 Burwood Rd		66	67.5	59.1	86	Yes	
						Behind Site office		N/A	N/A	N/A	N/A	N/A	
31/01/2022	21028-20220131-01	S.Hughes	The Bays	OOHW	7	End of Mansfield St	Excavation of services locations using excavators and a vacuum truck on Port Access Road Rozelle.	N/A	54	52	64	No	As the works were inaudible at all residential locations due to the ambient noise environment and the reduced items of plant operational during the monitoring, a revised noise level was predicted for receiver locations along Mansfield Street.
						Front of 11A Mansfield St		N/A	48	46	61	No	
						Front of 67 Mansfield St		N/A	47	38	68	No	
						Roberts Rd, White Bay		N/A	48	46	67	No	
1/02/2022	21028-20220201-00	S.Hughes	Five Dock West	OOHW	12	Front of 110 Great North Road	Permit 12 – Electrical disconnections	66	63.4	52.3	77.4	No	Construction work did not proceed for this permit. Noise monitoring captured background noise levels along Great Northern Road. This monitoring was completed for OOHW activity in accordance with the AFJV noise monitoring plan for Permit number 12. Activities included investigations that determined the cut over was not possible at the time of monitoring. Background noise monitoring was completed during the investigations however, no construction activities were audible
						Front of 122 Great North Road		70	66.5	51.1	87.5	No	
15/03/2022	21028-20220315-0	S.Hughes	The Bays	Establish NML Compliance for Piling	71	End of Mansfield Road, Rozelle	Piling and excavation at the Bays site.	48	61	55	77	Yes	As all activities were inaudible at the most affected residential locations during the monitoring period and barely audible within line of sight of the works and based on the measured noise levels in the current noise environment, it is expected that the activities, as measured, are NMLcompliant at the representative receiver locations.
						.Port Access Rd White Bay		48	64	58	83	Yes	
13/05/2022	21028-20220513-01	S.Hughes	The Bays	To validate OOHW	36	Mansfield Stree, Cul de Sac	Sewer installation including rock hammering	54	55.3	46.3	69	Yes	Measured construction noise levels were lower than the predicted noise from construction activities identified in the OOHW Permit 36. This was largely due to the operation of only a few items of plant at any given time compared to the full equipment list detail in the permit.
						49 Mansfield Road, front of residence			53.1	38.7	73	No	
						11 Mansfield Road, Batty Street side			47	44.5	59.3	No	
2/05/2022	21028-20220205-01	S.Hughes	Five Dock	OOHW	79 & 83	Corner 147 Great North Road	Scaffold Installation	66	66.8	52.2	86.5	Yes	All equipment was manually operated (no generators or powered machines were required) and additional equipment such as lighting plant appeared to be battery operated and was silent. As a result, the equipment identified in Permit 83 did not reflect the equipment used on site to complete the scaffolding installation during the monitoring period. No vehicles were left idling and general noise from the works was expected to be NML compliant apart from the random, but moderately frequent banging
						Adjacent to 108 Great North Road (in park)		59	61.4	47.9	83.5	Yes	

						Garfield Lane (junction of Fred Kelly Place)		65	64.9	49.5	85.4	No	(hammer on steel frame). The measured LAeq of around 65-66 dB(A) is in line with the Permit assessment at the most affected locations, notwithstanding the difference in noise generating activities.
20/06/2022	21028-20220620-01	S.Hughes	Burwood	OOHW	39	Corner of Neichs Lane and Burwood Rd	Sewer Manhole Works & Restoration	94	82	73.9	96.5	No	Ambient noise environment when no construction sources operating consists of frequent car and truck pass-bys on Burwood Road. Dominant noise sources during monitoring were from vacuum truck and rock hammer (when operational). Highest measured noise levels at the nearest residential receiver location during rock hammering however, the vacuum truck was constant background noise source.

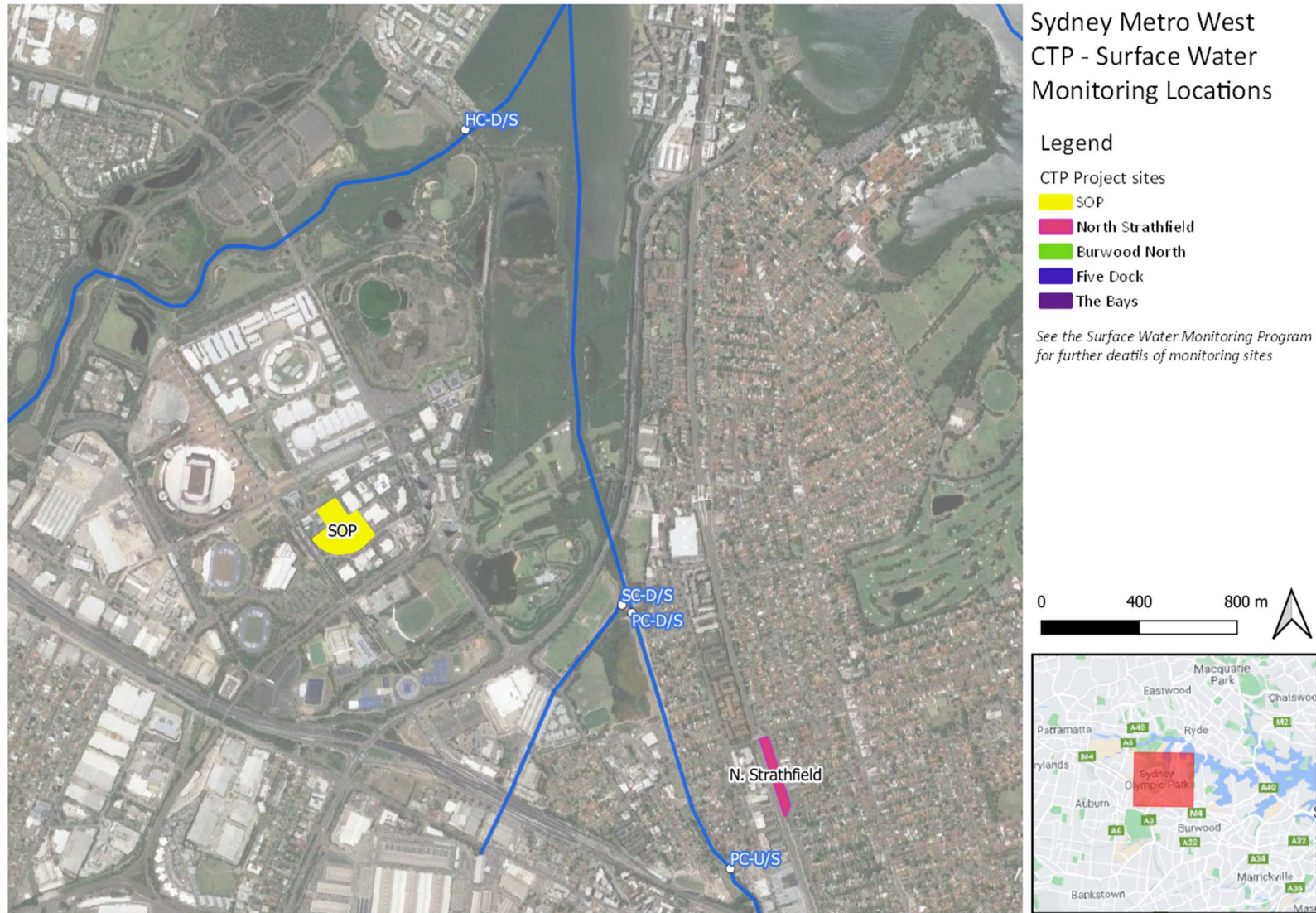
APPENDIX D - UNATTENDED VIBRATION MONITORING EXCEEDANCES

Vibration Exceedance Register

				Exceedance (2.5mm/s trigger)				
Date	Time	Site	Logger Location	mm/s	Hz	Works being undertaken	Investigation Notes	Corrective / Preventative Actions
18/01/2022	14:19	TBY	WBPS East Boundary	3.25	17.4	Vibratory roller operating to compact surface for the western diversion road.	Works occurring approximately 30m from the WBPS structure and monitoring location	Utilise static rolling if compaction requirements can be achieved.
24/01/2022	7:31	TBY	WBPS East Boundary	2.55	26.9	Vibratory roller operating to compact surface for the piling pad construction.	Works occurring approximately 40m from the WBPS structure and monitoring location	Utilise static rolling if compaction requirements can be achieved.
19/04/2022	13:31	TBY	WBPS East Boundary	3.1	120	Ground Improvement works, including drilling and grouting	<ul style="list-style-type: none"> - Exceedance was due one of the crew clearing debris from the down-the-hole hammer through banging it on the ground. -The DTH hammer was clogged with silt and sand, rendering it ineffective and requiring clearing. -The DTH hammer was brought to the surface where the blockage was cleared by one of the workers physically banging the hammer on the ground to remove the silt/sand. -A block of timber was placed on the ground to ensure no damage to the concrete surfaces (see photo attached). -The clearing of the DTH hammer was undertaken approximately 3m from the wall. -Workers were recently toolboxed on the heritage sensitivities around WBPS and the additional mitigation measures applicable to the works, and did not think that the manual activity of clearing the blockage would cause exceedances of the vibration criteria. 	<ul style="list-style-type: none"> - Discussions held on site to avoid banging or unnecessary vibratory works near the WBPS structures. - Signage proposed to be erected to remind crews of the heritage sensitivities of the building.
21/04/2022	7:53	TBY	WBPS East Boundary	2.9	137	Work being undertaken at the time of the exceedance: 5t excavator cleaning up mud in front of the concrete slab connected to the WBPS.	Assumed action causing exceedance: 5t excavator working within ~5m of the WBPS wall. Operation of excavator causing vibration to be transferred through the concrete slab to the WBPS wall.	<ul style="list-style-type: none"> - Assumed action causing exceedance: 5t excavator working within ~5m of the WBPS wall. Operation of excavator causing vibration to be transferred through the concrete slab to the WBPS wall. - Preventative actions: <ul style="list-style-type: none"> o Revise activity to position 5t excavator further away from the wall (off the connecting concrete slab). o Utilise non-mechanical means to clean the mud off the concrete slab (brush, gurney, etc.) - Note: Workers were aware of the sensitivities of vibration to the heritage building. - Note: Workers did not think using a small excavator would result in vibration concerns.
21/04/2022	7:55	TBY	WBPS East Boundary	3.15	120	Work being undertaken at the time of the exceedance: 5t excavator cleaning up mud in front of the concrete slab connected to the WBPS.	Assumed action causing exceedance: 5t excavator working within ~5m of the WBPS wall. Operation of excavator causing vibration to be transferred through the concrete slab to the WBPS wall.	<ul style="list-style-type: none"> -Assumed action causing exceedance: 5t excavator working within ~5m of the WBPS wall. Operation of excavator causing vibration to be transferred through the concrete slab to the WBPS wall. -Preventative actions: <ul style="list-style-type: none"> oRevise activity to position 5t excavator further away from the wall (off the connecting concrete slab). oUtilise non-mechanical means to clean the mud off the concrete slab (brush, gurney, etc.) -Note: Workers were aware of the sensitivities of vibration to the heritage building. -Note: Workers did not think using a small excavator would result in vibration concerns.
18/05/2022	13:22	TBY	WBPS East Boundary	3.55	158	Works being undertaken included drilling for ground improvement works. The hole being drilled is the closest location to the vibration monitoring location.	<ul style="list-style-type: none"> -Potential cause of vibration is the casing contacting the concrete at the surface during use of the drill rig. -Protection fencing with signage is in place to ensure no direct damage to WBPS wall. -Mitigation measures are being implemented in accordance with the NVMP.H23 	<ul style="list-style-type: none"> - Use least vibratory intensive plant available to complete the work. NOTE: Smallest drill rig available is being used. - Employ least vibratory intensive methodology available. NOTE: Hammer drilling is proposed as a methodology, but rotary drilling was being utilised at this point, which minimised potential vibratory impacts associated with the activity. - Casing will be removed tomorrow and rotary drilling will be utilised. If rotary drilling fails to develop the drill hole, hammer drilling will be required. o ACTION: Utilise rotary drilling where possible. o ACTION: Ensure drill rig is not contacting the concrete pavement at the surface to minimise vibration transmission into the WBPS eastern wall.H27
19/05/2022	15:58	TBY	WBPS East Boundary	2.65	171	Works being undertaken included drilling for ground improvement works. The hole being drilled is the closest location to the vibration monitoring location.	<ul style="list-style-type: none"> -Potential cause of vibration is the casing contacting the concrete at the surface during use of the drill rig. -Protection fencing with signage is in place to ensure no direct damage to WBPS wall. -Mitigation measures are being implemented in accordance with the NVMP.H23 	<ul style="list-style-type: none"> - Use least vibratory intensive plant available to complete the work. NOTE: Smallest drill rig available is being used. - Employ least vibratory intensive methodology available. NOTE: Hammer drilling is proposed as a methodology, but rotary drilling was being utilised at this point, which minimised potential vibratory impacts associated with the activity. - Casing will be removed tomorrow and rotary drilling will be utilised. If rotary drilling fails to develop the drill hole, hammer drilling will be required. o ACTION: Utilise rotary drilling where possible. o ACTION: Ensure drill rig is not contacting the concrete pavement at the surface to minimise vibration transmission into the WBPS eastern wall.H27
25/05/2022	13:30	TBY	WBPS East Boundary	3.2	146	Works being undertaken included drilling for ground improvement works. The hole being drilled is the closest location to the vibration monitoring location.	- DTH attachment required to be used close to the surface to break through a second concrete surface uncovered beneath the top concrete layer. This layer could not be core drilled due to its depth, so was required to be hammered so that the drill could operate.	- Minimise hammering wherever possible.
21/04/2022	11:36	BWD	Revelry Cycles (336 Parramatta Rd)	7.79	293	Works being undertaken included demolition on the Southern Shaft and core drilling for the purpose of soil testing	- Installation of the test pit involves using both a coring saw and a small hand held HLTi breaker, which would have been the cause of vibration exceedance	- Ensure team undertaking coring for soil testing is aware of location of geophone, and ensure coring methodology doesn't create high levels of vibration.

28/04/2022	8:30	BWD	16 Burton St, Concord	13	20.5	Works being undertaken included	- Investigation of the exceedance found that the exceedance was due to the use of a 20T vibratory roller clipping the concrete hardstand	- Team toolboxed on using static rolling as opposed to vibratory rolling

APPENDIX E - SURFACE WATER MONITORING LOCATIONS



Sydney Metro West CTP - Surface Water Monitoring Locations

Legend

CTP Project sites

SOP

North Strathfield

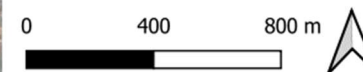
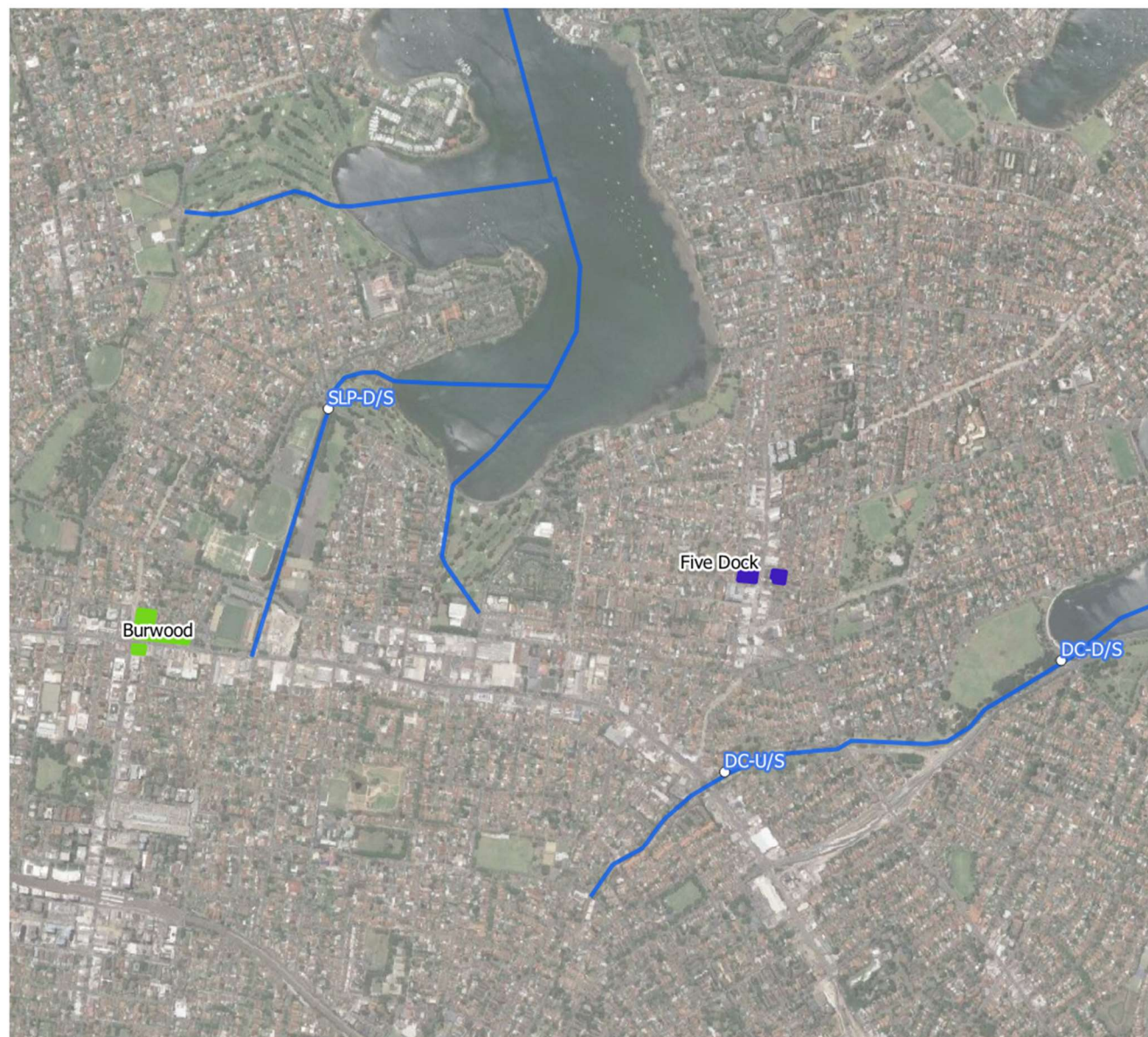
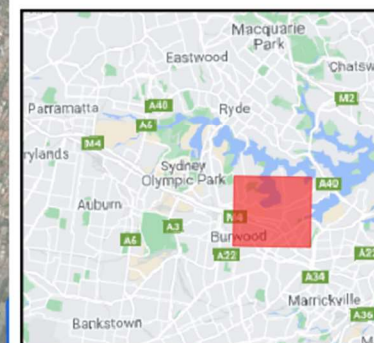
Burwood North

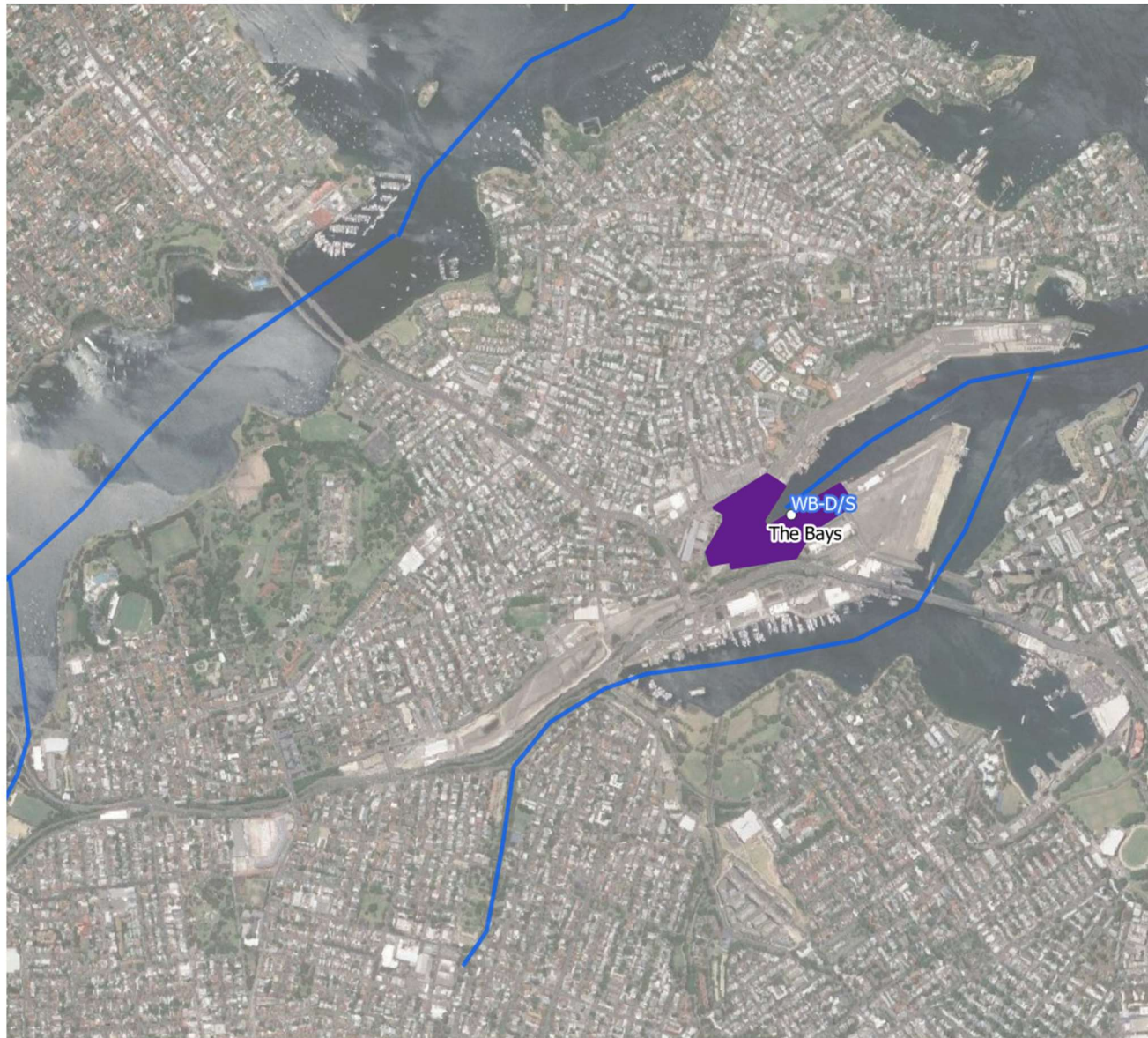
Five Dock

The Bays

*See the Surface Water Monitoring Program
for further details of monitoring sites*

0 400 800 m



Sydney Metro West CTP - Surface Water Monitoring Locations

Legend

CTP Project sites

■ SOP

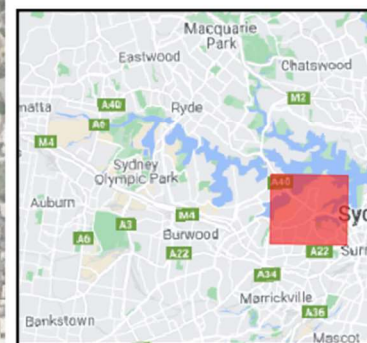
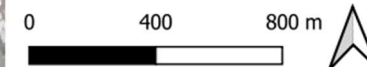
■ North Strathfield

■ Burwood North

■ Five Dock

■ The Bays

*See the Surface Water Monitoring Program
for further details of monitoring sites*



APPENDIX F - SURFACE WATER QUALITY RESULTS

Sydney Metro West - Central Tunnelling Package
Surface Water Monitoring

Rev: 00	Last Updated:	1/08/2022
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LEGEND

Preliminary Trigger Value Exceedance

TABLE 6-4 PELIMINARY TRIGGER VALUES TO MAINTAIN WATER QUALITY OBJECTIVES

Receiving watercourse type (WQO)	Turbidity	pH	Dissolved Oxygen	Oil and grease	Electrical conductivity/Salinity
Aquatic Ecosystem (Estuaries)	0.5–10 NTU	7.0-8.5	80-110%	None visible on surface	Lowland rivers: 125–2200 µS/cm

Field Measurement												
SW Monitoring ID	Date	Monitoring Category	pH	Temp (degrees)	DO (%)	Electrical Conductivity (µS/cm)	Turbidity (NTU)	Visual Inspection (Oil & Grease)	Current Weather Conditions	Rainfall in last 24hrs Sydney (Observatory Hill) (mm)	Rainfall in last 24hrs ydney Olympic Park AWS (Archery Centre) (mm)	Additional Comments
WB-D/S	23/12/2021	Pre-Construction Monitoring	7.08	24.17	140.5	49900	0.1	None	Light rain, no wind	18	1.4	N/A
DC-U/S	17/12/2021	Pre-Construction Monitoring	12.2	21.25	92.7	3610	20.4	None	Overcast conditions, no wind	0	0	Waster was flowing moderately
DC-D/S	17/12/2021	Pre-Construction Monitoring	7.92	23.16	48.9	44700	18.1	None	Overcast conditions, no wind	0	0	Water was flowing slowly, visible debris at the surface (mostly vegetation)
SLP-D/S	17/12/2021	Pre-Construction Monitoring	10.5	21.76	220	46100	10	None	Overcast conditions, no wind	0	0	Water was flowing slowly
PC-U/S	17/12/2021	Pre-Construction Monitoring	8.83	24.82	99.3	2110	43	None	Sunny conditions, no wind	0	0	Water level was very low, water was in a
PC-D/S	17/12/2021	Pre-Construction Monitoring	7.63	24.77	33.5	40400	15.2	None	Overcast conditions, no wind	0	0	Water was flowing slowly
SC-D/S	17/12/2021	Pre-Construction Monitoring	7.42	24.66	17.7	41500	99.6	None	Overcast conditions, moderate wind	0	0	Water was flowing slowly, while testing v
HC-D/S	17/12/2021	Pre-Construction Monitoring	7.89	24.03	53.6	40300	36	None	Overcast conditions, no wind	0	0	Water was flowing slowly
WB-D/S	24/01/2022	Pre-Construction Monitoring	6.85	24	61.6	49200	0	Small streak of visible oil at surface	Overcast conditions, no wind	1.2	0.2	N/A
DC-U/S	24/01/2022	Pre-Construction Monitoring	6.85	23.3	72.3	956	69.3	None	Overcast conditions, no wind	1.2	0.2	N/A
DC-D/S	24/01/2022	Pre-Construction Monitoring	7.15	24.46	66.4	47000	4.3	None	Overcast conditions with very light rainfall, no wind	1.2	0.2	N/A
SLP-D/S	24/01/2022	Pre-Construction Monitoring	7.19	23.99	70.6	39900	1.8	None	Overcast conditions, light wind	1.2	0.2	N/A
PC-U/S	24/01/2022	Pre-Construction Monitoring	7.07	24.31	86.3	1070	19.9	None	Overcast conditions, no wind	1.2	0.2	N/A
PC-D/S	24/01/2022	Pre-Construction Monitoring	7.26	24.72	49.9	30500	4	large streak of visible oil at surface	Sunny conditions with light cloud cover, no wind	1.2	0.2	N/A
SC-D/S	24/01/2022	Pre-Construction Monitoring	7.23	25.14	40.1	21300	8	None	Sunny conditions with light cloud cover, no wind	1.2	0.2	N/A
HC-D/S	24/01/2022	Pre-Construction Monitoring	7.27	25.49	126	38200	4.8	None	Sunny conditions with light cloud cover, moderate wind	1.2	0.2	N/A
WB-D/S	22/02/2022	Pre-Construction Monitoring	6.65	23.54	127.7	44100	1.3	None	overcast conditions, light wind	8.2	5.2	Low water flow
DC-D/S	22/02/2022	Pre-Construction Monitoring	6.66	24.01	57.5	45500	4.2	None	Light rain, moderate wind	8.2	5.2	Low water flow
DC-U/S	22/02/2022	Pre-Construction Monitoring	7.28	22.76	69.6	402	34.7	None	Light rain, no wind	8.2	5.2	Moderate water flow
SLP-D/S	22/02/2022	Pre-Construction Monitoring	6.63	23.45	75.2	43500	8.1	None	Moderate rain, no wind	8.2	5.2	Low water flow, moderate debris
PC-U/S	22/02/2022	Pre-Construction Monitoring	7.29	22.29	86.6	332	58.7	None	Heavy rain, no wind	8.2	5.2	High water flow
PC-D/S	22/02/2022	Pre-Construction Monitoring	7.38	21.29	64.9	283	80.3	None	Heavy rain, light wind	8.2	5.2	Noticably turbid water (for filtered meta
SC-D/S	22/02/2022	Pre-Construction Monitoring	7.45	21.18	64	154	79	None	Heavy rain, light wind	8.2	5.2	Noticably turbid water (for filtered meta
HC-D/S	22/02/2022	Pre-Construction Monitoring	6.68	22.44	47.7	18600	33.1	None	Heavy rain, moderate wind	8.2	5.2	Noticably turbid water (for filtered meta
WB-D/S	24/02/2022	Post-Rainfall Monitoring	8.57	25	125.4	22200	5.9	None	Overcast conditions, moderate wind	44.4	17.4	Post rain event monitoring conducted
WB-D/S	4/03/2022	Post-Rainfall Monitoring	6.34	23.87	106.2	22400	21.1	None	Light sun/overcast conditions, moderate wind, low water flow	19.6	26.8	Post rain event monitoring conducted

DC-D/S	4/03/2022	Post-Rainfall Monitoring	6.53	23.23	56.3	764	14.9	None	Overcast conditions, light wind, low water flow	19.6	26.8	Post rain event monitoring conducted
DC-U/S	4/03/2022	Post-Rainfall Monitoring	6.44	23.22	45.2	515	56.6	None	Overcast conditions, light wind, low water flow	19.6	26.8	Post rain event monitoring conducted
SLP-D/S	4/03/2022	Post-Rainfall Monitoring	6.39	22.96	62.3	718	25.8	None	Overcast conditions, light wind, low water flow	19.6	26.8	Post rain event monitoring conducted
PC-U/S	4/03/2022	Post-Rainfall Monitoring	6.48	23.31	73.8	451	81	None	Overcast conditions, moderate wind, high flow	19.6	26.8	Post rain event monitoring conducted
PC-D/S	4/03/2022	Post-Rainfall Monitoring	6.44	23.43	64.9	611	15.2	None	Sunny conditions with light cloud coverage, light wind, low flow water	19.6	26.8	Post rain event monitoring conducted
SC-D/S	4/03/2022	Post-Rainfall Monitoring	6.57	25.27	79.8	345	39.3	None	Sunny conditions with light cloud coverage, light wind, low flow water	19.6	26.8	Post rain event monitoring conducted
HC-D/S	4/03/2022	Post-Rainfall Monitoring	6.41	23.24	45.9	1740	16.1	None	Light rain, no wind, low flow water	19.6	26.8	Post rain event monitoring conducted
WB-D/S	25/03/2022	Monthly Monitoring	7.11	22.94	128.6	41800	0.3	None	Light rain, Light wind	16.6	20	Tidal flow
DC-D/S	25/03/2022	Monthly Monitoring	7.37	21.79	60.3	12300	21.4	None	Sunny with light cloud coverage, no wind	16.6	20	Low flow
DC-U/S	25/03/2022	Monthly Monitoring	8.19	22.78	116.7	1230	74.2	None	Light cloud cover, no wind	16.6	20	Medium flow. Visible soap/suds being pumped from what appears to be carwash up Parramatta Road
SLP-D/S	25/03/2022	Monthly Monitoring	7.72	22.44	146.6	3530	12.6	large streak of visible oil at surface	Overcast, no wind	16.6	20	Visibly murky, low flow
PC-U/S	25/03/2022	Monthly Monitoring	8.22	22.18	133	1620	36.1	None	Overcast, no wind	16.6	20	Medium Flow, Chloride odour
PC-D/S	25/03/2022	Monthly Monitoring	7.55	22.1	59.2	10500	21.5	None	Overcast, no wind	16.6	20	Visibile debris at surface, low flow
SC-D/S	25/03/2022	Monthly Monitoring	7.52	21.77	31.2	11800	14	None	Overcast, no wind	16.6	20	Visibile debris at surface, low flow
HC-D/S	25/03/2022	Monthly Monitoring	7.46	22.73	83.4	28700	4	None	Overcast, moderate wind	16.6	20	Tidal flow to Parramatta river
WB-D/S	21/04/2022	Monthly Monitoring	8.08	23.07	74.3	47400	0	None	Overcast, moderate wind, light rain	11.6	6.4	Tidal flow
DC-D/S	21/04/2022	Monthly Monitoring	8	21.15	117.7	42800	3.5	None	Overcast, no wind, light rain	11.6	6.4	Tidal flow
DC-U/S	21/04/2022	Monthly Monitoring	8.94	20.26	87.1	434	44.2	None	Light rain, no wind, Overcast	11.6	6.4	Moderate water flow
SLP-D/S	21/04/2022	Monthly Monitoring	7.85	20.6	84.1	4830	55.8	None	Overcast, no wind, light rain	11.6	6.4	Low flow
PC-U/S	21/04/2022	Monthly Monitoring	8.32	19.88	79.6	447	82.8	None	Overcast, no wind, light rain	11.6	6.4	Moderate water flow
PC-D/S	21/04/2022	Monthly Monitoring	7.81	20.08	75.6	19700	25.7	None	Overcast, light wind, no rain	11.6	6.4	Tidal flow
SC-D/S	21/04/2022	Monthly Monitoring	7.84	20.24	75.8	22300	8.1	None	Overcast, light wind, no rain	11.6	6.4	Tidal flow
HC-D/S	21/04/2022	Monthly Monitoring	7.77	21.17	85.5	37200	5.6	None	Light rain, no wind	11.6	6.4	Low flow
WB-D/S	13/05/2022	Post-Rainfall Monitoring	8.63	19.07	77.3	35400	2.9	None	Overcast, light wind, light rain	9	3.4	Tidal flow
DC-D/S	13/05/2022	Post-Rainfall Monitoring	8.65	18.88	92.7	6950	10.6	large streak of visible oil at surface	Overcast, No wind, No rain	9	3.4	Tidal flow
DC-U/S	13/05/2022	Post-Rainfall Monitoring	8.76	19.14	94.6	502	91	None	Overcast, No wind, No rain	9	3.4	Moderate Flow, evidence of dumping within channel - could impact results
SLP-D/S	13/05/2022	Post-Rainfall Monitoring	8.27	19.59	88.1	2320	12.2	None	Overcast, No wind, No rain	9	3.4	Low Flow
PC-U/S	13/05/2022	Post-Rainfall Monitoring	8.66	19.68	105.1	525	78.1	None	Overcast, No wind, No rain	9	3.4	High water flow
PC-D/S	13/05/2022	Post-Rainfall Monitoring	8.64	20.2	120.9	765	87.5	None	Overcast, No wind, No rain	9	3.4	Low flow
SC-D/S	13/05/2022	Post-Rainfall Monitoring	8.49	20.25	96.7	954	40.3	None	Overcast, No wind, No rain	9	3.4	Low flow
HC-D/S	13/05/2022	Post-Rainfall Monitoring	7.88	19.09	65.1	11300	9.9	None	Overcast, light wind, No rain	9	3.4	Tidal Flow
WB-D/S	26/05/2022	Monthly Monitoring	7.59	20.52	69.1	39400	5.3	None	Sunny conditions, No wind	0	0	Tidal flow

DC-D/S	26/05/2022	Monthly Monitoring	7.76	18.39	94.3	10800	17.6	None	Sunny conditions, No wind	0	0	Tidal flow, Visible Debris on surface of water
DC-U/S	26/05/2022	Monthly Monitoring	8.65	19.45	127.1	623	59.9	None	Sunny conditions, No wind	0	0	Moderate water flow
SLP-D/S	26/05/2022	Monthly Monitoring	7.76	20.19	72	4220	4.5	large streak of visible oil at surface	Sunny conditions, No wind	0	0	Low flow
PC-U/S	26/05/2022	Monthly Monitoring						None	Sunny conditions, No wind	0	0	Water level to low to sample
PC-D/S	26/05/2022	Monthly Monitoring	7.86	21.28	96.4	17300	7.3	Small shean on surface	Sunny conditions, No wind	0	0	Low flow
SC-D/S	26/05/2022	Monthly Monitoring	7.58	20.14	41.8	22000	5.2	None	Sunny conditions, No wind	0	0	Low flow
HC-D/S	26/05/2022	Monthly Monitoring	7.88	19.23	94.6	34200	2	None	Sunny conditions, No wind	0	0	Tidal flow
WB-D/S	6/06/2022	Monthly Monitoring	8.22	17.85	93.5	44900	3.4	None	Sunny conditions with high wind	0.8	0.2	Tidal flow
DC-D/S	6/06/2022	Monthly Monitoring	7.89	13.65	108.9	47900	1.9	Multiple large streaks visible on water surface	Sunny conditions with high wind	0.8	0.2	Tidal flow
DC-U/S	6/06/2022	Monthly Monitoring	8.86	13.81	129.5	948	6	None	Sunny conditions with moderate wind	0.8	0.2	Low flow
SLP-D/S	6/06/2022	Monthly Monitoring	8.13	13.8	118.2	39700	5.8	None	Sunny conditions with moderate wind	0.8	0.2	Low flow
PC-U/S	6/06/2022	Monthly Monitoring						None	Sunny conditions with moderate wind	0.8	0.2	Water level to low to sample
PC-D/S	6/06/2022	Monthly Monitoring	7.57	12.34	64.7	30400	0.9	None	Sunny conditions with moderate wind	0.8	0.2	Tidal flow
SC-D/S	6/06/2022	Monthly Monitoring	7.56	12.6	68	26900	2.7	None	Sunny conditions with moderate wind	0.8	0.2	Tidal flow
HC-D/S	6/06/2022	Monthly Monitoring	7.85	13.4	131.6	42600	0.3	None	Sunny conditions with moderate wind	0.8	0.2	Tidal flow

APPENDIX G - GROUNDWATER MONITORING LOCATIONS



Sydney Metro West - CTP

Tunnel North West of SOP

Legend

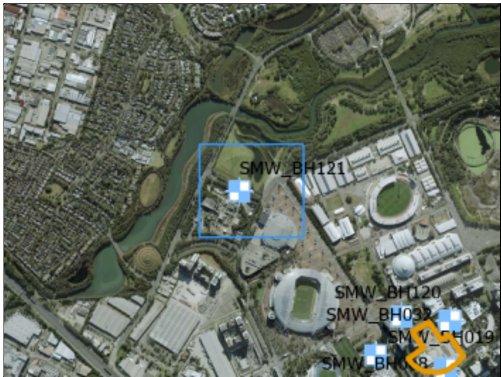
CONSTRUCTION

Site Schedule Boundary / EPL



MONITORING

Groundwater Wells



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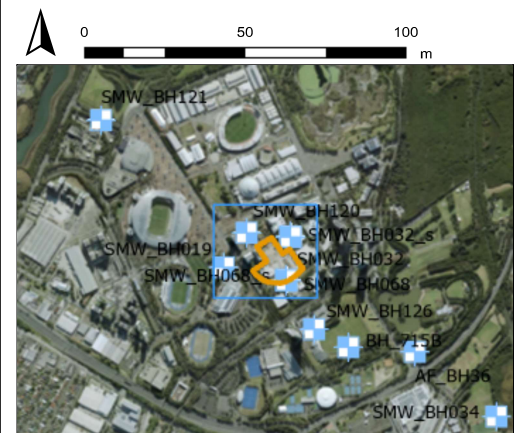


Sydney Metro West - CTP

Sydney Olympic Park

Legend


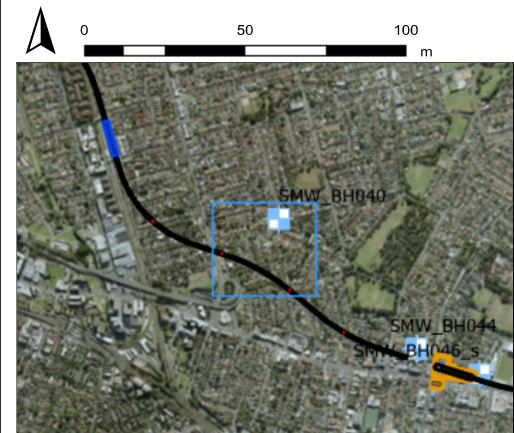
-  Site Schedule Boundary / EPL
- MONITORING**
-  Groundwater Wells



This map is shown for reference purposes only, Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.



Tunnel - NST to BWD

 Site Schedule Boundary / EPL Groundwater Wells

This map is shown for reference purposes only. Acciona Ferrovia JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovia JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.





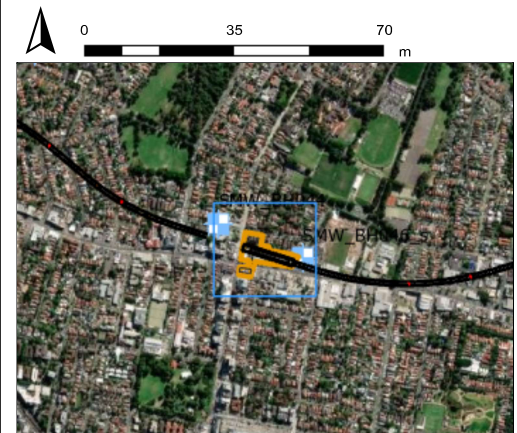


Sydney Metro West - CTP

Burwood North

Legend

-  Site Schedule Boundary / EPL
- MONITORING**
-  Groundwater Wells



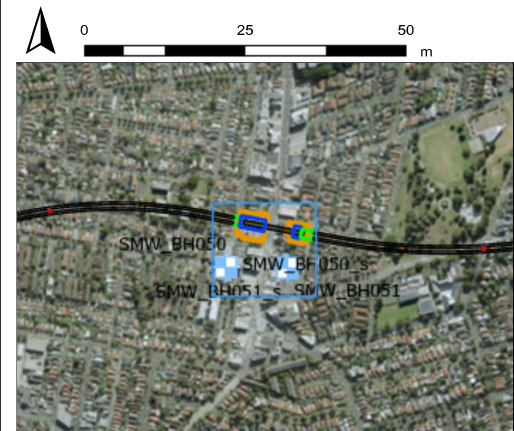
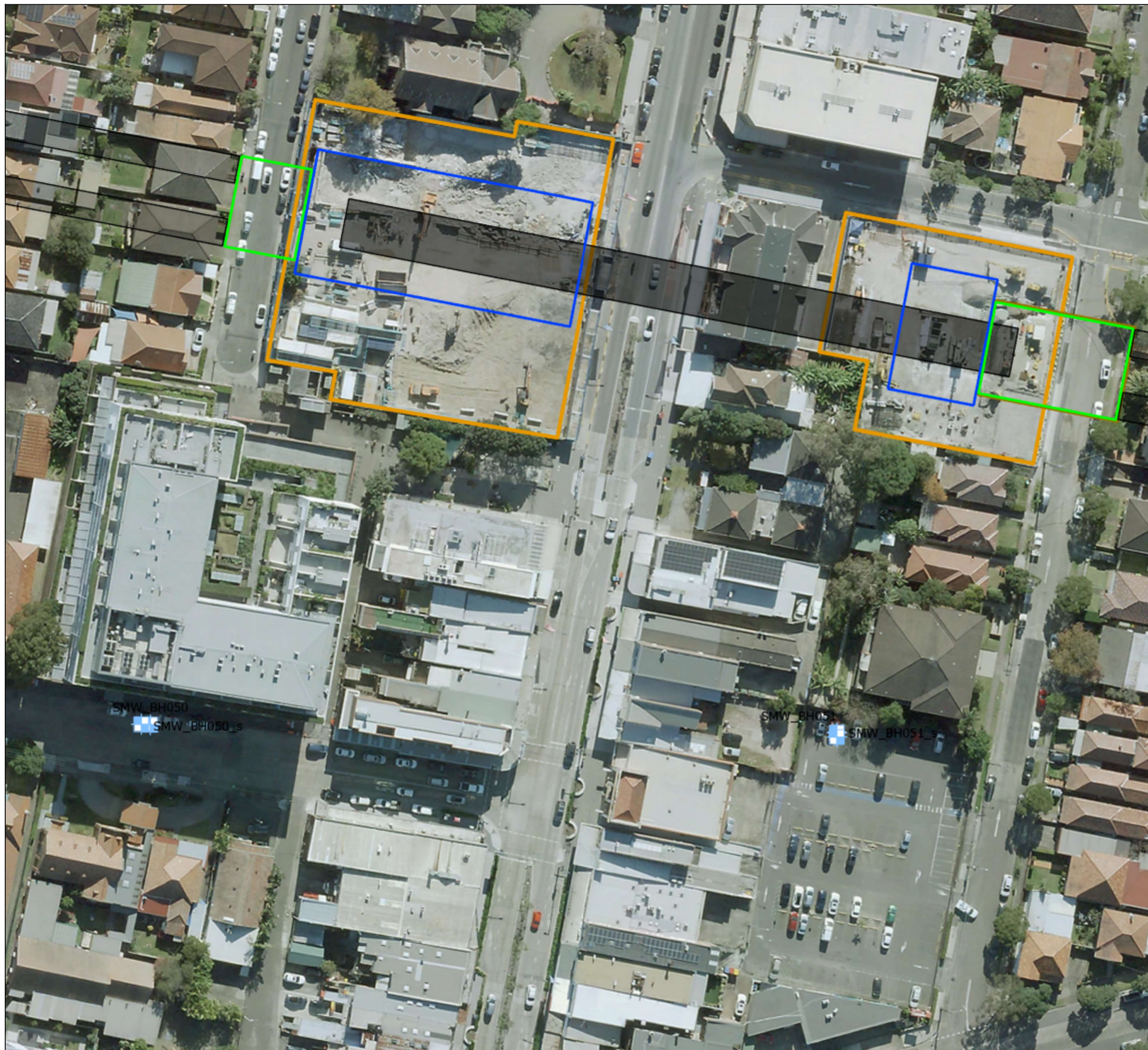
This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.



Five Dock

Legend

- Site Schedule Boundary / EPL
- MONITORING**
- Groundwater Wells





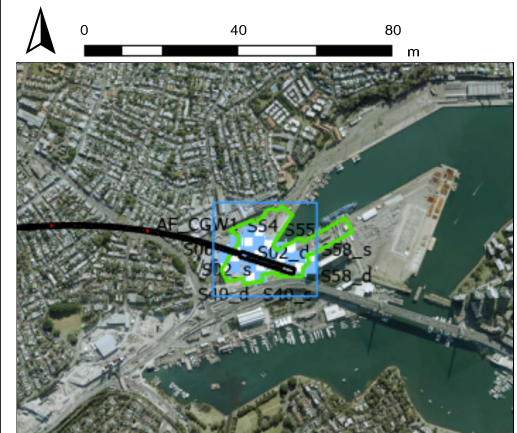
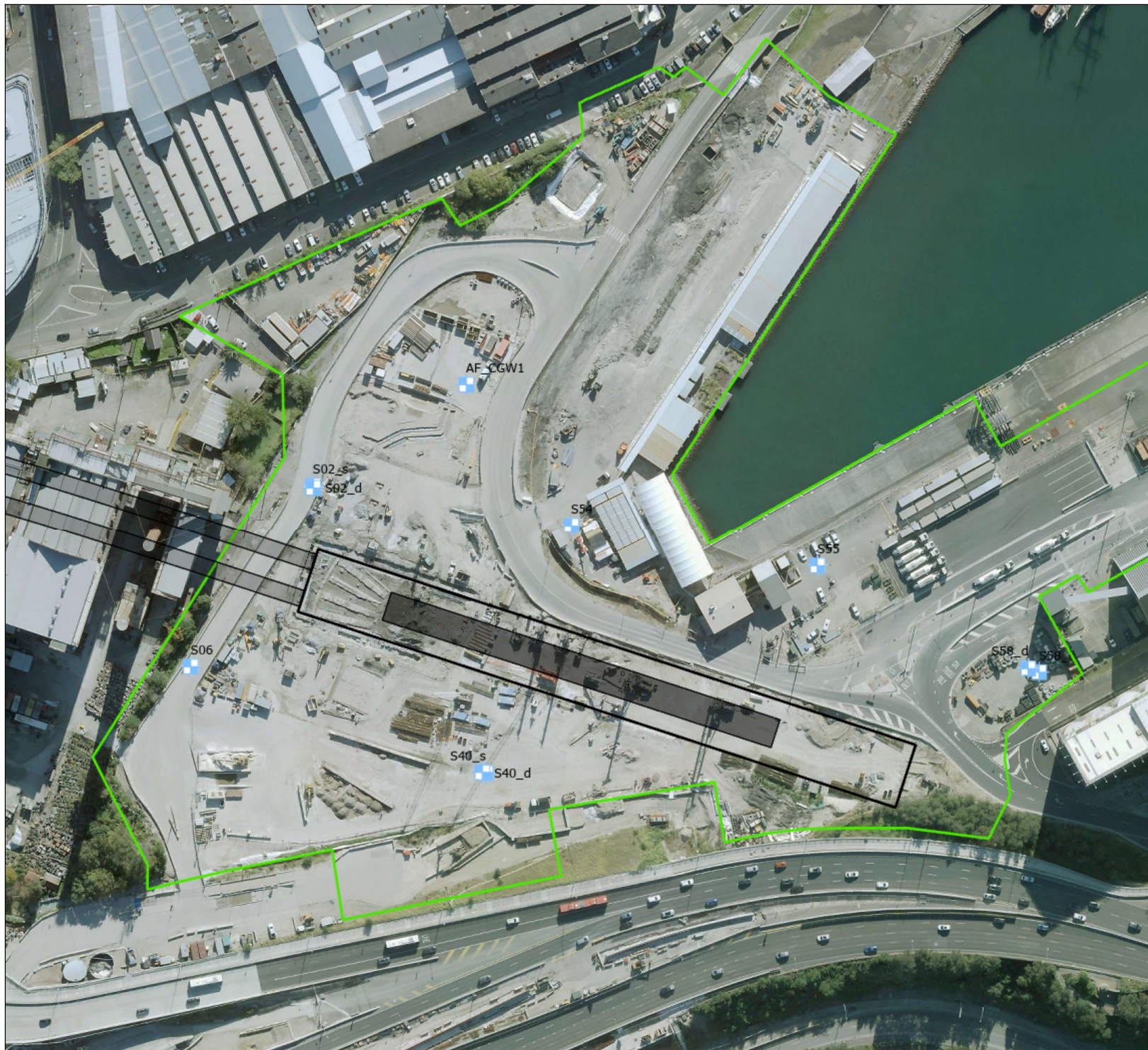
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The Bays

Legend

-  Site Schedule Boundary / EPL
- MONITORING**
-  Groundwater Wells



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APPENDIX H - GROUNDWATER MONITORING DATA

	Alkalinity		Major Ions									Physical Parameters		Inorganics										Metals															
	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Sulfate as SO4 - Turbidimetric (Filtered)	Calcium (Filtered)	Chloride	Magnesium (Filtered)	Potassium (Filtered)	Sodium (Filtered)	Anions Total	Cations Total	Ionic Balance	Total Dissolved Solids	Ammonia (as N)	Nitrate (as N)	Nitrite (as N)	Total Kjeldahl Nitrogen	Phosphorus (as P)	Nitrogen (Total)	Arsenic	Arsenic (Filtered)	Cadmium	Cadmium (Filtered)	Chromium	Chromium (Filtered)	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Lead (Filtered)	Mercury	Mercury (Filtered)	Nickel	Nickel (Filtered)	Zinc	Zinc (Filtered)			
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
EQ	1	1	1	1	1	1	1	1	0.01	0.01	0.01	10	0.01	0.01	0.01	0.1	mg/L	100	1	1	0.1	0.1	1	1	1	1	50	50	1	1	0.1	0.1	1	1	5	5			
ANZG (2018) Marine Water - Slightly to moderately disturbed ecosystems																																							
NHMRC (2008) Recommended Recreational Guidelines - Aesthetic					2500 ^{#3}			1800 ^{#3}				6000 ^{#3}																											
NHMRC (2008) Recommended Recreational Guidelines - Health					2500 ^{#4}														100 ^{#5}	100 ^{#5}	20 ^{#5}	20 ^{#5}	500 ^{#6}	500 ^{#6}	20000 ^{#5}	20000 ^{#5}	3000 ^{#3}	3000 ^{#3}	100 ^{#5}	100 ^{#5}	10 ^{#5}	10 ^{#5}	200 ^{#5}	200 ^{#5}	30000 ^{#3}	30000 ^{#3}			

LocCode	Field_ID	Sample_Type	Sampled_Date-Time	98	142	274	4	566	2	13	456	24.5	20.5	8.83	1350	1.48	<0.01	0.26	3.8	-	3900	-	17	-	<0.1	-	<1	-	2	-	-	-	<1	-	<0.1	-	4	-	<5
BUR_BH125	BUR_BH125	Normal	21/01/2022	<1	695	518	87	2310	125	27	1510	89.8	81	5.17	4910	0.41	0.02	<0.01	2.6	-	2600	-	13	-	0.4	-	<1	-	4	-	60	-	<1	-	<0.1	-	28	-	15
BUR_MW108	BUR-MW108	Normal	20/01/2022	<1	270	126	15	767	24	28	554	29.6	27.5	3.7	2550	0.29	0.04	<0.01	4.6	-	4600	-	1	-	<0.1	-	<1	-	2	-	440	-	<1	-	<0.1	-	2	-	<5
S02	S02_d	Normal	20/01/2022	<1	418	102	26	457	30	33	376	23.4	21	5.42	1280	0.57	0.02	<0.01	1	-	1000	-	2	-	<0.1	-	<1	-	2	-	13,400	-	<1	-	<0.1	-	2	-	<5
S06	S06	Normal	20/01/2022	<1	70	680	325	8110	459	77	3640	244	214	6.55	15,000	1.07	<0.1	<0.1	2.2	-	2200	-	1	-	<0.1	-	<1	-	5	-	330,000	-	<1	-	<0.1	-	80	-	<5
S40_D	S40_d	Normal	19/01/2022	<1	205	64	77	48	9	12	35	6.78	6.41	2.8	446	0.04	0.46	0.03	0.3	-	800	-	<1	-	0.3	-	<1	-	11	-	320	-	<1	-	<0.1	-	7	-	287
S40_S	S40_s	Normal	20/01/2022	<1	700	6	150	44	49	23	67	15.4	15	1.09	831	4.75	<0.1	<0.1	6.8	-	6800	-	65	-	<0.1	-	<1	-	<1	-	19,100	-	<1	-	<0.1	-	<1	-	<5
S51	S51	Normal	20/01/2022	<1	59	334	105	4650	279	90	2060	139	120	7.4	8360	0.64	<0.1	<0.1	3.9	-	3900	-	2	-	<0.1	-	<1	-	6	-	51,500	-	<1	-	<0.1	-	2	-	6
S54	S54	Normal	20/01/2022	<1	855	1	416	6510	365	43	2700	201	169	8.48	11,700	4.61	0.02	<0.01	6.3	-	6300	-	<1	-	<0.1	-	<1	-	2	-	5780	-	<1	-	<0.1	-	2	-	13
SMW_BH019	SMW_BH019	Normal	19/01/2022	<1	856	2	411	6580	358	43	2650	203	166	9.87	11,800	4.76	0.02	<0.01	6.4	-	6400	-	<1	-	<0.1	-	<1	-	2	-	5770	-	<1	-	<0.1	-	1	-	14
SMW_BH019	T01-220119	Interlab_D	19/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	0.08	5600	4	-	<0.2	-	7	-	16	-	11,000	-	5	-	<0.1	-	9	-	50	-
SMW_BH035	SMW_BH035	Normal	18/01/2022	<1	568	10	509	5610	364	45	2600	170	170	0.06	11,600	5.59	0.08	<0.01	8.2	-	8300	-	<1	-	<0.1	-	<1	-	4	-	340	-	<1	-	<0.1	-	26	-	30
SMW_BH035_S	SMW_BH035_S	Normal	18/01/2022	<1	131	500	63	1070	58	9	814	43.2	43.6	0.4	4260	0.18	0.06	<0.01	17.1	-	17,200	-	<1	-	<0.1	-	<1	-	1	-	4800	-	<1	-	<0.1	-	105	-	456
SMW_BH038	SMW_BH038	Normal	17/01/2022	163	208	291	272	836	<1	10	514	33.8	36.2	3.41	2430	0.61	<0.01	1.01	0.9	-	1900	-	<1	-	<0.1	-	14	-	<1	-	<50	-	<1	-	<0.1	-	<1	-	<5
SMW_BH051	SMW_BH051	Normal	18/01/2022	<1	149	421	24	1630	85	18	1130	57.7	57.8	0.07	4100	0.19	0.06	<0.01	0.7	-	800	-	<1	-	<0.1	-	<1	-	2	-	530	-	<1	-	<0.1	-	80	-	164
SMW_BH120	SMW_BH120	Normal	19/01/2022	<1	673	501	247	6750	474	51	3360	214	199	3.75	12,300	1.66	0.02	<0.01	2.3	-	2300	-	<1	-	<0.1	-	<1	-	<1	-	1990	-	<1	-	<0.1	-	<1	-	<5

Statistical Summary				15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	16	1	16	1	15	1	15	1	15	1	15	1	14	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1
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Env Stds Comments

#1: Apply LOSP 99

#2: Apply LOSP 95

#3: NHMRC (2011) Drinking Water Guidelines [2016] Aesthetic

#4: Health Canada (2014) Guidelines for Canadian Drinking Water Quality

#5: NHMRC (2011) Drinking Water Guidelines [2016] Health

#6: WHO (2011) Drinking Water Quality

	Naphthalene		TRH - Semivolatile Fraction										TRH Volatiles/BTEX										BTEX		Metals																			
	Naphthalene	>C10 - C16 Fraction	>C10 - C16 Fraction minus Naphthalene (F2)										>C10 - C16 Fraction minus BTEX (F1)										Total MAH																					
			>C10 - C16 Fraction (sum)		>C16 - C34 Fraction	>C34 - C40 Fraction	>C40 - C14 Fraction	>C10 - C36 Fraction (sum)	>C10 - C28 Fraction	>C28 - C36 Fraction	Toluene	Total Xylenes	Benzene	>C6 - C10 Fraction	>C6 - C10 Fraction minus BTEX (F1)	>C6 - C9 Fraction	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Sum of BTEX	Total MAH	Arsenic (Filtered)		Cadmium (Filtered)	Calcium	Calcium (Filtered)	Chromium (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Iron	Iron (Filtered)	Lead (Filtered)	Magnesium	Magnesium (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Phosphorus	Potassium	Potassium (Filtered)	Zinc (Filtered)	Manganese (Filtered)			
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L					
EQL	1	50	50	100	100	100	50	50	100	50	180 ⁶²	950 ⁶²		80 ⁶²	350 ⁶²		13 ⁶²	124 ⁶²	0.2 ⁶²			1	0.1		1	1	1	50	50		1	0.1												
ANZG (2018) Freshwater - Slightly to moderately disturbed ecosystems	16 ⁶²										180 ⁶²	950 ⁶²		80 ⁶²	350 ⁶²		13 ⁶²	124 ⁶²	0.2 ⁶²						1 ⁶²	13.3 ⁶⁴	1.4 ⁶⁴	1.4 ⁶²			3.4 ⁶²		0.06 ⁶¹	11 ⁶²					8 ⁶²	1900 ⁶²				
ANZG (2018) Marine Water - Slightly to moderately disturbed ecosystems	50 ⁶¹										180 ⁶²	500 ⁶¹		80 ⁶²	350 ⁶²				0.7 ⁶¹							4.4 ⁶²	27 ⁶²	1 ⁶²	1.3 ⁶²			4.4 ⁶²		0.1 ⁶¹	7 ⁶¹					15 ⁶²	80 ⁶⁴			
NEPM (1999) HSL A&B Residential - Clay 2 to <4 m	NL			NL							NL	NL	5000	NL	NL																													
NEPM (1999) HSL A&B Residential - Clay 4 to <8 m	NL			NL							NL	NL	5000	NL	NL																													
NEPM (1999) HSL A&B Residential - Clay 8 m+	NL			NL							NL	NL	5000	NL	NL																													
NHMRC (2008) Recommended Recreational Guidelines - Aesthetic																																												
NHMRC (2008) Recommended Recreational Guidelines - Health	700 ^{61,1}										8000 ⁶⁹	6000 ⁶⁹	10 ⁶⁹		3000 ⁶⁹								100 ⁶⁹	20 ⁶⁹		500 ^{61,1}	20000 ⁶⁹	3000 ⁶⁷	3000 ⁶⁷		100 ⁶⁹		10 ⁶⁹	200 ⁶⁹				30000 ⁶⁷	5000 ⁶⁹					

Field_ID	Sampled_Date-Time	Lab_Report_Number	Sample_Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Statistical Summary

Number of Results	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	1	10	10	1	1	9	10	5	10	6	9	10	1	9	10	10	1	1	9	10	5
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	9	2	4	5	6	8	0	1	8	0	8	1	1	9	8	4	
Minimum Concentration	<1	<50	<50	<100	<100	<100	<50	<50	<100	<50	<1	<2	<1	<20	<20	<20	<1	<2	<1	<1	<0.003	<1	<0.1	25	27	<1	<1	<1	320	<50	<1	84	<1	<0.1	<1	0.02	20	8	<5	<1			
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	0.4	25	27	1	3	1	320	70	ND	84	47	ND	2	0.02	20	8	5	177	
Maximum Concentration	<1	<100	<100	<100	<100	<100	<50	<100	<100	<100	<2	<3	<1	<20	<20	<20	<2	<2	<2	<1	<0.003	19	0.4	25	568	19	127	3	15200	266000	<1	84	401	<0.1	85	0.02	20	90	486	47000			
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19	0.4	25	568	19	127	3	15200	266000	ND	84	401	ND	85	0.02	20	90	486	47000	
Average Concentration	0.5	48	48	50	50	50	25	28	50	28	0.95	1.1	0.5	10	10	10	0.95	1	0.5	219	0.09		2.4	70	1.3	4595	36811	0.5		177	0.05	35			36	93	19974						
Median Concentration	0.5	50	50	50	50	50	25	25	50	25	1	1	0.5	10	10	10	1	1	1	0.5	0.0015	0.5	0.05	25	159	0.5	95	0.75	1485	880	0.5	84	74	0.05	32.5	0.02	20	22	24.5	6090			
Standard Deviation	0	7.9	7.9	0	0	0	0	7.9	0	7.9	0.16	0.16	0	0	0	0	0.16	0	0.16	0			5.8	0.11		185	5.8	64	0.92	6092	87429	0		158	0	35			30	149	24612		
Number of Guideline Exceedances	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	4	2	4	0	0	0	0	10	6	0	0	6	4		
Number of Guideline Exceedances(Detects Only)	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	4	2	4	0	0	0	0	6	0	0	0	6	4		

Env Stds Comments

- #1:Apply LOSP 99
#2:Apply LOSP 95
#3:Apply LOSP 95; 'Grading' guideline values published in the report Updating nitrate toxicity effects on freshwater aquatic species
#4:Apply LOSP Unknown
#5:Apply Freshwater DGV (LOSP Unknown)
#6:Apply Freshwater LOSP Unknown
#7:NHMRC (2011) Drinking Water Guidelines [2016] Aesthetic
#8:US EPA (2012) Health Advisories for Drinking Water Contaminants
#9:NHMRC (2011) Drinking Water Guidelines [2016] Health
#10:Health Canada (2014) Guidelines for Canadian Drinking Water Quality
#11:EPHC (2008) Australian Guidelines for Water Recycling - Drinking Water
#12:NHMRC (2011) Drinking Water Guidelines Health (Ver. 3.5)
#13:California EPA (2014) Public Health Goals for Drinking Water
#14:WHO (2011) Drinking Water Quality
#15:WHO (2020) Trichloroethene in drinking-water: Background document for development of WHO Guidelines for drinking-water quality. WHO/HEP/ECH/WSH/2020.10

Data Comments

- #1 Reported Analyte LOR is higher than Requested Analyte LOR

Locality by PC Title	MNA							Nitrite and Nitrate as N		Total Phosphorus	Inorganics						
	Carbonate Alkalinity as CaCO ₃	Bicarbonate Alkalinity as CaCO ₃	Ferrous Iron - Fe ²⁺	Methane	Sulphate	TDS	Ammonia as N	Nitrate (as N)	Nitrite + Nitrate as N	Total Phosphorus as P	Alkalinity (Hydroxide) as CaCO ₃	Alkalinity (total) as CaCO ₃	Anions Total	Cations Total	Chloride	Ionic Balance	Sodium (Filtered)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L
EQL	1	1	0.05	0.01		10	0.01	0.01	0.01	0.01	1	1	0.01	0.01	1	0.01	0.5
ANZG (2018) Freshwater - Slightly to moderately disturbed ecosystems								2.4 ^{#1}									
ANZG (2018) Marine Water - Slightly to moderately disturbed ecosystems																	
NHMRC (2008) Recommended Recreational Guidelines - Aesthetic					2500 ^{#5}	6000 ^{#5}									2500 ^{#5}		1800 ^{#5}
NHMRC (2008) Recommended Recreational Guidelines - Health					5000 ^{#6}										2500 ^{#6}		
Slightly to Moderately Disturbed Discharge Criteria for Estuarine Water										0.025 ^{#10}							

LocCode	Field_ID	Sampled_Date	Lab_Report	<1	45	295	-	-	15,500	0.85	<0.01	<0.01	0.19	<1	45	202	195	6560	1.83	3350
S40_S	S40_S	14-Mar-22	ES2208954	<1	684	21.5	-	-	716	4	0.02	0.02	0.58	<1	684	15.6	15.7	55	0.44	55
S51	S51	14-Mar-22	ES2208954	<1	40	52.6	-	-	8540	0.73	<0.01	<0.01	1.52	<1	40	119	114	3930	2.02	1950
S54	S54	14-Mar-22	ES2208954	<1	51	51.7	-	-	8530	0.75	<0.01	<0.01	1.49	<1	51	120	115	3960	2.18	1970
S54	T01_20220314	14-Mar-22	878151	<10	<20	-	-	1800	9000	1.1	<0.02	-	-	<20	<20	-	-	3900	-	1900
SMW_BH019	SMW_BH019	15-Mar-22	ES2209170	<1	75	0.1	0.01	-	168	0.08	0.13	0.16	0.76	<1	75	3.17	2.16	12	19	16
SMW_BH035	SMW_BH035	16-Mar-22	ES2209368	<1	649	-	-	-	11,800	1.7	0.61	0.61	1.11	<1	649	172	150	5650	7	2190
SMW_BH035_S	SMW_BH035_S	16-Mar-22	ES2209368	<1	242	-	-	-	845	0.02	0.04	0.04	0.44	<1	242	10.5	10.5	52	0.11	200
SMW_BH038	SMW_BH038	15-Mar-22	ES2209170	<1	198	0.05	-	-	4600	1.92	<0.01	<0.01	<0.02	<1	198	70.5	66.4	2150	2.95	1180
SMW_BH051	SMW_BH051	15-Mar-22	ES2211288	<1	57	0.05	-	-	398	1.24	-	0.25	0.25	<1	57	6.7	6.16	170	4.26	108
SMW_BH051_S	SMW_BH051_S	15-Mar-22	ES2211288	<1	56	0.3	-	-	388	0.01	-	0.16	0.02	<1	56	5.29	5.4	63	1.04	28
Sub-W1	Sub-W1	16-Mar-22	ES2209368	<1	775	-	<0.01	-	2750	0.25	0.14	0.14	0.51	<1	775	42.7	40.1	538	3.16	727

Statistical Summary

Number of Results	12	12	8	2	1	12	12	10	11	11	12	12	11	11	12	11	12
Number of Detects	0	11	8	1	1	12	12	5	7	10	0	11	11	11	12	11	12
Minimum Concentration	<1	<20	0.05	<0.01	1800	168	0.01	<0.01	<0.01	<0.02	<1	<20	3.17	2.16	12	0.11	16
Minimum Detect	ND	40	0.05	0.01	1800	168	0.01	0.02	0.02	0.02	ND	40	3.17	2.16	12	0.11	16
Maximum Concentration	<10	775	295	0.01	1800	15500	4	0.61	0.61	1.52	<20	775	202	195	6560	19	3350
Maximum Detect	ND	775	295	0.01	1800	15500	4	0.61	0.61	1.52	ND	775	202	195	6560	19	3350
Average Concentration	0.88	240	53			5270	1.1	0.097	0.13	0.63	1.3	240	70	65	2253	4	1140
Median Concentration	0.5	66	10.9	0.0075	1800	3675	0.8	0.015	0.04	0.51	0.5	66	42.7	40.1	1344	2.18	953.5
Standard Deviation	1.3	288	101			5251	1.1	0.19	0.18	0.54	2.7	288	73	68	2437	5.3	1116
Number of Guideline Exceedances	0	0	0	0	0	5	0	0	0	9	0	0	0	0	5	0	5
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	5	0	0	0	9	0	0	0	0	5	0	5

Env Stds Comments

- #1:Apply LOSP 95; 'Grading' guideline values published in the report Updating nitrate toxicity effects on freshwater aquatic species
- #2:Apply LOSP 95
- #3:Apply LOSP Unknown
- #4:Apply LOSP 99
- #5:NHMRC (2011) Drinking Water Guidelines [2016] Aesthetic
- #6:Health Canada (2014) Guidelines for Canadian Drinking Water Quality
- #7:NHMRC (2011) Drinking Water Guidelines [2016] Health
- #8:WHO (2011) Drinking Water Quality
- #9:EPHC (2008) Australian Guidelines for Water Recycling - Drinking Water
- #10:Lowland Rivers
- #11:Estuaries
- #12:ANZECC (2000). Applied Canadian Value
- #13:99% species protection is recommended to account for bioaccumulation
- #14:Recommended for slightly to moderately disturbed ecosystems (to protect key species from chronic toxicity,95% protection).

					Metals																
	Sulfate as SO4 - Turbidimetric (Filtered)	Kjeldahl Nitrogen Total			Nitrite (as N)	Nitrogen (Total)	Arsenic (Filtered)	Cadmium (Filtered)	Calcium (Filtered)	Chromium (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Magnesium (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Phosphorus	Potassium (Filtered)	Zinc (Filtered)	Aluminium (Filtered)	Selenium (Filtered)
	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L
EQL	1	0.1	0.01	100	1	0.1	0.5	1	1	50	1	0.5	0.1	1			0.5	5	10	10	10
ANZG (2018) Freshwater - Slightly to moderately disturbed ecosystems					13 ^{#2} / 24 ^{#2}	0.2 ^{#2}		1 ^{#2} / 3.3 ^{#3}	1.4 ^{#2}		3.4 ^{#2}		0.06 ^{#4}	11 ^{#2}				8 ^{#2}	0.8 ^{#3} / 55 ^{#2}	5 ^{#4}	
ANZG (2018) Marine Water - Slightly to moderately disturbed ecosystems						0.7 ^{#4}		4.4 ^{#2} / 27 ^{#2}	1.3 ^{#2}		4.4 ^{#2}		0.1 ^{#4}	7 ^{#4}				15 ^{#2}			
NHMRC (2008) Recommended Recreational Guidelines - Aesthetic										3000 ^{#5}								30000 ^{#5}			
NHMRC (2008) Recommended Recreational Guidelines - Health					100 ^{#7}	20 ^{#7}		500 ^{#8}	20000 ^{#7}		100 ^{#7}		10 ^{#7}	200 ^{#7}						2000 ^{#9}	100 ^{#7}
Slightly to Moderately Disturbed Discharge Criteria for Estuarine Water				350 ^{#11}	13	0.2			1.3	300 ^{#12}	3.4		0.06 ^{#13}	7 ^{#14}				8			

LocCode	Field_ID	Sampled_Date	Lab_Report																			
S40_S	S40_S	14-Mar-22	ES2208954	790	1.2	<0.01	1200	1	<0.1	309	<1	<1	243,000	<1	390	<0.1	81	-	74	<5	20	<10
S51	S51	14-Mar-22	ES2208954	17	5	<0.01	5000	80	<0.1	183	<1	<1	16,900	<1	44	<0.1	1	-	22	<5	10	<10
S54	D01_2020314	14-Mar-22	ES2208954	344	4	<0.01	4000	2	<0.1	125	<1	<1	40,600	<1	254	<0.1	5	-	84	<5	90	<10
S54	S54	14-Mar-22	ES2208954	366	3.7	<0.01	3700	2	<0.1	125	<1	<1	41,000	<1	257	<0.1	5	-	83	<5	70	<10
S54	T01_20220314	14-Mar-22	878151	-	-	-	900	2	<0.2	120	<1	<1	5000	<1	260	<0.1	5	0.9	87	<5	-	-
SMW_BH019	SMW_BH019	15-Mar-22	ES2209170	64	1	0.03	1200	27	<0.1	18	<1	4	-	<1	5	<0.1	4	-	6	16	-	-
SMW_BH035	SMW_BH035	16-Mar-22	ES2209368	11	5.8	<0.01	6400	1	<0.1	561	<1	1	2010	<1	312	<0.1	21	-	41	26	<10	<10
SMW_BH035_S	SMW_BH035_S	16-Mar-22	ES2209368	201	0.9	<0.01	900	<1	<0.1	26	<1	5	80	<1	5	<0.1	5	-	4	23	140	<10
SMW_BH038	SMW_BH038	15-Mar-22	ES2209170	282	1.8	0.02	1800	4	<0.1	114	<1	6	-	<1	108	<0.1	2	-	21	<5	-	-
SMW_BH051	SMW_BH051	15-Mar-22	ES2211288	37	7.1	0.36	7400	<1	<0.1	14	<1	2	-	<1	8	<0.1	10	-	4	51	-	-
SMW_BH051_S	SMW_BH051_S	15-Mar-22	ES2211288	115	0.2	0.01	400	<1	<0.1	52	<1	2	-	<1	19	<0.1	6	-	1	62	-	-
Sub-W1	Sub-W1	16-Mar-22	ES2209368	579	2.4	<0.01	2500	<1	<0.1	77	<1	2	<50	<1	52	<0.1	9	-	14	<5	<10	<10

Statistical Summary

Number of Results	11	11	11	12	12	12	12	12	12	8	12	12	12	12	1	12	12	7	7
Number of Detects	11	11	4	12	8	0	12	0	7	7	0	12	0	12	1	12	5	5	0
Minimum Concentration	11	0.2	<0.01	400	<1	<0.1	14	<1	<1	<50	<1	5	<0.1	1	0.9	1	<5	<10	<10
Minimum Detect	11	0.2	0.01	400	1	ND	14	ND	1	80	ND	5	ND	1	0.9	1	16	10	ND
Maximum Concentration	790	7.1	0.36	7400	80	<0.2	561	<1	7	243000	<1	390	<0.1	81	0.9	87	62	140	<10
Maximum Detect	790	7.1	0.36	7400	80	ND	561	ND	7	243000	ND	390	ND	81	0.9	87	62	140	ND
Average Concentration	255	3	0.041	2950	10	0.054	144	0.5	2.5	43577	0.5	143	0.05	13		37	16	49	5
Median Concentration	201	2.4	0.005	2150	1.5	0.05	117	0.5	1.5	10950	0.5	80	0.05	5	0.9	21.5	2.5	20	5
Standard Deviation	252	2.3	0.11	2338	23	0.014	155	0	2.4	82377	0	141	0	22		35	21	53	0
Number of Guideline Exceedances	0	0	0	12	2	0	0	0	6	6	0	0	12	4	0	0	5	3	7
Number of Guideline Exceedances(Detects Only)	0	0	0	12	2	0	0	0	6	6	0	0	0	4	0	0	5	3	0

Env Stds Comments

- #1:Apply LOSP 95; 'Grading' guideline values published in the report Upda
- #2:Apply LOSP 95
- #3:Apply LOSP Unknown
- #4:Apply LOSP 99
- #5:NHMRC (2011) Drinking Water Guidelines [2016] Aesthetic
- #6:Health Canada (2014) Guidelines for Canadian Drinking Water Quality
- #7:NHMRC (2011) Drinking Water Guidelines [2016] Health
- #8:WHO (2011) Drinking Water Quality
- #9:EPHC (2008) Australian Guidelines for Water Recycling - Drinking Water
- #10:Lowland Rivers
- #11:Estuaries
- #12:ANZECC (2000). Applied Canadian Value
- #13:99% species protection is recommended to account for bioaccumulat
- #14:Recommended for slightly to moderately disturbed ecosystems (to pr

Sample	Date Sampled	Type of sample	Date extracted	Date analysed	Arsenic	Cadmium	Chromium	Copper	Cobalt	Mercury	Manganese	Nickel	Lead	Zinc	Iron	Phosphorus	Ammonia as N in water	Nitrate as N in water	Total Nitrogen in water
Unit					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L
S51	06/05/2022	Water	09/05/2022	10/05/2022	93	<0.1	<1	<1	-	<0.05	-	15	<1	11	27	0.6	4.5	0.005	4.7
S54	06/05/2022	Water	09/05/2022	10/05/2022	2	<0.1	<1	<1	-	<0.05	-	58	<1	18	52	0.1	0.79	0.006	0.9
S54	25/05/2022	Water	27/05/2022	28/05/2022	3	<0.1	35	45	4	0.1	950	15	85	20	44000	0.2	1.8	<0.005	2.1
S54-R01	25/05/2022	Water	27/05/2022	28/05/2022	-	<0.1	<1	<1	<1	<0.05	<5	<1	<1	<1	<10	-	-	-	-
S55	25/05/2022	Water	27/05/2022	28/05/2022	2	<0.1	3	4	<1	<0.05	9	1	1	9	280	0.06	0.006	0.5	0.8

	TRIGGER LEVELS ADOPTED
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APPENDIX I HISTORICAL GROUNDWATER GAUGING DATA

CTP - Groundwater Level Monitoring

ID	Gauging Date	Site Identification	TOC Elevation (mAHD)	Ground Surface Elevation (mAHD)	Total Measured Depth (mbTOC)	Depth to LNAPL (mbTOC)	Depth to Water (mbTOC)	Corrected Depth to Water (mbgl)	Water Elevation (mAHD)	Comments
SMW_BH044	18/01/2022	Burwood	22.6	22.6	-	-	-	-	-	Unable to be accessed, car parked over well (Note left on car, but no response)
SMW_BH044	21/02/2022	Burwood	22.6	22.6	32.55	-	7.734	7.734	14.866	Car over majority of well. Clear, no odour
SMW_BH044	20/06/2022	Burwood	22.6	22.6	32.5	-	7.9	7.9	14.7	No odour
SMW_BH046	18/01/2022	Burwood	6.47	6.47	-	-	-	-	-	Lost/destroyed. Construction works likely paved over well
SMW_BH046	17/02/2022	Burwood	6.47	6.47	-	-	-	-	-	Lost/destroyed
SMW_BH046_s	18/01/2022	Burwood	6.47	6.47	2.887	-	1.702	1.702	4.768	Data logger and tubing in well, no odour
SMW_BH046_s	17/02/2022	Burwood	6.47	6.47	2.873	-	1.552	1.552	4.918	Tubing, data logger in well. No odour, minor brown sediment on probe
SMW_BH046_s	20/06/2022	Burwood	6.47	6.47	2.84	-	1.86	1.86	4.61	No odour
S02_d	20/01/2022	The Bays	3	3.11	15.3	-	2	2	1	Data logger and tubing in well. Approx. 0.9m taken off well depth and water level sue to TOC being elevated 0.9m from ground surface
S02_d	22/02/2022	The Bays	3	3.11	-	-	-	-	-	Could not access due to constructions works
S02_d	14/03/2022	The Bays	3	3.11	-	-	-	-	-	Could not access due to constructions works
S02_s	20/01/2022	The Bays	2.99	3.11	-	-	-	-	-	Could not access (covered)
S02_s	22/02/2022	The Bays	2.99	3.11	-	-	-	-	-	Could not access due to constructions works
S02_s	14/03/2022	The Bays	2.99	3.11	-	-	-	-	-	Could not access due to constructions works
S06	20/01/2022	The Bays	3.04	3.13	21.229	-	2.225	2.225	0.815	Water in well, depth to surface changed, re-surveyed
S06	22/02/2022	The Bays	3.04	3.13	-	-	-	-	-	Could not access due to constructions works
S06	14/03/2022	The Bays	3.04	3.13	-	-	-	-	-	Could not access due to constructions works
S40_d	20/01/2022	The Bays	3.66	3.68	15.235	-	3.254	3.254	0.406	2x data loggers and tubing in well, no odour
S40_d	22/02/2022	The Bays	3.66	3.68	15.258	-	3.217	3.217	0.443	2x data loggers
S40_d	14/03/2022	The Bays	3.66	3.68	15.082	-	3.021	3.021	0.639	2x data loggers, mislabelled in lab report as S40_s
S40_s	20/01/2022	The Bays	3.49	3.6	4.34	-	1.699	1.699	1.791	Data logger and tubing in well. No odour
S40_s	22/02/2022	The Bays	3.49	3.6	-	-	-	-	-	Could not access due to constructions works
S40_s	14/03/2022	The Bays	3.49	3.6	-	-	-	-	-	Has been lost
S51	20/01/2022	The Bays	4.01	4.15	5.899	-	3.361	3.361	0.649	No odour
S51	22/02/2022	The Bays	4.01	4.15	5.818	-	3.701	3.701	0.309	Clear, no odour
S51	14/03/2022	The Bays	4.01	4.15	5.783	-	3.391	3.391	0.619	Brown Tinge, no odour
S51	6/05/2022	The Bays	4.01	4.15	5.8	-	3.57	3.57	0.44	No odour
S51	25/05/2022	The Bays	4.01	4.15	5.77	-	3.51	3.51	0.5	No odour
S54	20/01/2022	The Bays	3.53	3.59	16.898	-	3.065	3.065	0.465	Data logger and tubing in well. Organic odour
S54	22/02/2022	The Bays	3.53	3.59	16.641	-	3.121	3.121	0.409	Data logger, organic odour
S54	14/03/2022	The Bays	3.53	3.59	16.561	-	2.845	2.845	0.685	Dark brown silty
S54	6/05/2022	The Bays	3.53	3.59	16.55	-	3.06	3.06	0.47	No odour
S54	25/05/2022	The Bays	3.53	3.59	16.625	-	3.3	3.3	0.23	No odour
SMW_ENV21	20/01/2022	The Bays	3.03	3.09	-	-	-	-	-	Could not be accessed due to construction works
SMW_ENV21	22/02/2022	The Bays	3.03	3.09	-	-	-	-	-	Could not access due to constructions works
SMW_ENV21	14/03/2022	The Bays	3.03	3.1	-	-	-	-	-	Could not access due to constructions works
SMW_ENV21_s	20/01/2022	The Bays	3.03	3.09	-	-	-	-	-	Could not be accessed due to construction works
SMW_ENV21_s	22/02/2022	The Bays	3.03	3.09	-	-	-	-	-	Could not access due to constructions works
SMW_ENV21_s	14/03/2022	The Bays	3.03	3.09	-	-	-	-	-	Could not access due to constructions works
SMW_BH051	18/01/2022	Five Dock	21.68	21.68	10.615	-	2.258	2.258	19.422	Tubing and two data loggers. No odour
SMW_BH051	17/02/2022	Five Dock	21.68	21.68	10.605	-	2.303	2.303	19.377	2x data loggers, no odour
SMW_BH051	15/03/2022	Five Dock	21.68	21.68	6.874	-	2.075	2.075	19.605	2x data loggers, no odour
SMW_BH050	17/01/2022	Five Dock	24.34	24.34	26.008	-	23.181	23.181	1.159	Data logger in well, no odour
SMW_BH050	17/02/2022	Five Dock	24.34	24.34	26.029	-	23.19	23.19	1.15	Data logger, no odour
SMW_BH050_s	17/01/2022	Five Dock	24.35	24.35	1.211	-	0.321	0.321	24.029	Data logger in well, no odour
SMW_BH050_s	17/02/2022	Five Dock	24.35	24.35	1.211	-	0.289	0.289	24.061	Water in gatic, grey sediment on probe, no odour
SMW_BH051_s	18/01/2022	Five Dock	21.66	21.66	1.811	-	Dry	Dry	-	Data logger in well. Well dry
SMW_BH051_s	17/02/2022	Five Dock	21.66	21.66	1.813	-	Dry	Dry	-	Dry, data logger
SMW_BH051_s	15/03/2022	Five Dock	21.66	21.66	1.8	-	1.269	1.269	20.391	Data logger, no odour
SMW_BH009	18/01/2022	North Strathfield	18.45	18.45	33.23	-	30.581	30.581	-12.131	Data logger in well, no odour
SMW_BH009	17/02/2022	North Strathfield	18.45	18.45	42.952	-	30.536	30.536	-12.086	Data logger present. Clear, no odour
SMW_BH009	16/03/2022	North Strathfield	18.45	18.45	43.046	-	30.5	30.5	-12.05	Data logger present. Clear, no odour
SMW_BH009_s	17/01/2022	North Strathfield	18.6	18.6	4.933	-	3.692	3.692	14.908	Water in casing, data logger and tubing in well. No odour
SMW_BH009_s	17/02/2022	North Strathfield	18.6	18.6	4.92	-	3.72	3.72	14.88	Water in gatic, data logger and tubing. Clear, no odour
SMW_BH009_s	16/03/2022	North Strathfield	18.6	18.6	4.916	-	3.175	3.175	15.425	Tubing, data logger present in well.No odour.
SMW_BH035	18/01/2022	North Strathfield	26.74	26.74	42.24	-	35.551	35.551	-8.811	Data logger in well
SMW_BH035	18/02/2022	North Strathfield	26.74	26.74	50.981	-	35.355	35.355	-8.615	Data logger, no odour
SMW_BH035	16/03/2022	North Strathfield	26.74	26.74	35.259	-	35.259	35.259	-8.519	Data logger, no odour
SMW_BH035_s	18/01/2022	North Strathfield	26.62	26.62	2.7	-	1.589	1.589	25.031	Data logger in well, no odour
SMW_BH035_s	18/02/2022	North Strathfield	26.62	26.62	2.698	-	1.498	1.498	25.122	Data logger, no odour
SMW_BH035_s	16/03/2022	North Strathfield	26.62	26.62	1.431	-	1.25	1.25	25.37	Data logger, no odour
SMW_BH038	17/01/2022	North Strathfield	9.91	9.91	25.21	-	12.658	12.658	-2.748	Data logger in well
SMW_BH038	18/02/2022	North Strathfield	9.91	9.91	34.309	-	12.548	12.548	-2.638	Data logger. No odour
SMW_BH038	15/03/2022	North Strathfield	9.91	9.91	34.193	-	12.494	12.494	-2.584	Data logger. No odour
SMW_BH015	21/01/2022	Sydney Olympic Park	22.94	22.94	29.622	-	15.489	15.489	7.451	Data logger in well, no odour, minor silt on IP
SMW_BH015_s	21/01/2022	Sydney Olympic Park	22.02	22.02	2.579	-	Dry	Dry	-	Data logger in well, Dry
SMW_BH019	19/01/2022	Sydney Olympic Park	17.33	17.33	26.365	-	14.452	14.452	2.878	Data logger, organic odour
SMW_BH019	21/02/2022	Sydney Olympic Park	17.33	17.33	26.278	-	13.37	13.37	3.96	Data logger, organic odour
SMW_BH019	15/03/2022	Sydney Olympic Park	17.33	17.33	26.08	-	14.07	14.07	3.26	Data logger, organic odour
SMW_BH120	19/01/2022	Sydney Olympic Park	17.38	17.38	22.034	-	16.943	16.943	0.437	Data logger, organic odour
SMW_BH120	21/02/2022	Sydney Olympic Park	17.38	17.38	-	-	-	-	-	Did not have permit to access well during this round of monitoring

SMW_BH120	16/03/2022	Sydney Olympic Park	17.38	17.38	-	-	-	-	-	Did not have permit to access well - and consistent vehicle traffic on top of well
SMW_BH68_s	21/01/2022	Sydney Olympic Park	23.36	23.36	3.68	-	Dry	Dry	-	Data logger, tubing in well. Dry, no odour
SMW_BH068_s	21/02/2022	Sydney Olympic Park	23.36	23.36	-	-	-	-	-	Storage crate on top of well, could not access
SMW_BH068_s	16/03/2022	Sydney Olympic Park	23.36	23.36	-	-	-	-	-	Storage crate on top of well, could not access
SMW_BH040	18/01/2022	Tunnel - NS to B	23.06	23.06	60	-	24.01	24.01	-0.95	Data logger in well, one bolt missing, depth of well greater than IP length. No odour
SMW_BH040	17/02/2022	Tunnel NS to B	23.06	23.06	60	-	24.196	24.196	-1.136	1x bolt missing, data logger, depth greater than IP (60+), no odour
SMW_BH040	15/03/2022	Tunnel NS to B	23.06	23.06	60	-	22.416	22.416	0.644	1x bolt missing, data logger, no odour
SMW_BH040	20/06/2022	Tunnel NS to B	23.06	23.06	60	-	24.39	24.39	-1.33	No odour

Notes:

mAHD metres Australian Height Datum
 mbgl metres below ground level
 mbTOC metres below top of casing
 m metres