



ENVIRONMENTAL MONITORING REPORT, JUNE 2020

PARRAMATTA LIGHT RAIL INFRASTRUCTURE WORKS

25 June 2020

Parramatta
Connect

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0	25 th June 2020	O. Cooper	D. Corish	D. Corish	Monthly Environmental Monitoring Report for June 2020
1	30 th June 2020	D. Corish	D. Corish	D. Corish	Minor amendments
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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 June 2020.

Table 2-1 Monthly Environmental Monitoring Reporting Requirements

Precinct	Site Activities
Westmead and North Parramatta	<u>Westmead:</u>
	- UTC-016 works continued between Railway Parade and Hainsworth Street, Westmead
	- UTC-017 works continued between Jessie Street and Hainsworth Street, Westmead
	- UTC-018a works continued at Hainsworth Street, Westmead
	<u>Cumberland:</u>
	- Tree removal works between Bridge Road and Factory Street
	- UTC-018 works
	- Archaeological salvage was completed
	<u>North Parramatta:</u>
	- Demolition of 1-2/2 Factory Street commenced
	- Demolition of 519 Church Street completed
	- Underground Petroleum Storage System removal complete at 435 Church Street
- Demolition of Royal Oak Hotel complete	
Parramatta CBD	Area 2 West (CBD)
	- Installing Chainwire fencing on Church Street
	- Removal of awnings
	<u>UTC works</u>
	- UTC-005 Telstra works at Church, George and Smith Street
	- UTC-007 temporary water main at Macquarie Street
	- UTC-008 general utilities at Endeavour at Church Street
	- UTC-037 electrical and lighting in the CBD
	- UTC-041 multifunction poles in the CBD
	<u>Micro tunnel</u>
	- UTC-037 electrical and lighting in the CBD
	- Site establishment, pit excavation and Tunnel Boring Machine drilling in Centenary Square
<u>Area 2 West tree clearing</u>	
- Church Street	
- Macquarie Street	



Precinct	Site Activities
	Area 2 East (Smith/Charles to Arthur St) <ul style="list-style-type: none">- Jemena relocation works at Harris Street, nearing completion- Demolition at Arthur Street / Tramway Ave (2 of 3 houses)- Heritage investigations at George Street <u>Utility works</u> <ul style="list-style-type: none">- UTC-006 (General utilities) at Harris and Macquarie Street- UTC-009 (General utilities) at George Street and Harris to Purchase Street- UTC-0012 (General Utilities) at Macquarie/Charles Street intersection <u>Area 2 East tree clearing</u> <ul style="list-style-type: none">- Macquarie Street- George Street
Camellia and Carlingford line	<u>Grand Avenue North & Tramway Avenue (UTC-003)</u> <ul style="list-style-type: none">- Drainage works at Grand Avenue North- Connection of utilities- Concrete pour for sewer encasement at Tramway Avenue- Piling for Caltex protection slab at Grand Avenue North <u>UTC-013a</u> <ul style="list-style-type: none">- Camellia Junction: Utility Investigation and commencement of deep excavation for sewer- Sandown Line: excavation and installation of sewer sleeve <u>Grand Avenue (UTC-004)</u> <ul style="list-style-type: none">- Site establishment, utility Investigation and tree felling <u>James Ruse Drive Underbridge</u> <ul style="list-style-type: none">- Piling at Tramway Avenue for James Ruse Drive underbridge <u>Carlingford line</u> <ul style="list-style-type: none">- Foundation treatment for Camellia retaining wall- Retaining wall works from Rydalmere to Telopea- Fill compaction from Telopea to Carlingford- Stump grinding from Camellia to Carlingford- Demolition of Leamington Road Overpass <u>Rosehill / Clyde</u> <ul style="list-style-type: none">- Construction of track prototype



3. Monitoring Results

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

3.1. Inspections

A total of five ER inspections were completed in during the reporting period in addition to thirty-two 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 June 2020

Date	Number of Inspections	Type	Actions	Closed in Time
26/05/2020	1	Internal Inspection	2	Yes
26/05/2020	1	ER Inspection	5	Yes
26/05/2020	1	AA Inspection	0	N/A
29/05/2020	2	Internal Inspection	0	N/A
1/06/2020	4	Internal Inspection	0	N/A
1/06/2020	1	Internal Inspection	3	Yes
1/06/2020	1	Internal Inspection	1	Yes
3/06/2020	1	Internal Inspection	4	Yes
4/06/2020	1	ER Inspection	3	Yes
4/06/2020	1	Internal Inspection	0	Yes
5/06/2020	2	Internal Inspection	3	Yes
8/06/2020	3	Internal Inspection	0	N/A
10/06/2020	1	Internal Inspection	0	N/A
10/06/2020	1	Internal Inspection	1	Yes
11/06/2020	1	ER Inspection	1	Yes
11/06/2020	1	Internal Inspection	1	Yes
15/06/2020	2	Internal Inspection	0	N/A
15/06/2020	2	Internal Inspection	1	Yes
16/06/2020	2	Internal Inspection	0	N/A
17/06/2020	1	ER Inspection	4	Yes



18/06/2020	1	Internal Inspection	1	Yes
18/06/2020	1	Internal Inspection	4	Yes
23/06/2020	1	ER Inspection	3	Yes
Total	-	33	37	Yes

3.2. Weather

The total rainfall during the reporting period was 49 mm with 10 days with >1mm of rain and no days exceeding the 80th percentile (25.8mm) or the 85th percentile (33.1mm).

During the reporting period, there were 16 days where the maximum wind gust recorded was greater than 25km/hr, there were no days where the maximum wind gust recorded was greater than 50km/hr. There were a total of 14 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 June 2020 are presented in **Appendix A-1**.

Table 3-2 Weather Summary and Trigger Weather Events for June¹ 2020

Weather event	Forecast	Observation
Minimum temperature	5°C	3.2°C
Maximum temperature	22°C	22.3°C
Total rainfall	39mm	49mm
Number of days with rain (>1mm)	6 days	10 days
>80 th percentile (25.8mm) rain events	0	0 events
>85 th percentile (33.1mm) rain events	0	0 events
Flood warning / events	0	0 events
>25km/hr wind ²	13 days	15 days
>50km/hr wind	1 day	0 days

1. Weather summary based on data from the 26 May to 25 June (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.

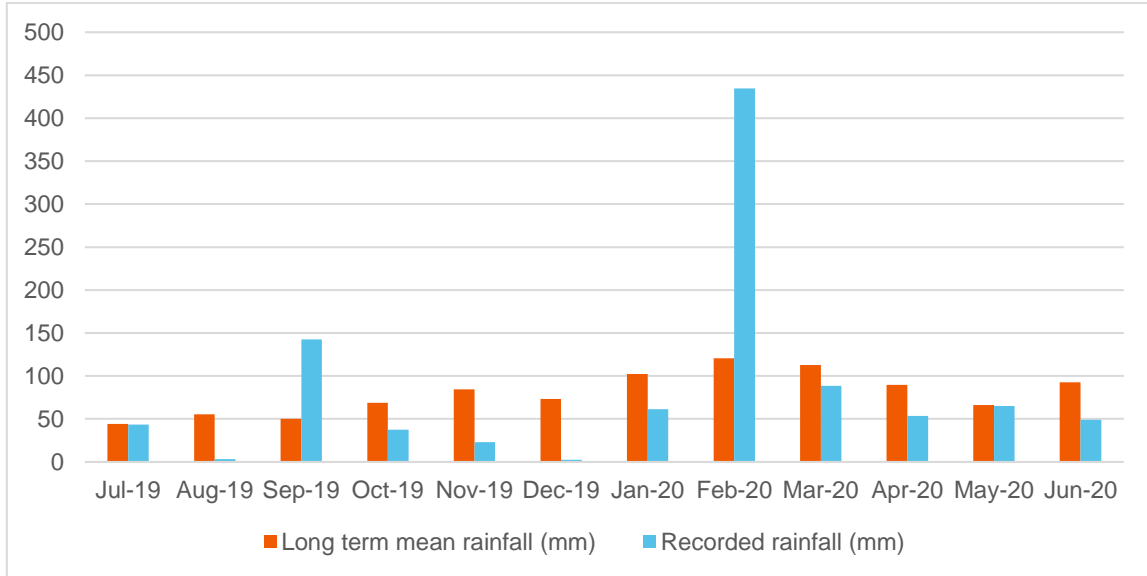


Figure 3-1 Monthly rainfall comparison

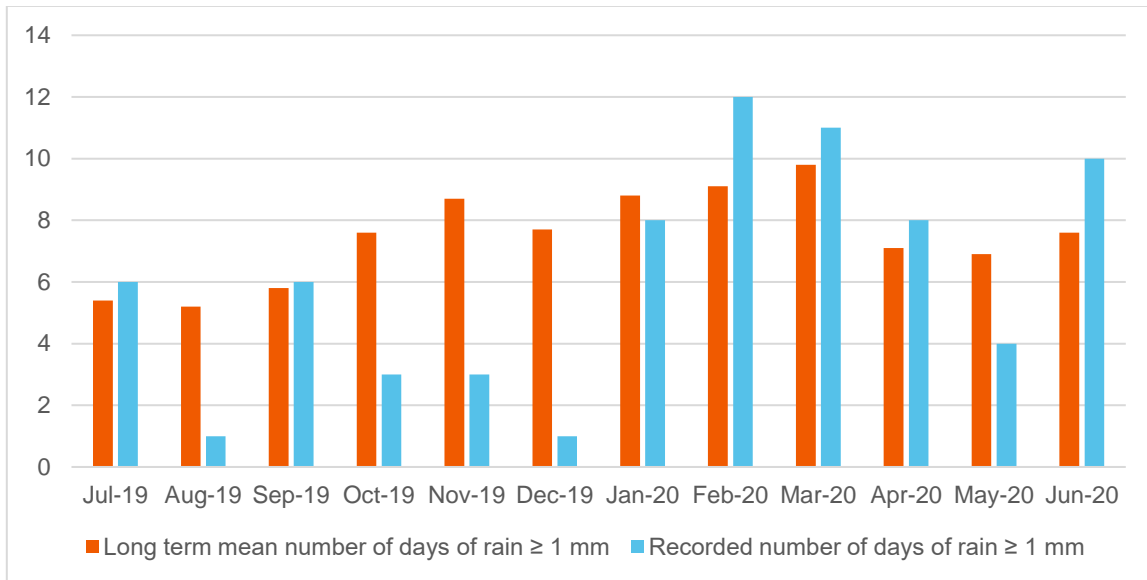


Figure 3-2 Monthly rain days comparison

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 June 2020

Date	Monitoring Location	Description
27/05/2020	86-94 Kissing Point Road, Dundas	Bored piling
28/05/2020	61 O'Connell Street	Jemena gas utility works; excavation, saw cutting, jackhammering
5/06/2020	6-10 Charles Street	Excavation for water main
5/06/2020	6-10 Charles Street	Saw cutting and hammering
6/06/2020	128 Macquarie Street	Backfilling trench
12/06/2020	234 Church Street	Hammering and vac truck

Table 3-4 Summary of vibration monitoring June 2020

Date	Monitoring Location	Description
26/05/2020	Attached to Duck Creek Bridge	Jackhammer existing concrete slab and median
3/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
4/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
4/06/2020	Alfred Street Demolition	Demolition using 46T excavator
5/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
6/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
7/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
8/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
9/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
10/06/2020	Alfred Street Demolition	Demolition using 46T excavator
11/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
12/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
13/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
14/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
15/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
16/06/2020	Royal Oaks Hotel, 387 Church Street	Demolition saw, 21T excavator
24/06/2020	13a Kenny Place, Carlingford	Fill compaction with a vibrating roller



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
Vibration Monitor	7099	15/05/2021

Note: The calibration of the monitoring equipment is checked in the field before and after the noise measurement period per 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.

During the reporting period, one wet weather monitoring event was undertaken and is summarised by Table 3-6, further detail can be found in Appendix 3. The monitoring was undertaken following a 33.4 mm rain event that occurred from the 8th of June 2020 to the 21st of June 2020. Water levels were higher than usual and minimal debris was present in all waterways when sampling.

The sampling results recorded were generally in accordance with the baseline values and ANZACC Guidelines, however, pH for VY1 and PR6 were marginally above the baseline value. In addition, turbidity recorded at the up-stream Parramatta River locations and Duck Creek were above the baseline NTU values which is likely attributed to high rainfall.

Table 3-6 Water quality (turbidity) in receiving waters

Date	Type	Type of Results	Wet / Dry	Locations
15/06/2020	Pre-construction screening	Field	Wet	Parramatta River: PR1; PR3; PR4; PR5; PR6 Clay Cliff Creek: CC1 Vineyard Creek: VY1; VY2 Domain Creek: DC1

3.4.2. Discharge and dewatering

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

There were 2 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. Baseline data indicated that the value of Total Insoluble Matter (TIM) was 3.9 g/m² before commencement of construction activities at 13A Grand Avenue.

The dust monitoring result for the June 2020 reporting period was 3.5g/m²/month which is below the trigger criteria of 4 g/m²/month.

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
26/06/2020	13a Grand Avenue	3.5

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				Cld	Dir	Spd
	°C	°C	mm	%	8th			
26/05/2020	12	16.7	0	14.2	76	8	SW	15
27/05/2020	12.2	19.4	12	14.5	94	8	SW	11
28/05/2020	10	20	0.6	15	81	3	SW	7
29/05/2020	8.6	22	0	13.6	93	0	W	4
30/05/2020	9.2	17	0	13.7	88	6	SE	4
31/05/2020	9	20	1.8	13	97	0	W	4
1/06/2020	9.7	22.3	0	19	72	1	NNW	15
2/06/2020	5	16.6	1.2	9.6	86	7	SW	6
3/06/2020	5.2	19	0	14	71	0	SW	6
4/06/2020	9.1	16.5	0	12.5	62	5	SSW	11
5/06/2020	3.2	19.8	0	9.8	83	0	W	2
6/06/2020	4.6	19.3	0	10.5	78	0	W	4
7/06/2020	6.2	17.8	0	9.8	84	6	W	4
8/06/2020	7	18	10	12.5	53	2	WSW	4
9/06/2020	8.2	19	1	13.3	97	4	SW	4
10/06/2020	9.8	16.2	3	14.2	97	8	NNE	2
11/06/2020	12.2	21.6	1.4	13.8	97	4	W	6
12/06/2020	9.8	15.2	0	14.2	90	7	SW	4
13/06/2020	8.8	20	3	13.8	97	5	NW	4
14/06/2020	11.8	20.7	7.2	14.8	96	7	W	6
15/06/2020	6.3	20	0	12.5	71	0	W	6
16/06/2020	9.4	20.8	0	14.8	73	*	*	*
17/06/2020	7.4	16.2	0	13.5	77	5	SW	2
18/06/2020	9.4	19	1.8	11.7	91	7	WNW	2
19/06/2020	5	19.8	0	10.6	97	0	WNW	2
20/06/2020	6.2	20	0	9.1	97	5	W	6
21/06/2020	8.2	19.2	6	12	97	7	NW	4
22/06/2020	6.8	16.5	0	10.8	77	5	W	4
23/06/2020	6.3	15.7	0	11.5	70	3	WNW	4
24/06/2020	5.2	*	0	12.5	68	0	W	2
25/06/2020	6	*	0	12.4	72	0	W	2



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
26/05/2020	SSE	35	11:42	W	6	SSE	17
27/05/2020	S	17	10:48	WNW	9	ESE	7
28/05/2020	SSE	22	15:38	NW	9	SSW	7
29/05/2020	WNW	13	8:29	NW	9		Calm
30/05/2020	N	20	14:05	WNW	9	NNE	7
31/05/2020	N	24	12:39	NNW	6	N	9
1/06/2020	WNW	48	17:42	N	11	NW	17
2/06/2020	WNW	37	13:03	NW	9	W	15
3/06/2020	S	33	13:08	W	9	S	17
4/06/2020	SW	28	0:18	WSW	11	S	9
5/06/2020	NW	17	9:25	NW	7	NW	4
6/06/2020	NW	17	6:32	NW	7	NE	4
7/06/2020	SSE	28	13:44	WNW	7	SE	15
8/06/2020	SSE	35	15:15	W	7	SSE	11
9/06/2020	SSE	20	12:02	NW	2	ESE	9
10/06/2020	NE	15	0:05	NW	6	ESE	7
11/06/2020	SSE	30	15:01	WSW	7	SE	19
12/06/2020	W	13	9:34	WSW	7	NW	7
13/06/2020	NW	15	12:32	WNW	4	E	6
14/06/2020	WNW	37	13:50	NW	6	WNW	19
15/06/2020	WNW	26	12:23	NW	9	WNW	9
16/06/2020	NW	26	11:54	NW	9	WNW	7
17/06/2020	S	28	15:03	WNW	6	S	13
18/06/2020	SSE	22	2:02	WNW	2	E	7
19/06/2020	NNE	15	15:20		Calm	ENE	6
20/06/2020	N	20	15:03	WNW	11	N	11
21/06/2020	WNW	28	21:55		Calm	WNW	6
22/06/2020	WSW	26	16:27	W	7	WSW	13
23/06/2020	W	33	13:04	WNW	11	WSW	9
24/06/2020	SW	31	14:54	WNW	13	SW	13
25/06/2020	*	*	*	WNW	11	WSW	*

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.

* Data was unavailable.



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
27/05/2020	8:31	Standard Working Hours	Bored piling	Abutment B, Kissing Point Road, Dundas	86-94 Kissing Point Road, Dundas	56	88	PV, V	80.0	62.1	-25.9	No	Highly Noise Intrusive Works Moxy driving by at 8:33
28/05/2020	22:15	OOHW Period 2	Jemena gas utility works; excavation, saw cutting, jackhammering	Factory Street OConnell Street, North Parramatta	61 O'Connell Street	46	87	PN, V, RP, SN, DR	82.8	78.9	-8.1	No	Highly Noise Intrusive Works No comments
5/06/2020	22:23	OOHW Period 2	Excavation for water main	Macquarie Street and Charles Street	6-10 Charles Street	48	92	PN, V, RP, DR	85.4	71.6	-20.4	No	Highly Noise Intrusive Works Vac truck on idle Hammering with blankets at commencement of works Noise blankets were relocated closer to the hammer at 9:30
5/06/2020	23:04	OOHW Period 2	Saw cutting and hammering	Macquarie Street and Charles Street	6-10 Charles Street	48	92	PN, V, RP, DR	80.4	72.2	-19.8	No	Highly Noise Intrusive Works 21:00 hammering starts (76dB) Picking up asphalt by hand (after the monitoring stopped)
6/06/2020	23:25	OOHW Period 2	Utility excavation and backfilling	128 Macquarie Street	128 Macquarie Street	48	87	PN, V, RP, DR	75.9	65.2	-21.8	No	Construction Moderately Intrusive 7:50 mins into monitoring – excavation commenced and 65dB recorded 14:00 mins into monitoring – truck parked in front of the monitor
12/06/2020	12:23	Standard Working Hours	Hammering and vac truck	232 Church Street	234 Church Street	70	90	PN, V	90.8	79.5	-10.5	No	Construction Moderately Intrusive 12:28 minutes someone spoke into the sound meter (96dB) Constant pedestrian movement

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	Trigger Value	Recorded PVS (Max values)	Exceedance of Target	Construction vibration exceedance	Comments
26/05/2020	21:10-21:25	OOHW Period 2	Jackhammer existing concrete slab and median	Parramatta Road	Attached to Duck Creek Bridge	20 mm/s	0.493 mm/s	No	No	No comments
3/06/2020	07:42-17:59	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.18 mm/s	No	No	No comments
4/06/2020	09:01-17:59	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.126 mm/s	No	No	No comments
4/06/2020	08:30-08:45	Standard work hours	46T excavator	Alfred Street Demolition	Alfred Street	7.5 mm/s	0.246	No	No	No vibration generating activities for demolition works
5/06/2020	09:02-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.12 mm/s	No	No	No comments
6/06/2020	09:01-17:59	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.447 mm/s	No	No	No comments
7/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.11 mm/s	No	No	No comments
8/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.11 mm/s	No	No	No comments
9/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.18 mm/s	No	No	No comments
10/06/2020	08:30-10:00	Standard work hours	46T excavator	Alfred Street Demolition	Alfred Street	7.5 mm/s	0.179	No	No	No vibration generating activities for demolition works
11/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.16 mm/s	No	No	No comments
12/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.739 mm/s	No	No	No comments
13/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.009 mm/s	No	No	No comments
14/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.739 mm/s	No	No	No comments
15/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.73 mm/s	No	No	No comments
16/06/2020	09:01-18:00	Standard work hours	Demolition saw, 21T excavator	Royal Oaks Hotel, 387 Church Street	Royal Oaks Hotel, 387 Church Street	6.5 mm/s	0.022 mm/s	No	No	No comments
24/06/2020	16:13-16:28	Standard work hours	Fill compaction with a vibrating roller	South of Carlingford Station	Adjacent to 13a Kenny Place, Carlingford	3 mm/s	0.053 mm/s	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
	ANZECC Guideline	Trigger	Values			LR ¹ : 6.5-7.5 E: 7-8.5	LR ¹ : 7.0-9.1 E: 6.6-9.1	LR ¹ : 125-2200 E: None	LR ¹ : 6-50 E: 0.5-10	
PR1	Parramatta River	Wet	15/06/2020	11:01	15.42	7.68	7.37	0.293	36.5	Sunny weather. Normal current. Water murky
DC1	Domain Creek	Wet	15/06/2020	11:48	14.14	7.22	8.11	0.226	11.8	Sunny weather. Normal current. Water clear..
PR3	Parramatta River	Wet	15/06/2020	10:33	15.04	7.74	10.46	0.509	29.3	Water general dark colour. Sunny weather.
PR4	Parramatta River	Wet	15/06/2020	12:18	14.8	7.74	8.31	0.453	13.7	Sunny weather. Normal current. No leaf litter or rubbish. Water murky
PR5	Parramatta River	Wet	15/06/2020	2:02	16.19	7.56	42.26	23.2	2.5	Sunny weather. Normal current. No rubbish. Water clarity is good.
VY2	Vineyard Creek	Wet	15/06/2020	12:42	13.99	7.71	15.31	0.286	2	Clay coloured run-off. Overcast
VY1	Vineyard Creek	Wet	15/06/2020	12:58	14.21	7.94	42.61	0.764	3.1	Water clear. Sunny weather.
PR6	Parramatta River	Wet	15/06/2020	12:47	13.94	7.48	14.75	14	5.6	Water clear. Sunny weather.

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

Table A-3-2 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
A2.25	1	Basins and settling containers	Stormwater inlet	9/06/2020	DW A2_002	Not visible	8.25	0	Discharge from water filled barriers (filled with potable water)
A2.09	1	Basins and settling containers	Stormwater inlet	04/06/2020	DW A2_012	Not visible	8.08	0	Discharge from Sydney Water main

