



ENVIRONMENTAL MONITORING REPORT, MAY 2020

PARRAMATTA LIGHT RAIL INFRASTRUCTURE WORKS

25 May 2020

Parramatta
Connect

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1. Introduction

1.1. Background

Parramatta Light Rail Stage 1 ('Stage 1') will connect Westmead to Carlingford via Parramatta Central Business District (CBD) and Camellia. Stage 1 is expected to be operational in 2023.

Stage 1 will create new communities, connect great places and help both local residents and visitors move around and explore what the region has to offer. The route will link Parramatta's CBD and train station to a number of key locations, including the Westmead Precinct, the Parramatta North Growth Centre, the new Western Sydney Stadium, the Camellia Town Centre, the new Powerhouse Museum and Riverside Theatre arts and cultural precinct, the private and social housing redevelopment at Telopea, the Rosehill Gardens Racecourse and the three Western Sydney University campuses.

Key features of Stage 1 include:

- A new dual track light rail network of approximately twelve (12) kilometres in length, including approximately seven (7) kilometres within the existing road corridor and approximately five (5) kilometres within the existing Carlingford Line and Sandown Line, replacing current heavy rail services
- Sixteen (16) stops that are fully accessible and integrated into the urban environment including a terminus stop at each end of Westmead and Carlingford
- High frequency 'turn-up-and-go' services operating seven days a week from 5am to 1am. Weekday services will operate approximately every 7.5 minutes in the peak period between 7am and 7pm
- Modern and comfortable air-conditioned light rail vehicles, nominally 45 metres long and driver-operated, each carrying up to 300 passengers.
- Intermodal interchanges with existing public transport services at Westmead terminus, Parramatta CBD and the Carlingford terminus
- Creation of two light rail and pedestrian zones (no general vehicle access) within the Parramatta CBD along Church Street (generally between Market Street and Macquarie Street) and along Macquarie Street (generally between Horwood Place and Smith Street)
- A Stabling and Maintenance (SaM) Facility located in Camellia for light rail vehicles to be stabled, cleaned and maintained
- New bridge structures along the alignment including over James Ruse Drive and Clay Cliff Creek, Parramatta River (near the Cumberland Hospital), Kissing Point Road and Vineyard Creek, Rydalmere
- Alterations to the existing road network including line marking, additional traffic lanes and turning lanes, new traffic signals, and changes to traffic flows
- Relocation and protection of existing utilities
- Public domain and urban design works along the corridor and at Stop precincts
- Closure of the heavy rail line between Carlingford and Clyde
- Active transport corridors and additional urban design features along sections of the alignment and within Stop precincts
- Integration with the Opal Electronic Ticketing System (ETS)
- Real time information in light rail vehicles and at Stops via visual displays and audio.



1.1.1. Statutory Context

The Parramatta Light Rail is classified as Critical State Significant Infrastructure (CSSI) and was subject to environmental impact assessment under the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS assessed impacts for Parramatta Light Rail Stage 1 (Westmead to Carlingford) including the light rail and associated road enabling works.

Stage 1 received Infrastructure Approval from the Minister for Planning under Section 5.19 of the EP&A Act on 29 May 2018 (Critical State Significant Infrastructure Application SSI-8285), subject to the conditions provided in the Instrument of Approval, specifically Schedule B – Ministerial Conditions of Approval.

The Infrastructure Approval was subsequently modified under Section 5.25 of the EP&A Act on 21 December 2018 and 25 January 2019.

The planning approval, modifications and related environmental assessment documents are located at: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8285.

A Construction Environmental Management Plan (CEMP) has been prepared for the Parramatta Light Rail Package 4 – Infrastructure Works (Infrastructure Works). The purpose of the CEMP and associated Sub-plans is to address the requirements of the:

- Minister’s Conditions of Approval (CoA) SSI-8285
- Revised Environmental Mitigation and Management Measures (REMMMs)
- Environmental Performance Outcomes (EPOs)
- Applicable legislation and contractual requirements, including the PLR Stage 1 Infrastructure Contract Project Deed (ISD-17-6721).

The REMMMs and EPOs are listed in Parramatta Light Rail Stage 1 Westmead to Carlingford via Parramatta CBD and Camellia Environmental Impact Statement (the EIS), as amended by the Parramatta Light Rail (Stage 1) Westmead to Carlingford via Parramatta CBD and Camellia Submissions Report (incorporating Preferred Infrastructure Report) (March 2018) (the SPIR). The CEMP and associated Sub-plans were approved the Secretary on the 21 November 2019.

1.2. Scope

The scope of this report is to present monthly results of the inspection and monitoring programs outlined in the Infrastructure Works CEMP and associated Sub-plans, including the results of the construction monitoring programs referred to in Condition C9 of the Planning Infrastructure Approval.

Environmental inspections and monitoring are undertaken to:

- Validate the predicted impacts of the Infrastructure Works
- Measure the effectiveness of environmental controls
- Track progress against targets and objectives of the CEMP.

The monitoring requirements for nominated aspects are included in the relevant environmental management sub plans and summarised in **Table 1-1**.

Where relevant, data will be presented on a progressive basis (i.e. monthly summary) to identify trends.

The data of the monitoring programs will also be reviewed annually in the Annual Environment Reports.



Table 1-1 Monthly Environmental Monitoring Reporting Requirements

CEMP or Sub-plan	Monitoring program	Distribution
Noise and Vibration Management Sub-plan	<ul style="list-style-type: none"> - Locations and descriptions of monitoring undertaken - Noise monitoring results - Summary of any exceedance of the nominated criteria - Corrective actions 	<ul style="list-style-type: none"> - City of Paramatta Council - Cumberland Council - EPA - NSW Health - TfNSW - IC - ER - AA - Made publicly available
Soil and Water Management Sub-plan	<ul style="list-style-type: none"> - Weather forecasts and observations - Water Quality (Turbidity) monitoring - Discharge and dewatering monitoring 	<ul style="list-style-type: none"> - City of Paramatta Council - Cumberland Council - EPA - DOI Water - TfNSW - IC - Made publicly available
Air Quality and Dust Management Sub-plan	<ul style="list-style-type: none"> - Weather observations - Dust deposition monitoring - Real time aerosol dust monitors - Asbestos fibre air monitoring 	<ul style="list-style-type: none"> - EPA - TfNSW - IC - Made publicly available



2. Site Activities

Table 2-1 provides a summary of the site activities for May 2020.

Table 2-1 Monthly Environmental Monitoring Reporting Requirements

Precinct	Site Activities
Westmead and North Parramatta	<p><u>Demolition</u></p> <ul style="list-style-type: none">- Demolition and waste removal offsite continued for 149 Hawkesbury Road, 519 Church Street and 435 Church Street- Ongoing demolition of Royal Oak Hotel <p><u>UTC-016</u></p> <ul style="list-style-type: none">- Site establishment and TCP implementation occurred between Railway Parade and Darcy Road, Westmead- Tree removal <p><u>Cumberland Hospital</u></p> <ul style="list-style-type: none">- Archaeological salvage continued <p><u>UTC-017 & UTC-018a</u></p> <ul style="list-style-type: none">- Planning for UTC-017 and 18a was in progress for the reporting period
Parramatta CBD	<p>Area 2 West (CBD)</p> <p><u>UTC works</u></p> <ul style="list-style-type: none">- UTC-005 Telstra works at Church, George, Smith Street- UTC-007 temporary water main at Macquarie Street- UTC-007 sewer relocation at Barrack Lane- UTC-008 general utilities including Jemena, Water, Endeavour at Church Street.- Utility relocations at Centenary Square <p><u>Tree clearing</u></p> <ul style="list-style-type: none">- Church Street- Macquarie Street <p><u>Micro-tunnel</u></p> <ul style="list-style-type: none">- Site establishment and excavation work at Centenary Square <p>Area 2 East (Smith/Charles to Arthur St)</p> <ul style="list-style-type: none">- Heritage investigations/salvage on George Street/Queens Wharf Reserve (Eastern section)- UTC-006 utility Investigations and relocations at Harris and Macquarie Street <p><u>Harris and Macquarie Street</u></p> <ul style="list-style-type: none">- Jemena relocation works at Harris St- Harris and Macquarie Street TMP Implementation. Partial road closures of Macquarie Street



Precinct	Site Activities
	<u>Tree clearing</u> <ul style="list-style-type: none">- Queens Wharf Reserve- Macquarie Street
Camellia and Carlingford line	Grand Avenue North & Tramway Avenue <u>UTC-003</u> <ul style="list-style-type: none">- Excavation and trenching works occurring at Arthur Street, Tramway Avenue and Grand Avenue North for the installation of Utilities- Connection of utilities- Underboring at James Ruse Drive for the installation of Utilities.- Piling and deep excavation at Tramway Avenue for sewer encasement and the manhole <u>Rosehill Bowling Club</u> <ul style="list-style-type: none">- Construction of new driveway for Rosehill Bowling Club. Camellia Station <u>UTC-013a Rosehill Bowling Club</u> <ul style="list-style-type: none">- Site establishment and utility investigation work. <u>Sandown Line</u> <ul style="list-style-type: none">- Tree mulching along Sandown Line. <u>Carlingford Line</u> <ul style="list-style-type: none">- Abutment piling at Kissing Point Road pier- James Hardie Culvert piling- Demolition of Telopea and Carlingford Stations- Tree felling from Camellia to Carlingford.- Excavation of spoil retention pit at Rydalmere.- Topsoil stripping and stockpiling from Camellia to Carlingford. <u>Rosehill / Clyde</u> <ul style="list-style-type: none">- Rosehill Rail Yard Site Establishment- Parramatta Road Crossing Removal- Parramatta Road Traffic Hut Demolition- Rosehill Signalling Hut Demolition



3. Monitoring Results

Section 3 presents a summary of the environmental inspection and monitoring programs completed during the reporting period (26 April 2020 to 25 May 2020). Detailed monitoring results for each program are presented in the appendices to this report.

3.1. Inspections

A total of four ER inspections were completed in May 2020 in addition to 11 internal inspections. **Table 3-1** provides a summary of the number of actions raised and closed within the agreed timeframe.

Table 3-1 Inspections for May 2020

Date	Type	Actions	Closed in time
28/04/2020	ER Inspection	4	Yes
28/04/2020	AA Inspection	0	N/A
30/04/2020	Internal Inspection	1	Yes
01/05/2020	Internal Inspection	0	N/A
04/05/2020	Internal Inspection	0	N/A
05/05/2020	ER Inspection	3	Yes
06/05/2020	Internal Inspection	0	N/A
07/05/2020	Internal Inspection	2	Yes
11/05/2020	Internal Inspection	1	Yes
12/05/2020	ER Inspection	9	Yes
12/05/2020	AA Inspection	0	N/A
13/05/2020	Internal Inspection	0	N/A
14/05/2020	Internal Inspection	1	Yes
16/05/2020	AA Inspection (OOHW)	0	N/A
19/05/2020	Internal Inspection	0	N/A
21/05/2020	ER Inspection	4	Yes
22/05/2020	Internal Inspection	2	Yes
25/05/2020	Internal Inspection	0	N/A
Total	19	25	Yes

3.2. Weather

The total rainfall during the reporting period was 65mm with 4 days with >1mm of rain. 1 day with rain exceeded the 80th percentile (25.8mm) and the 85th percentile (33.1mm).



During the reporting period, there were 19 days (29 days in the reporting period) where the maximum wind gust recorded was greater than 25km/hr, and 2 days where the maximum wind gust recorded was greater than 50km/hr. There was a total of 12 days where wind speeds greater than 25km/hr were forecast and on each of those days, notifications were issued to the construction team to alert them of the strong winds forecast.

A summary of the weather observations and weather events during the reporting period of relevance to the Soil and Water Management Sub-plan and Air Quality Management Sub-Plan Trigger Action Response Plans (TARPs) are summarised in **Table 3-2**. A comparison between long term monthly means and recorded values can be found in **Figure 3-1** for rainfall and **Figure 3-2** for rain days >1mm.

Detailed weather observation records for May 2020 are presented in **Appendix A-1**.

Table 3-2 Weather Summary and Trigger Weather Events for May¹ 2020

Weather event	Forecast	Observation
Minimum temperature	4°C	3°C
Maximum temperature	27°C	27.3°C
Total rainfall	69mm	65mm
Number of days with rain (>1mm)	5 days	4 days
>80 th percentile (25.8mm) rain events	0	1 event
>85 th percentile (33.1mm) rain events	0	1 event
Flood warning / events	-	-
>25km/hr wind ²	11 days	19 days
>50km/hr wind	1 days	3 days

1. Weather summary based on data from the 26 April to 25 May (29 days).

2. Wind data from Sydney Olympic Park AWS (Archery Centre) {station 066212}. Weather data from Parramatta North (Masons Drive) {station 066124}.

Note: Red text in Observation column indicates observation greater than forecast.

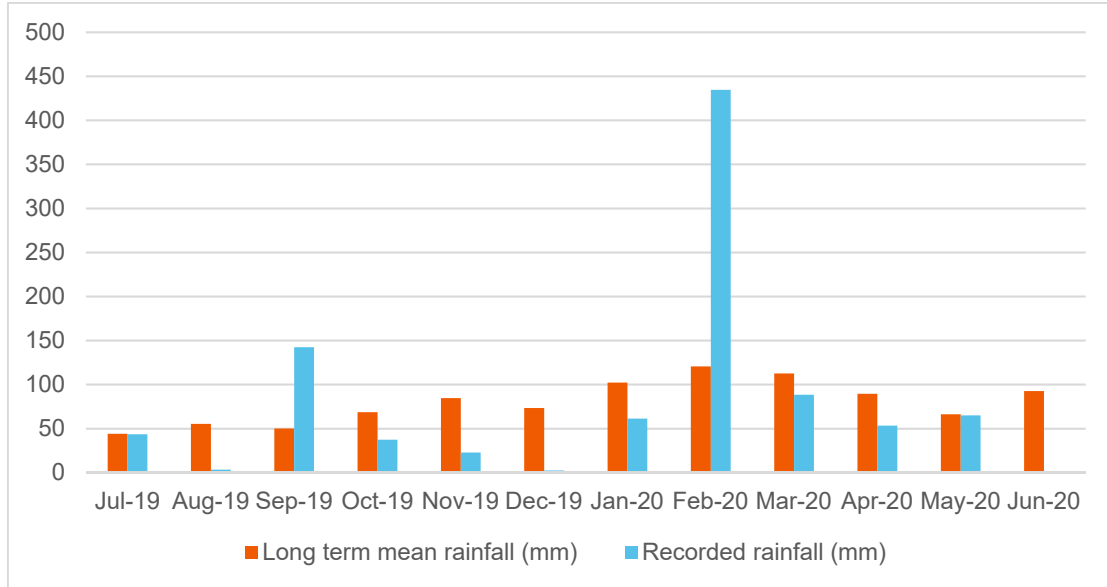


Figure 3-1 Monthly rainfall comparison

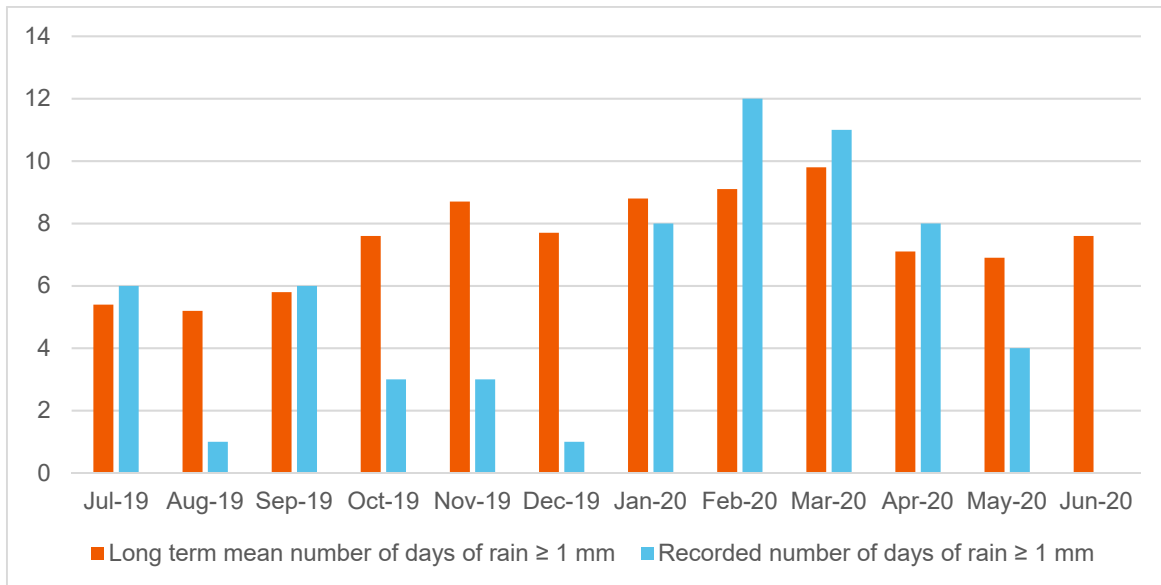


Figure 3-2 Monthly rain days comparison

3.3. Noise and Vibration

Table 3-3 provides a summary of noise monitoring events conducted during the reporting period. Detailed noise monitoring results and comments are presented in **Appendix A-2**. It is noted that recorded noise levels (Leq15min) during the reporting period were consistently below the predicted noise levels.

Additional information on the hours of works, respite requirements and alternative accommodation is provided in the Noise and Vibration Management Sub-plan (Section 11.3).

Vibration monitoring events completed during the reporting period are summarised in **Table 3-4** and detailed results and comments are presented in **Appendix A-2**. All monitoring events were compliant with vibration targets.

All noise and vibration monitors used during the reporting period, together with current NATA calibration data, is provided in **Table 3-5**.



Table 3-3 Summary of noise monitoring May 2020

Date	Monitoring Location	Description
13/05/2020	157 Hawkesbury Road	Standard work hours: Excavation using a pulveriser
18/05/2020	149 Hawkesbury Road	Standard work hours: Tree removal
20/05/2020	86 Kissing Point Road	Standard work hours: Excavation/earthworks
20/05/2020	Centenary Square	OOHW Period 1: Tree removal
05/05/2020	Centenary Square	OOHW Period 1: Tree clearing
20/05/2020	Centenary Square	OOHW Period 1: Tree clearing/removal
14/05/2020	Kissing Point Road	OOHW Period 1: Piling
16/05/2020	Kissing Point Road	OOHW Period 2: Piling
20/05/2020	2 Arthur Street	OOHW Period 2: Rail cutting
20/05/2020	88 Parramatta Road	OOHW Period 2: Rail cutting
12/05/2020	Centenary Square	Standard work hours: Plant spot check

Table 3-4 Summary of vibration monitoring May 2020

Date	Monitoring Location	Description
20/05/2020	Level 2, 7 Ashley Lane	Standard work hours: saw cutting of the concrete slab
12/05/2020	Centenary Square	Standard work hours: hydraulic hammering
1/05/2020	Kissing Point Road abutment above the sewer	Standard work hours: borehole drilling
14/05/2020	Pier 2 Kissing Point Road	OOHW Period 2: piling

Table 3-5 Noise and Vibration Monitors and NATA Calibration

Equipment	Serial Number	Calibration Date
Noise Level Meter	00973277	4/12/2020
Noise Level Meter	00973275	26/11/2020
Vibration Monitor	BE15042	19/07/2020
Vibration Monitor	BE14639	5/12/2020

Note: The calibration of the monitoring equipment is checked in the field before and after the noise measurement period in accordance with Standards Australia AS/IEC 60942:2004/IEC 60942:2003–Electroacoustic – Sound Calibrators.



3.4. Soil and Water

3.4.1. Water quality (turbidity) in receiving waters

Water quality monitoring is based upon on pre-construction screening to verify the water quality objectives established on the baseline data presented in the EIS Technical Paper 6 – Water Quality Assessment.

On the 28th and 29th of April 2020, dry weather water quarterly sampling was undertaken. There had been 0.4 mm of rainfall in the 5-day weather period prior. On the two days of sampling there was no rainfall.

In May 2020, one wet weather monitoring event was undertaken as summarised by in Appendix 3. The monitoring was undertaken following a 48 mm rain event that occurred from 15th to the 25th of May. Water levels were higher than usual and minimal debris was present in all waterways when sampling. Sampling was taken due to wet weather (>20mm rainfall) and lab samples were taken for wet weather quarterly sampling. The results recorded are those like the baseline values and ANZACC Guidelines. The turbidity that was recorded at the up-stream Parramatta River locations are above the baseline NTU values.

Detailed water quality (turbidity) monitoring results and comments for May 2020 are presented in **Appendix A-3**.

Table 3-6 Monitoring results for water quality sampling

Date	Type	Type of Results	Wet / Dry	Locations
28/04/2020	Pre-construction screening	Field and lab	Dry	Parramatta River: PR1; PR3; PR4; PR5; PR6 Vineyard Creek: VY1; VY2 Clay Cliff Creek: CC1; CC2 Subiaco Creek: SC1 Domain Creek: DC1 A'becketts Creek: AC1
22/05/2020	Pre-construction screening	Field and lab	Wet	Parramatta River: PR1; PR3; PR4; PR5; PR6 Vineyard Creek: VY1; VY2 Subiaco Creek: SC1 Domain Creek: DC1 A'becketts Creek: AC1

3.4.2. Discharge and dewatering

Detailed water quality (turbidity) monitoring results and comments for May 2020 are presented in **Appendix A-3**.

There were 4 discharge events during the reporting period.



3.5. Air Quality

3.5.1. Dust Deposition Monitoring

A dust deposition gauge was installed at 13A Grand Avenue in Camellia in December 2019 in advance of works which commenced at the beginning of February 2020. The baseline data indicates that the value of Total Insoluble Matter (TIM) was 3.9 g/m² prior to commencement of construction activities at 13A Grand Avenue.

The dust monitoring result for April 2020 marginally exceeded the trigger criteria of 4 g/m²/month. In response, supervision of the site was significantly increased in early May 2020 and daily site inspections were undertaken to ensure that stockpiles are covered at all times.

The dust monitoring results for May 2020 similarly exceeded the trigger criteria of 4 g/m²/month. In accordance with the Air Quality and Dust Management Sub-plan, the controls on the site were reviewed and reinforced with site personnel.

It is noted that the data for the February 2020 reporting period for is not available due to inadvertent damage to the monitoring gauge.

Table 3-7 Summary of dust disposition data

Date	Monitoring Location	Total Insoluble Matter g/m ² /month
20/01/2020	13a Grand Avenue	3.9
24/03/2020	13a Grand Avenue	4
27/04/2020	13a Grand Avenue	4.1
28/05/2020	13a Grand Avenue	4.9



Appendices

A-1 Weather Observations

Table A-1-1 Weather observations: Parramatta North (Masons Drive) {station 066124}.

Date	Temps		Rain	Temp	RH	9:00 AM		
	Min	Max				Temp	Dir	Spd
	°C	°C	mm	°C	%	8th	km/h	
26/04/2020	11.5	27.3	0	22	54	5	NNW	4
27/04/2020	11.6	21.2	0	18	75	6	NW	4
28/04/2020	14.3	22.3	0.4	19.2	85	8	NNE	2
29/04/2020	14.8	25.2	0.2	21.5	70	7	N	4
30/04/2020	14.8	18.5	0.2	18.4	91	8	ENE	2
1/05/2020	9.8	16.3	15.6	14	52	3	NW	19
2/05/2020	11.2	18	0	14.5	52	3	W	33
3/05/2020	6.7	20	0	15	44	0	SW	22
4/05/2020	6	19.6	0	18.3	33	0	WSW	7
5/05/2020	10	20.7	0.6	16	74	2	WSW	7
6/05/2020	7	22.7	0	13	96	2	NE	4
7/05/2020	7.8	23.7	0	14	84	6	NW	2
8/05/2020	12.8	27	0	21	57	0	W	15
9/05/2020	15.2	25.3	0	21.2	56	5	NNE	9
10/05/2020	7	17.7	0	13.5	51	0	WSW	22
11/05/2020	3	19.2	0	11.3	66	0	NW	7
12/05/2020	4.8	20	0	11.2	73	0	E	2
13/05/2020	7.2	18.8	0	12	45	6	W	4
14/05/2020	7.3	18.4	0	13	79	5	NNW	2
15/05/2020	6.2	17	0.2	14.2	67	2	SW	2
16/05/2020	9.1	18.8	3	14	97	6	NW	6
17/05/2020	7.2	20.8	0	11.7	95	5	WNW	4
18/05/2020	8	18.6	0.6	14.6	97	4	W	2
19/05/2020	10.2	21.8	1	13.5	99	6	NW	2
20/05/2020	10	23.7	0	16.6	74	6	NNW	4
21/05/2020	13.2	18.8	0	15.7	88	8	NW	2
22/05/2020	7.8	16.8	39.4	12.7	65	6	S	19
23/05/2020	10.2	18.2	3	16.5	62	4	SW	19
24/05/2020	12.3	17.9	0.8	15	68	6	SW	11
25/05/2020	12	16.4	0	14.2	76	8	SW	15



Table A-1-2 Wind observations: Sydney Olympic Park AWS (Archery Centre) {station 066212}.

Date	Max Wind Gust			9:00 AM		3:00 PM	
	Dir	Spd	Time	Dir	Spd	Dir	Spd
		km/h	local		km/h		km/h
26/04/2020	WNW	35	15:42	NW	6	WNW	17
27/04/2020	ESE	17	12:32	NW	7		Calm
28/04/2020	NNE	22	15:13		Calm	NNE	13
29/04/2020	N	28	10:35	N	6	NNE	9
30/04/2020	WSW	31	11:34	WSW	2	WSW	4
1/05/2020	WNW	57	11:17	NW	20	NW	30
2/05/2020	WNW	59	10:17	NW	30	NW	30
3/05/2020	SE	30	12:57	W	13	SE	9
4/05/2020	SE	28	14:13	W	9	SSE	17
5/05/2020	S	28	12:06	W	6	SSE	11
6/05/2020	NNW	24	11:55	NW	7	NNW	7
7/05/2020	NW	41	15:39	NW	7	NNW	11
8/05/2020	NNW	35	10:35	NW	17	N	9
9/05/2020	N	39	13:49	NW	13	NNW	17
10/05/2020	WNW	41	9:16	WNW	20	W	11
11/05/2020	ESE	22	15:31	WNW	9	SSE	7
12/05/2020	N	20	13:05	WNW	11	N	13
13/05/2020	NW	17	10:11	NW	6	WSW	4
14/05/2020	S	39	11:44	WNW	7	SSW	13
15/05/2020	SSE	30	12:41	W	7	S	9
16/05/2020	E	19	12:54	WNW	6		Calm
17/05/2020	E	19	14:27	WNW	11	E	9
18/05/2020	E	20	13:00	WNW	6		Calm
19/05/2020	NNW	19	13:31	WNW	6	N	9
20/05/2020	NW	41	12:35		Calm	NNW	20
21/05/2020	WSW	35	19:10		Calm	NW	2
22/05/2020	NW	39	2:41	WNW	11	W	11
23/05/2020	WSW	31	12:23	WNW	13	W	15
24/05/2020	SSW	46	14:23	WSW	9	SSW	20
25/05/2020	SSW	52	16:08	WSW	9	SSW	20

Notes:

Blue text indicates a rain event greater than 1mm of rain.

Orange text indicates a rain event greater than the 80th percentile of 25.8mm, and a wind speed of greater than 25km/hr

Red text indicates a rain event greater than the 85th percentile of 33.1mm, and a wind speed greater than 50km/hr.



A-2 Noise and Vibration Monitoring Results

Table A-2-1 Noise monitoring results

Date	Time	Works Period	Construction Activity	Activity Location	Monitoring Location	NML (dBA)	Predicted (dBA)	Additional Mitigation Measures	L _{Amax}	Recorded L _{eq, 15min} (dBA)	Exceedance of Predicted (dBA)	Construction noise exceedance	Comments
13/05/2020	11:42	Standard Working Hours	Excavation using pulveriser	149 Hawkesbury Road	157 Hawkesbury Road	56	82	PN, V	70.1	50.1	-30.9	No	Highly Noise Intensive Works Members of were public speaking and phones were ringing
18/05/2020	10:45	Standard Working Hours	Tree removal	Queens Wharf Reserve	1A Noller Parade	55	86	PN, V	83.8	64.3	-21.7	No	Highly Noise Intensive Works No comments
20/05/2020	19:45	OOHW Period 1	Tree removal	Centenary Square	45 Macquarie Street	58	69	PN	76.2	65.6	-3.4	No	Construction Clearly Audible No comments
20/05/2020	20:09	OOHW Period 1	Tree clearing	Centenary Square	20 O'Connell St and 16 Macquarie St	70	64	N/A	79.0	67.0	3	Nil	Construction Noticeable The dominant noise source was vehicle traffic
05/05/2020	09:03	Standard Working Hours	Excavation/earthworks	Abutment B, Kissing Point Road Bridge	86 Kissing Point Road, Dundas	56	74	PN, V	80.8	65.6	-8.4	No	Construction Moderately Intrusive Excavation movement was the dominant sound
20/05/2020	20:30	OOHW Period 1	Tree clearing/removal	Centenary Square	Centenary Square	70	93	PN, V, SN, RO	94.6	80.7	-12.3	No	Construction Moderately Intrusive No comments
14/05/2020	22:00	OOHW Period 1	Piling	Pier 2 Piling, Kissing Point Road	78 Kissing Point Road	47	74	PN, V, SN, RP, DR	89.3	64.1	-9.9	No	Highly Noise Intensive Works No comments
16/05/2020	01:40	OOHW Period 2	Piling	Pier 2 Piling, Kissing Point Road	78 Kissing Point Road	39	74	PN, V, SN, RP, DR	79.5	65.1	-8.9	No	Highly Noise Intensive Works No comments
20/05/2020	11:56	OOHW Period 2	Rail cutting	Parramatta Road Crossing Removal	2 Arthur Street	47	70	PN, V, SN, RP, DR	70.8	50.3	-19.7	No	Construction Moderately Intrusive L _{Amax} attributed to motorcycle noise and not related to construction works
20/05/2020	11:37	OOHW Period 2	Rail cutting	Parramatta Road Crossing Removal	88 Parramatta Road	48	70	PN, V, SN, RP, DR	85.0	71.5	1.5	Nil	Construction Moderately Intrusive The dominant noise source was vehicle traffic
12/05/2020	14:02	Standard Working Hours	Plant spot check -hydraulic hammering	Centenary Square	Centenary Square	-	93	-	99	91.6	-1.4	No	Plant Spot Check

Notes:

Standard hours:

- a) All areas excluding Eat Street and Camellia – Monday to Friday 7:00 am to 7:00 pm. Saturday 8:00 am to 6:00 pm
- b) Eat Street (Church Street between Palmer Street and George Street) – Monday to Friday 7:00 am to 6:00 pm. Saturday 8:00 am to 12:00 pm)
- c) Camellia, Rosehill and Rydalmere (east of James Ruse Drive to Victoria Road) – 24 hours a day and seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence

OOHW Period 1 is defined as:

- a) 6:00pm to 10:00pm (evenings) Monday to Saturday
- b) 7:00am to 8:00am and 1:00pm to 10:00pm (day & evening) Saturday and
- c) 8:00am to 6:00pm Sunday and public holidays (days).

OOHW Period 2 is defined as:

- a) 10:00pm to 7:00am (nights) Monday to Saturday and
- b) 6:00pm to 8:00am (nights) Sundays and public holidays.

Additional Mitigation Measures

- PN = Project Notification
- V = Verification Monitoring
- RP = Respite Period
- AA = Alternate Accommodation
- SN = Specific Notification / individual briefing or phone call
- DR = Duration Reduction
- RO = Project Specific Respite Offer

Table A-2-2 Vibration monitoring results

Date	Time	Works Period	Construction Activity	Activity Location	Monitoring Location	Target	Recorded PVS (Max values)	Exceedance of Target	Construction vibration exceedance	Comments
20/05/2020	08:15-08:40	Standard work hours	Saw cutting of concrete slab	149 Hawkesbury Rd	Level 2, 7 Ashley Lane	15 mm/s	0.189 mm/s	No	No	No vibration detected on Level 2.
12/05/2020	14:02-14:17	Standard work hours	Hydraulic hammering	Centenary Square	Centenary Square	7.5 mm/s	0.648 mm/s	No	No	No comments
1/05/2020	9:00-16:45	Standard work hours	Borehole drilling	Kissing Point Road	Kissing Point Road abutment above sewer	3.0 mm/s	0.389 mm/s	No	No	No comments
14/05/2020	21:21	OOHW Period 2	Piling	Pier 2 Kissing Point Road	Pier 2 Kissing Point Road	25 mm/s	0.469	No	No	No comments

A-3 Water Sampling and Discharge Results

Table A-3-1 Water Quality Monitoring - Comments and observations

Location	Waterway	Type	Date	Time	Temp (C)	pH	Dissolved Oxygen (mg/L)	Elec. Conduct. (µS/cm)	Turbidity (NTU)	Comments and observations
PR1	Parramatta River	Dry	28/04/2020	14:45	19.61	8.3	29.62	0.497	2.5	Overcast. No wind. Slight current. Water clear.
DC1	Domain Creek	Dry	28/04/2020	15:00	24.85	7.92	15.62	0.301	38.3	Overcast. No wind. Very murky.
PR3	Parramatta River	Dry	28/04/2020	15:00	21.58	7.82	11.08	0	21.8	Overcast. No wind. Minimal current. Murky visual observation.
PR4	Parramatta River	Dry	29/04/2020	17:10	21.1	8.25	10	1.15	11.5	Water clarity good.
PR5	Parramatta River	Dry	29/04/2020	16:50	22.8	7.68	7.34	36.1	11.2	Overcast. Water clarity good.
CC1	Clay Cliff Creek	Dry	28/04/2020	16:00	20.45	8.52	37.53	13.1	15.9	No wind. No current. Clear water.
CC2	Clay Cliff Creek	Dry	29/04/2020	16:40	21.88	8.04	8.45	24.4	13.9	Overcast. Water clarity good. Leaf litter.
VY2	Vineyard Creek	Dry	29/04/2020	15:30	23.65	8.23	7.46	0.552	0	Overcast. No wind. Slightly clear water, 100mm of clarity.
VY1	Vineyard Creek	Dry	29/04/2020	15:15	23.73	8.11	16.97	0.9998	0	Overcast. No wind. Slight current. Clear water.
PR6	Parramatta River	Dry	29/04/2020	16:40	24.27	7.42	6.45	37.7	7.4	Overcast. No wind. Clear water.
AC1	A'becketts Creek	Dry	29/04/2020	16:30	23.51	8.08	14.41	7.13	11.9	Overcast. No wind. Water clear.
PR1	Parramatta River	Wet	22/05/2020	9:35	13.75	8.54	19.3	0.193	85.4	Clear sky. No wind. Slight current. Water murky.
DC1	Domain Creek	Wet	22/05/2020	10:25	14.14	7.98	26.62	0.122	61.8	Clear sky. No wind. Slight current. Water murky.
PR3	Parramatta River	Wet	22/05/2020	10:45	14.12	7.87	43.41	0.166	80.1	Clear sky. No wind. Slight current. Water murky.
PR4	Parramatta River	Wet	22/05/2020	13:50	13.6	8.02	12.08	0.244	74.1	Overcast. No wind. Water murky.
PR5	Parramatta River	Wet	22/05/2020	13:30	14.39	7.63	30.77	7.47	55.2	Overcast. No wind. No oil or grease visible. Murky.
VY2	Vineyard Creek	Wet	22/05/2020	11:20	15.35	7.59	17.21	0.352	91.9	Overcast. No wind. Water murky.
VY1	Vineyard Creek	Wet	22/05/2020	11:50	15.5	7.64	10.71	0.414	102	Overcast. No wind. Fast current. Water murky.
PR6	Parramatta River	Wet	22/05/2020	11:30	15.1	7.6	21.14	1.25	90.2	Clear sky. No wind. Fast current. Water murky.
AC1	A'becketts Creek	Wet	22/05/2020	12:20	14.12	7.9	22.9	0.264	52	Clear sky. No wind. Water murky.

1. ANZECC Waterway types: LR: Lowland River (PR1, PR3, PR4, DC1, CC1, CC2, AC1, VY1 and VY2); E: Estuary (PR5 and PR6). Red text indicates values outside of ANZECC Guideline Trigger Values.

Table A-3-2 Water Quality Monitoring - Lab Results



Location	Waterway	Type	Date	pH	Elec. Cond. (µS/cm)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L) LOR:1	Sulfate (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Total Al (mg/L)	Total Cu (mg/L)	Total Pb (mg/L)	Total Mn (mg/L)	Total Fe (mg/L)	TPH (µg/L)	TRH (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	o-Xylene (µg/L)	m+p-Xylene (µg/L)
	ANZECC Guideline	Trigger	Values	LR:6.5-7.5 E: 7-8.5	LR: 125-2200 E: None		LR:6-50 E: 0.5-10	LR: 400 E: None	LR: 400 E: None	LR: 350 E: 300	LR: 25 E: 30	0.055	0.0014	0.0034	1.9	0.3	ID ²	ID	950	ID	ID	350	ID
PR1	Parramatta River	Dry Baseline	28/04/2020	7.57	589	<5	1.6	80	27	0.03	0.002	0.03	0.002	<0.001	0.025	0.14	<LOR	<LOR	<1	<2	<2	<2	<2
DC1	Domain Creek	Dry Baseline	28/04/2020	7.59	301	43	22.6	34	24	0.39	0.011	0.39	0.011	0.015	0.039	3.28	<LOR	<LOR	<1	<2	<2	<2	<2
PR3	Parramatta River	Dry Baseline	28/04/2020	7.88	537	11	3.7	70	27	0.07	0.003	0.07	0.003	<0.001	0.058	0.5	<LOR	<LOR	<1	<2	<2	<2	<2
PR4	Parramatta River	Dry Baseline	29/04/2020	8.08	594	9	4.7	81	27	102	3.5	102	3.5	1.2	30.8	282	<LOR	<LOR	<1	<2	<2	<2	<2
PR5	Parramatta River	Dry Baseline	29/04/2020	7.7	40100	11	4.4	13100	2200	41	135	41	135	1.6	0.3	55.8	<LOR	<LOR	<1	<2	<2	<2	<2
CC1	Clay Cliff Creek	Dry Baseline	28/04/2020	8.17	16100	5	4.3	5240	674	0.15	0.013	0.15	0.013	<0.001	0.037	0.24	<LOR	<LOR	<1	<2	<2	<2	<2
CC2	Clay Cliff Creek	Dry Baseline	29/04/2020	8.07	25900	7	6.8	8580	1380	0.12	0.009	0.12	0.009	<0.001	0.053	0.23	<LOR	<LOR	<1	<2	<2	<2	<2
VY2	Vineyard Creek	Dry Baseline	29/04/2020	8.11	1050	43	8.8	214	38	0.03	0.003	0.03	0.003	<0.001	0.014	0.22	<LOR	<LOR	<1	<2	<2	<2	<2
VY1	Vineyard Creek	Dry Baseline	29/04/2020	8.27	756	<5	2.1	102	27	0.03	0.002	0.03	0.002	<0.001	0.011	0.24	<LOR	<LOR	<1	<2	<2	<2	<2
PR6	Parramatta River	Dry Baseline	29/04/2020	7.8	44300	<5	3	14400	2420	37	1.6	37	1.6	0.4	42.4	88	<LOR	<LOR	<1	<2	<2	<2	<2
AC1	A'beckett's Creek	Dry Baseline	29/04/2020	8.2	7330	25	6.2	2130	317	0.07	0.036	0.07	0.036	<0.001	0.068	0.27	<LOR	<LOR	<1	<2	<2	<2	<2
PR1	Parramatta River	Wet Baseline	22/05/2020	7.07	163	50	45.7	20	9	-	-	0.46	0.006	0.003	0.054	0.89	<LOR	<LOR	<1	<2	<2	<2	<2
DC1	Domain Creek	Wet	22/05/2020	7.05	118	19	27.6	10	7	-	-	0.32	0.005	0.003	0.014	0.3	<LOR	<LOR	<1	<2	<2	<2	<2
PR3	Parramatta River	Baseline	22/05/2020	7.29	168	31	29.7	22	11	-	-	0.66	0.004	0.002	0.03	0.93	<LOR	<LOR	<1	<2	<2	<2	<2
PR4	Parramatta River	Wet	22/05/2020	7.37	176	26	31.9	23	10	-	-	1.31	0.006	0.003	0.043	1.7	<LOR	<LOR	<1	<2	<2	<2	<2
PR5	Parramatta River	Baseline	22/05/2020	7.07	7700	31	22.9	2410	328	-	-	0.34	0.003	0.002	0.032	0.58	<LOR	<LOR	<1	<2	<2	<2	<2
VY2	Vineyard Creek	Wet	22/05/2020	7.48	383	23	30.1	46	26	-	-	0.54	0.014	0.002	0.041	1.16	<LOR	<LOR	<1	<2	<2	<2	<2
VY1	Vineyard Creek	Baseline	22/05/2020	7.5	421	43	28.5	50	28	-	-	0.79	0.018	0.002	0.044	1.52	<LOR	<LOR	<1	<2	<2	<2	<2
PR6	Parramatta River	Wet	22/05/2020	7.37	1830	45	40.6	543	76	-	-	1.24	0.011	0.003	0.043	1.88	<LOR	<LOR	<1	<2	<2	<2	<2

AC1	A'beckett's Creek	Baseline	22/05/2020	7.54	276	32	29.1	34	18	-	-	0.62	0.006	0.002	0.019	0.64	<LOR	<LOR	<1	<2	<2	<2	<2
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1. ANZECC Waterway types: LR: Lowland River (PR1, PR3, PR4, DC1, CC1, CC2, AC1, VY1 and VY2); E: Estuary (PR5 and PR6). Red text indicates values outside of ANZECC Guideline Trigger Values.
2. ID: Insufficient data to derive a reliable trigger value (ANZECC 2000).
3. LOR: Limit of Reporting

Table A-3-3 Discharge water quality

Discharge monitoring Point ID	P1.2 Identification Number	Type of Monitoring Point	Type of Discharge Point	Date	Discharge Permit #	Oil and Grease (Not visible)	pH (6.5 - 8.5)	Total Suspended Solids (31 mg/L)	Comments
A2.06	1	Basins and settling containers	Stormwater inlet	6/05/2020	DW A2_002	Not visible	7.00	0	Discharge from Sydney Water main
A2.04 & A2.05	1	Basins and settling containers	Stormwater inlet	16/05/2020	DW A2_012	Not visible	7.00	0	Discharge from Sydney Water main
A2.09 & A2.05	1	Basins and settling containers	Stormwater inlet	16/05/2020	DW-A2_013	Not visible	7.00	0	Discharge from Sydney Water main
A3.20	1	Basins and settling containers	Creek	20/05/2020	DW001	Not visible	7.62	20	Discharge from dewatering of deep excavation at Tramway Avenue

