



# ENVIRONMENTAL MONITORING REPORT, SEPTEMBER 2020

## PARRAMATTA LIGHT RAIL INFRASTRUCTURE WORKS

25 September 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](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 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**

<b>CEMP or Sub-plan</b>	<b>Monitoring program</b>	<b>Distribution</b>
Noise and Vibration Management Sub-plan	<ul style="list-style-type: none"> <li>- Locations and descriptions of monitoring undertaken</li> <li>- Noise monitoring results</li> <li>- Summary of any exceedance of the nominated criteria</li> <li>- Corrective actions</li> </ul>	<ul style="list-style-type: none"> <li>- City of Paramatta Council</li> <li>- Cumberland Council</li> <li>- EPA</li> <li>- NSW Health</li> <li>- TfNSW</li> <li>- IC</li> <li>- ER</li> <li>- AA</li> <li>- Made publicly available</li> </ul>
Soil and Water Management Sub-plan	<ul style="list-style-type: none"> <li>- Weather forecasts and observations</li> <li>- Water Quality (Turbidity) monitoring</li> <li>- Discharge and dewatering monitoring</li> </ul>	<ul style="list-style-type: none"> <li>- City of Paramatta Council</li> <li>- Cumberland Council</li> <li>- EPA</li> <li>- DOI Water</li> <li>- TfNSW</li> <li>- IC</li> <li>- Made publicly available</li> </ul>
Air Quality and Dust Management Sub-plan	<ul style="list-style-type: none"> <li>- Weather observations</li> <li>- Dust deposition monitoring</li> <li>- Real time aerosol dust monitors</li> <li>- Asbestos fibre air monitoring</li> </ul>	<ul style="list-style-type: none"> <li>- EPA</li> <li>- TfNSW</li> <li>- IC</li> <li>- Made publicly available</li> </ul>
Grey-headed Flying-fox (GHFF) Construction Monitoring Program	<ul style="list-style-type: none"> <li>- Weekly visual checks of GHFF camp during high risk periods (1 September to 31 January)</li> </ul>	<ul style="list-style-type: none"> <li>- TfNSW</li> </ul>



## 2. Site Activities

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

**Table 2-1 Site Activities During Reporting Period**

Precinct	Site Activities
Westmead and North Parramatta	<b>Westmead</b>
	<ul style="list-style-type: none"> <li>– Utility installation for Telstra, Endeavour Energy, Optus</li> <li>– Utility installation and property adjustments along Hawkesbury Road and Hainsworth Street</li> </ul>
	<b>Cumberland</b>
	<ul style="list-style-type: none"> <li>– Utility installation for private utilities (AAPT, AARNET), Jemena and Endeavour Energy</li> <li>– Planning for sewer installation continued</li> </ul>
Parramatta CBD	<b>North Parramatta</b>
	<ul style="list-style-type: none"> <li>– Utility installation and property adjustment works between Factory Street to Market Street and Church Street</li> </ul>
	<b>Area 2 West (CBD)</b>
	<ul style="list-style-type: none"> <li>– Utilities works for Telstra on Church Street, George Street, Smith Street.</li> <li>– General utility relocations of Jemena, Sydney Water and Endeavour Energy on Church Street and Macquarie Street</li> <li>– Electrical and lighting works including the footings for multifunction poles continue</li> <li>– Tunnel Boring Machine drilling to compete pits continues.</li> <li>– Foreshore works along Parramatta River continue for the investigation of the lintel at Lennox Bridge</li> <li>– Minor civil works continue along Church Street</li> </ul>
Camellia and Carlingford line	<b>Area 2 East (Smith Street to Arthur Street)</b>
	<ul style="list-style-type: none"> <li>– General utility relocations for Jemena, Sydney Water and Endeavour Energy on Harris Street and Macquarie Street, George Street between Harris Street to Purchase Street, Purchase Street to Arthur Street and Macquarie Street to Charles Street intersection</li> <li>– Heritage investigations completed at Robin Thomas Reserve</li> <li>– Ongoing property adjustments and utility connections on George Street</li> <li>– Tree removal completed at Tramway Avenue and George Street</li> <li>– Macquarie Street and George Street Traffic Management Plan approved</li> </ul>
	<b>Camellia</b>
	<ul style="list-style-type: none"> <li>– James Ruse Drive Bridge preparation</li> <li>– Soil mass mixing and stormwater drainage works at Tramway Avenue.</li> <li>– Ongoing utility works at Grand Avenue</li> <li>– Clearing and stormwater drainage works ongoing at the Sandown Line</li> </ul>
	<b>Carlingford Line</b>
	<ul style="list-style-type: none"> <li>– Piling ongoing for Vineyard Creek bridge, Victoria Road deflection wall and Camellia Bridge piling</li> </ul>



<b>Precinct</b>	<b>Site Activities</b>
	<ul style="list-style-type: none"><li>- Retaining wall works undertaken from Rydalmere to Carlingford</li><li>- Ongoing utility works at Rydalmere</li><li>- Site establishment and utility investigation at Leamington Road, Dundas</li><li>- Site establishment and utility investigation for Sydney Water sewer at Carlingford</li><li>- Utility Connection and testing at Telopea Station</li></ul>

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## 3. Monitoring Results

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

### 3.1. Inspections

A total of five ER inspections and two AA inspections were completed during the reporting period in addition to 36 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 September 2020**

Date	Number of Inspections	Type	Actions	Closed in Time
27/08/2020	1	ER Inspection	6	Yes
31/08/2020	9	Internal Inspection	1	Yes
01/09/2020	1	ER Inspection	6	Yes
02/09/2020	1	AA Inspection	3	Yes
07/09/2020	4	Internal Inspection	1	Yes
08/09/2020	16	Internal Inspection	21	Yes
10/09/2020	1	ER Inspection	12	Yes
14/09/2020	6	Internal Inspection	1	Yes
15/09/2020	1	ER Inspection	4	Yes
21/09/2020	1	Internal Inspection	2	Yes
22/09/2020	1	ER Inspection	7	Yes
16/09/2020	1	AA Inspection	1	Yes
<b>Total</b>	<b>43</b>	<b>-</b>	<b>65</b>	<b>-</b>

### 3.2. Weather

The total rainfall during the reporting period was 29.2mm with six days with over 1mm of rain. No rain events exceeded the 80<sup>th</sup> percentile (25.8mm) or the 85<sup>th</sup> percentile (33.1mm).

During the reporting period, there were 22 days where the maximum wind gust recorded was greater than 25km/hr and one day where the maximum wind gust recorded was greater than 50km/hr. There was a total of 17 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 7-2**. A comparison between long term monthly means and recorded values can be found in **Figure 3-2**.

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

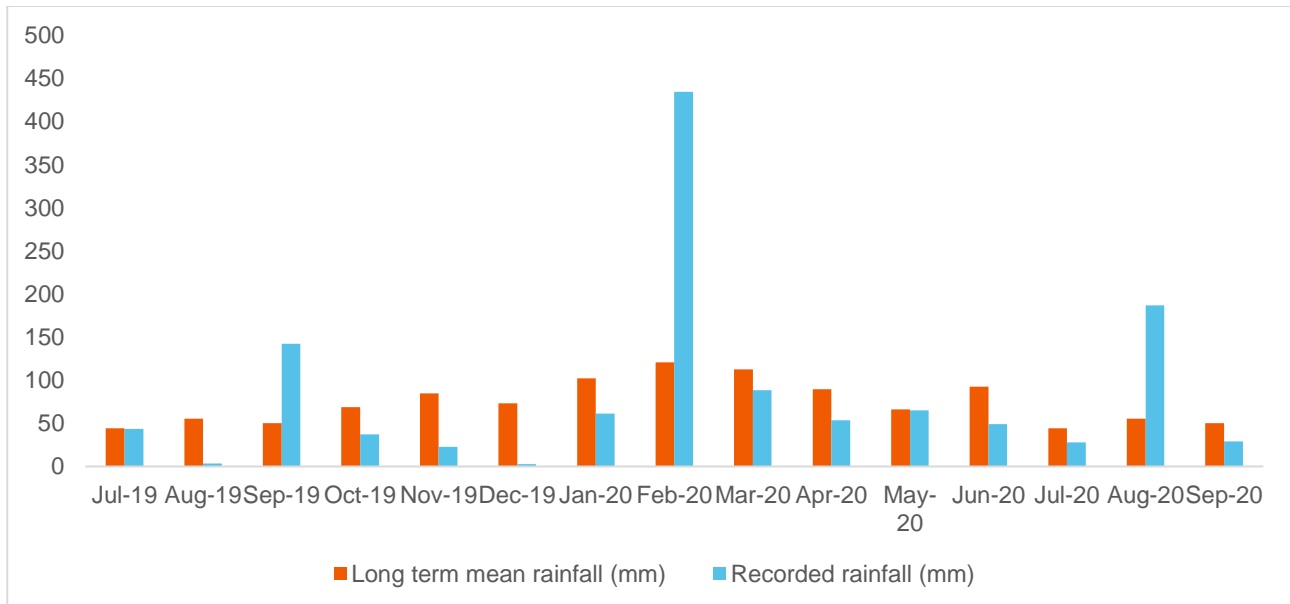
**Table 3-2 Weather Summary and Trigger Weather Events for September<sup>1</sup> 2020**

Weather Event	Forecast	Observation
Minimum temperature	4°C	3.2°C
Maximum temperature	31°C	30.8°C
Total rainfall	47.2mm	29.2mm
Number of days with rain (>1mm)	7 days	6 days
>80 <sup>th</sup> percentile (25.8mm) rain events	No events	No events
Flood warning / events	No events	No events
>25km/hr wind <sup>2</sup>	17 days	22 days
>50km/hr wind	No days	1 day

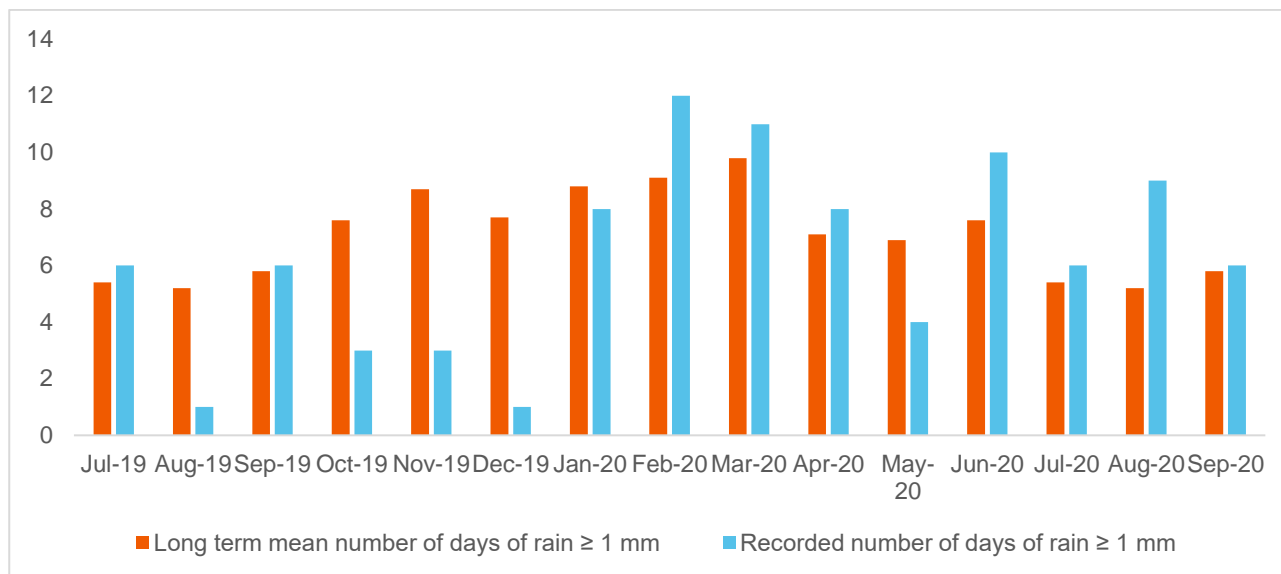
<sup>1</sup>Weather summary based on data from the 26 August to 25 September (31 days).

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

Note: Red text 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**. All recorded noise levels ( $L_{Aeq15min}$ ) during the reporting period were 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**.

Continuous noise and vibration monitoring was undertaken during the reporting period at medical facilities in Westmead that have been identified as sensitive receivers. In consultation with the Health Administration Corporation, monitoring will be ongoing for 12 months. Locations of the noise and vibration monitors are provided in **Table 3-6**.

**Table 3-3 Summary of Noise Monitoring September 2020**

Date	Monitoring Location	Attended/Continuous	Description
31/8/2020	34 Rippon Ave	Attended	Construction noise is clearly audible
01/09/2020	Top of Lennox Bridge	Attended	Construction noise is dominant noise source
01/09/2020	Kissing Point Road	Attended	Construction noise is clearly audible



Date	Monitoring Location	Attended/Continuous	Description
07/09/2020	Carlingford Station	Attended	Construction noise sometimes audible
07/09/2020	Dundas Station	Attended	Traffic noise is dominant and clearly audible
07/09/2020	89 Marshall Rd	Attended	Construction noise sometimes audible
07/09/2020	22 Adderton Rd	Attended	Traffic noise is dominant and clearly audible
07/09/2020	14 Dudley St	Attended	Construction noise audible at most times
8/09/2020	504 Church St	Attended	Construction noise is clearly audible
15/09/2020	504 Church St	Attended	Construction noise is dominant and clearly audible
17/09/2020	185 George St	Attended	Construction noise is dominant noise source
17/09/2020	173 George St	Attended	Construction noise audible at most times
20/08/2020	Westmead Institute for Medical Research (Sleep Lab)	Continuous	General construction
20/08/2020	Westmead Institute for Medical Research (Brain Dynamics Centre)	Continuous	General construction
26/06/2020	Children's Medical Research Institute (Microscopy Labs)	Continuous	General construction
26/06/2020	Cumberland Hospital (Clinical psychology rooms)	Continuous	General construction

**Table 3-4 Summary of Vibration Monitoring September<sup>1</sup> 2020**

Date	Monitoring Location	Attended/Continuous	Description
26/08/2020	Works at 181 James Ruse Dr	Attended	Works at 181 James Ruse Dr
27/08/2020	Lennox Bridge	Attended	Sheet piling
27/08/2020	Lennox Bridge	Attended	Sheet piling
28/08/2020	Lennox Bridge	Attended	Sheet piling



Date	Monitoring Location	Attended/Continuous	Description
28/08/2020	Lennox Bridge	Attended	Sheet pilling
28/08/2020	Lennox Bridge	Attended	Sheet pilling
31/08/2020	34 Rippon Ave	Attended	Rock breaking
01/09/2020	Lennox Bridge	Attended	Sheet pilling
7/09/2020	Lennox Bridge	Attended	Sheet pilling
7/09/2020	Lennox Bridge	Attended	Sheet pilling
8/09/2020	Lennox Bridge	Attended	Sheet pilling
8/09/2020	Lennox Bridge	Attended	Sheet pilling
10/09/2020	Lennox Bridge	Attended	Sheet pilling
16/06/2020	Hawkesbury Road Westmead Institute for Medical Research (HAL incubators)	Continuous	General construction
16/06/2020	Hawkesbury Road Westmead Institute for Medical Research (Microscopy Labs)	Continuous	General construction
16/06/2020	Hawkesbury Road Children's Medical Research Institute (Microscopy Labs)	Continuous	General construction

**Table 3-5 Noise and Vibration Monitors and NATA Calibration**

Equipment <sup>1</sup>	Serial Number	Calibration Date
Noise Level Meter	00973277	4/12/2020
Noise Level Meter	00661732	19/05/2021
Vibration Monitor	BE14639	5/12/2020
Vibration Monitor	BE17441	16/07/2021

<sup>1</sup>Continuous monitoring equipment installed at the Westmead Institute for Medical Research and the Children's Medical Research Institute is owned and operated by Renzo Tonin.



**Table 3-6 HAC Noise and Vibration Monitor Locations**

Organisation	Monitor Type	Location
Westmead Institute for Medical Reach	Vibration Monitor	HAL incubators
		Microscopy Labs
	Noise Monitor	Sleep Lab
		Brain Dynamics Centre
Children's Medical Research Institute	Vibration Monitor	Microscopy Labs
	Noise Monitor	Labs (Level 1)
Cumberland Hospital	Noise Monitor	Clinical psychology rooms

**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 in receiving waters

A pre-construction investigation to establish water quality objectives for the project is included within the EIS Technical Paper 6 – Water Quality Assessment.

During the reporting period, dry weather monitoring for the quarter was undertaken as summarised in **Table 3-6** and detailed in **Table A-3-1**. Water levels were moderate with a normal to slow flow at the time of sampling and overall there were little to no debris or leaf litter present. All results were within the water quality objectives.

Locations DC1 (Duck Creek) and SC1 (Subiaco Creek) will be monitored if there are differences in the water quality up-stream and down-stream of Parramatta River, as per the Soil and Water Management Plan.

**Table 3-6 Water Quality in Receiving Waters**

Date	Type	Type of Results	Wet / Dry	Locations
31/08/2020	Monitoring during construction	Laboratory	Dry	Parramatta River: PR1; PR3; PR4; PR5; PR6 Clay Cliff Creek: CC1, CC2 Vineyard Creek: VY1; VY2 A'becketts Creek: AC1, AC2

**Table 3-7 Water Monitor Calibration**

Equipment <sup>1</sup>	Serial Number	Calibration Date
Water Quality Monitor	DV7F6E7J	21/08/2021

<sup>1</sup>All equipment is calibrated by NATA standards.



### 3.4.2. Discharge and dewatering

There were two discharge events during the reporting period as presented in **Table A-3-2**.

## 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/m<sup>2</sup> before the commencement of construction activities at 13A Grand Avenue.

Additional dust gauges were installed as per the Air Quality Management Plan in July at Rydalmere Station and Dundas Station and at Carlingford in August as large-scale earthworks are ongoing.

The dust monitoring results for the September 2020 reporting period are a month in arrears.

**Table 3-7 Summary of Dust Deposition Data**

Date	Monitoring Location	Total Insoluble Matter g/m <sup>2</sup> /month
January	13a Grand Avenue	3.9
March	13a Grand Avenue	4
April	13a Grand Avenue	4.1
May	13a Grand Avenue	4.9
June	13a Grand Avenue	3.5
July	13a Grand Avenue	12
July	Rydalmere Station	21.7
July	Dundas Station	0.7
August	13a Grand Avenue	2.8
August	Rydalmere Station	2.6
August	Dundas Station	0.5
August	Carlingford	0.9
September	13a Grand Avenue	-
September	Rydalmere Station	-
September	Dundas Station	-
September	Carlingford	-



## 3.6. Flora and Fauna

### 3.6.1. Grey-Headed Flying Fox Monitoring

Under Condition of Approval C9, a Grey-Headed Flying Fox (GHFF) Construction Monitoring Program has been developed by TfNSW. The requirements of this Program have been reflected in the Flora and Fauna Management Plan.

The Grey-Headed Flying Fox camp is in Parramatta Park which lies approximately 150m from the project boundary at the nearest point.

Visual observation inspections must be carried out from September to January during the 'high risk' months. If any distress is observed, TfNSW is to be immediately notified.

**Table 3-8 Observations from Visual Monitoring**

Date	Time	Temperature	Works	Notification Triggers <sup>1</sup>	Comments
26/08/2020	12:30	16°C	Installation of private utilities and decommissioning of redundant utilities	No	No indicators of stress or abnormal behaviour was observed during the inspection. No construction works can be heard.
02/09/2020	08:09	14°C	Utility installation at Cumberland East and West	No	No indicators of stress or abnormal behaviour was observed during the inspection. No construction works can be heard.
09/09/2020	10:09	17°C	Utility installation at Cumberland East and West	No	No indicators of stress or abnormal behaviour was observed during the inspection. No construction works can be heard.
16/09/2020	10:11	27°C	Utility excavation near Green Up drive.	No	No indicators of stress or abnormal behaviour was observed during the inspection. No construction works can be heard.
22/09/2020	14:17	27°C	Utility excavation near Green Up Drive	No	No indicators of stress or abnormal behaviour was observed during the inspection. No construction works can be heard.

<sup>1</sup>Notification triggers include: >50% of the roost takes flight for over 20 minutes, GHFF leaving the roost in daylight hours, unusual vocalisations, located on or 2m from the ground, panting, saliva spreading, adults moving away from young, GHFF injured or killed on site (including aborted foetuses).



# Appendices

## A-1 Weather Observations

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

Date	Temperatures		Rain	Temp	RH	9:00 AM		
	Min	Max				Cld	Dir	Spd
	°C	°C	mm	°C	%			
26/08/2020	3.7	19.2	0	10.4	70	0	W	4
27/08/2020	3.2	21.6	0	11.4	73	5	W	4
28/08/2020	8.3	19.2	0	15.4	53	2	SSW	9
29/08/2020	4	22.8	0	13	70	0	WSW	4
30/08/2020	5.3	25.5	0	14.3	62	0	W	6
31/08/2020	13.5	23	0	18.8	68	0	SW	4
1/09/2020	10	19	0	14.5	71	2	S	4
2/09/2020	5.5	24.2	0	15.6	70	6	NW	11
3/09/2020	14.8	29.8	0	23.5	60	2	NNW	19
4/09/2020	15.5	21	0	20.8	71	8	N	2
5/09/2020	11	22.5	7	15.5	84	0	W	4
6/09/2020	7.2	19.3	0	14.5	83	4	N	2
7/09/2020	7.2	22.5	0	17.2	73	0	NW	4
8/09/2020	7.8	25.6	0	17.2	73	6	N	2
9/09/2020	13.2	16.5	1.6	14.6	97	8	SSE	15
10/09/2020	9	18.4	8	16.2	63	6	SE	22
11/09/2020	8.6	19.8	0.6	16.4	75	2	SW	2
12/09/2020	7.6	23.8	0	15	89	1	NNW	4
13/09/2020	8	24.8	0	18	65	6	NW	11
14/09/2020	8	22	0.2	19.5	68	0	SE	4
15/09/2020	11.3	24.2	0	18.2	83	7	N	4
16/09/2020	9.5	28	0	19	79	0	NW	4
17/09/2020	11.6	30.8	0	24	54	6	NW	6
18/09/2020	14.8	17.4	0	16.5	85	8	S	2
19/09/2020	14.5	23	1.6	16.5	99	8	SSE	2
20/09/2020	10	24	4	16.2	98	8	NE	2
21/09/2020	12.6	29.7	6.2	23.5	74	0	NW	6
22/09/2020	18.4	24.2	0	22.4	55	0	SW	9
23/09/2020	11	23.5	0	20	*	0	W	7
24/09/2020	9	21.4	0	17.5	36	0	WSW	9
25/09/2020	6.7	23.3	0	19.2	37	0	NNW	20



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

Date	Maximum Wind Gusts			9:00 AM		3:00 PM	
	Direction	Speed	Time	Direction	Speed	Direction	Speed
		km/h	local		km/h		km/h
26/08/2020	E	22	16:37	NW	9	*	Calm
27/08/2020	NW	26	23:52	NW	9	WNW	13
28/08/2020	SSW	30	10:27	SW	13	E	15
29/08/2020	ESE	20	16:13	NW	7	E	11
30/08/2020	NNW	24	14:42	WNW	11	NNW	9
31/08/2020	SE	46	14:28	WSW	7	SE	22
1/09/2020	ENE	26	16:46	WSW	4	E	13
2/09/2020	NNW	37	13:29	NNW	2	NNW	15
3/09/2020	NNW	39	9:30	NNW	17	NW	13
4/09/2020	NNW	33	0:50	*	Calm	NNE	2
5/09/2020	NW	31	10:22	WNW	15	ESE	15
6/09/2020	ESE	26	15:31	NW	6	ENE	13
7/09/2020	NE	28	16:36	WNW	7	ENE	13
8/09/2020	N	22	11:56	*	Calm	ENE	9
9/09/2020	SSE	41	4:51	SSE	13	S	4
10/09/2020	SSE	35	9:27	SE	19	SSE	15
11/09/2020	ENE	24	15:56	S	4	NNE	11
12/09/2020	E	24	15:23	*	Calm	E	13
13/09/2020	WNW	31	14:56	*	Calm	WNW	19
14/09/2020	ESE	28	13:14	SE	2	E	19
15/09/2020	ESE	24	14:56	ENE	7	E	15
16/09/2020	N	33	13:36	WNW	2	NNW	11
17/09/2020	SSE	56	16:28	*	Calm	NW	9
18/09/2020	S	24	0:08	S	2	SE	7
19/09/2020	NE	30	13:42	*	Calm	E	13
20/09/2020	N	31	14:09	NNE	4	NNE	13
21/09/2020	N	35	10:56	N	13	NNE	13
22/09/2020	WNW	46	16:11	W	15	N	13
23/09/2020	NW	41	14:22	WNW	20	WNW	20
24/09/2020	NW	44	12:27	WNW	19	WNW	24
25/09/2020	WNW	69	16:44	NNW	20	NW	13

Notes:

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

The orange text indicates a rain event greater than the 80<sup>th</sup> percentile of 25.8mm, and a wind speed of greater than 25km/hr

Red text indicates a rain event greater than the 85<sup>th</sup> 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 <sub>Amax</sub>	Recorded L <sub>eq, 15min</sub> (dBA)	Exceedance of Predicted (dBA)	Exceedance of Predicted	Comments
31/8/2020	11:26	Standard Hours	Rock hammering	34 Rippon Ave	34 Rippon Ave	55	89	PN, V, RP	97.3	83.9	-5.1	No	Construction noise is clearly audible
01/09/2020	13:40	Standard Hours	Sheet piling	Lennox Bridge	Top of Lennox Bridge	68	80	PN, V, SN	93.9	79.1	-0.9	No	Construction noise is dominant noise source
01/09/2020	12:35	OOHW Period 2	Median Strip removal	Kissing Point Rd	Kissing Point Road	48	86	PN, V, RP	88.7	72.2	-13.8	No	Construction noise is clearly audible
07/09/2020	09:37	Standard Hours	FRP Pennant Hills deflection wall	Pennant Hills Rd	Carlingford Station	56	65	PN, V, RP	70	52.3	-12.7	No	Construction noise sometimes audible
07/09/2020	10:48	Standard Hours	Material Haulage	Dundas	Dundas Station	61	65	PN, V, RP	81.9	67.6	2.6	Yes	Traffic noise is dominant and clearly audible
07/09/2020	10:03	Standard Hours	Drainage works	Telopea	89 Marshall Rd	55	71	PN, V, RP	75.5	58	-13	No	Construction noise sometimes audible
07/09/2020	10:24	Standard Hours	Retaining wall	Adderton Rd	22 Adderton Rd	61	65	PN, V, RP	79.1	67.2	2.2	Yes	Traffic noise is dominant and clearly audible
07/09/2020	11:10	Standard Hours	Drainage	Rydalmere	14 Dudley St	53	69	PN, V, RP	79.25	68.1	-0.9	No	Construction noise audible at most times
8/09/2020	22:25	OOHW Period 2	Saw cutting	Church Street	504 Church St	48	86	PN, V, SN	85.7	67.5	-18.5	No	Construction noise is clearly audible
15/09/2020	22:54	OOHW Period 2	Concrete cutting	Church Street	504 Church St	48	93	PN, V, RP	105.7	76.1	-16.9	No	Construction noise is dominant and clearly audible
17/09/2020	12:29	Standard Hours	Mulching	218 George Street	185 George St	53	93	PN, V, RP	104.5	87	-6	No	Construction noise is dominant noise source
17/09/2020	12:47	Standard Hours	Mulching	214 George Street	173 George St	53	85	PN, V, RP	79	68	-17	No	Construction noise audible at most times
26/06/2020	Continuous monitoring	Construction works	Hawkesbury Road works	Westmead Institute for Medical Research (Sleep Lab)		40	*	*	*	*	*	No	
26/06/2020	Continuous monitoring	Construction works	Hawkesbury Road works	Westmead Institute for Medical Research (Brain Dynamics Centre)		60	*	*	*	*	*	No	Activities are reviewed in response to exceedance alerts. Where the exceedance is attributed to construction, a review is undertaken of works and plant/equipment or methodology is modified where necessary.
26/06/2020	Continuous monitoring	Construction works	Hawkesbury Road works	Children's Medical Research Institute (Microscopy Labs)		60	*	*	*	*	*	No	
26/06/2020	Continuous monitoring	Construction works	Cumberland Hospital	Cumberland Hospital (Clinical psychology rooms)		60	*	*	*	*	*	No	

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
26/08/2020	11:31-11:46	Standard work hours	Works at 181 James Ruse Dr	181 James Ruse Dr	Tramway Ave	25 mm/s	3.77 mm/s	No	No	No comment
27/08/2020	14:55-15:10	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	0.813 mm/s	No	No	No comment
27/08/2020	14:32-14:47	Standard work hours	Sheet piling	Lennox bridge	Bottom of Lennox bridge abutment	7.5 mm/s	0.813 mm/s	No	No	No comment
28/08/2020	12:21-12:36	Standard work hours	Sheet piling	Lennox bridge	Bottom of Lennox bridge abutment	7.5 mm/s	0.582 mm/s	No	No	No comment
28/08/2020	12:21-12:36	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	3.873 mm/s	No	No	No comment
28/08/2020	14:37-14:48	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	0.554 mm/s	No	No	No comment
31/08/2020	11:26-11:41	Standard work hours	Rock breaking	34 Rippon Ave	34 Rippon Ave	25 mm/s	7.141 mm/s	No	No	No comment
01/09/2020	13:42-14:57	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	4.859 mm/s	No	No	No comment
7/09/2020	14:54-8:00	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	0.773 mm/s	No	No	No comment
7/09/2020	15:16-08:13	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	3.178 mm/s	No	No	No comment
8/09/2020	08:01-16:49	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	1.205 mm/s	No	No	No comment
8/09/2020	08:15-16:53	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	6.224 mm/s	No	No	No comment
10/09/2020	8:16-11:21	Standard work hours	Sheet piling	Lennox bridge	Top of Lennox bridge abutment	7.5 mm/s	1.709 mm/s	No	No	No comment
26/06/2020	Continuous monitoring	Hawkesbury Road works	Hawkesbury Road	Westmead Institute for Medical Research (HAL incubators)	0.1 mm/s	*	No	No	Activities are reviewed in response to exceedance alerts. Where the exceedance is attributed to construction, a review is undertaken of works and plant/equipment or methodology is modified where necessary.	
26/06/2020	Continuous monitoring	Hawkesbury Road works	Hawkesbury Road	Westmead Institute for Medical Research (Microscopy Labs)	0.1 mm/s	*	No	No		
26/06/2020	Continuous monitoring	Hawkesbury Road works	Hawkesbury Road	Children's Medical Research Institute (Microscopy Labs)	0.1 mm/s	*	No	No		

## A-3 Water Sampling and Discharge Results

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

Location	Waterway	Upstream/ Downstream of Works	Type	Date	Time	pH 5.5-8.5 <sup>2</sup>	Elec. Conduct. ( $\mu$ S/cm) LR <sup>1</sup> : 125-2200 <sup>2</sup> E: None	Turbidity (NTU) 6-50 <sup>2</sup>	Comments and Observations
PR1	Parramatta River	Upstream	Dry	31/08/2020	13:30	7.48	681	2.1	Clear sky. No wind. Slight current. No oil or grease visible. No rubbish. No leafy debris. Water clear.
PR3	Parramatta River	Upstream	Dry	31/08/2020	13:15	7.9	581	2.6	Clear sky. No wind. Slight current. No oil or grease visible. No rubbish and leafy debris. Water clear.
PR4	Parramatta River	Downstream	Dry	31/08/2020	15:17	8	791	1.2	Overcast. No wind. No oil or grease visible. No rubbish and or debris. Water clear.
PR5	Parramatta River	N/A	Dry	31/08/2020	16:10	7.78	27500	1.3	Overcast. No wind. No oil or grease visible. No rubbish or leafy debris. Water murky.
PR6	Parramatta River	N/A	Dry	31/08/2020	14:13	7.48	30100	0.8	Clear sky. No wind. Normal current. No oil or grease visible. No rubbish or leafy debris. Water clear.
VY1	Vineyard Creek	Upstream	Dry	31/08/2020	13:57	7.81	852	61	Clear sky. No wind. Normal current. No oil or grease visible. Some rubbish and leafy debris present. Water clear.
VY2	Vineyard Creek	Downstream	Dry	31/08/2020	13:49	7.89	804	15.3	Clear sky. No wind. Slow current. No oil or grease visible. No rubbish and leafy debris. Water clear.
CC2	Clay Cliff Creek	Upstream	Dry	31/08/2020	14:47	8.24	19900	3.2	Clear sky. No wind. No oil or grease visible. No rubbish or leafy debris. Water clear.
CC2	Clay Cliff Creek	Downstream	Dry	31/08/2020	14:35	8.24	22200	1.8	Overcast. No wind. No oil or grease visible. No rubbish or leafy debris. Water murky.
AC1	A'Becketts Creek	Upstream	Dry	01/09/2020	8:11	7.92	11000	3.6	Clear sky. No wind. No oil or grease visible. No rubbish or leafy debris. Water murky.
AC2	A'Becketts Creek	Downstream	Dry	01/09/2020	08:01	8.32	14800	3.2	Clear sky. No wind. No oil or grease visible. Minimal rubbish and leafy debris. Water murky.

1. ANZECC Waterway types: Fresh water (PR1, PR2, PR3, PR4, VY1 and VY2); E: Estuarine (CC1, CC2, AC1, AC2, PR5 and PR6).

2. Trigger values were established by Parramatta Connect within the Pre-Construction Sampling (Baseline Review) Water Quality Monitoring Report (PLR1INF-CPBD-ALL-WA-RPT-000003). Red text indicates values outside of the baseline trigger values.

Table A-3-2 Discharge Water Quality

Discharge monitoring Point ID	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
A2.11	Basins and settling containers	Stormwater inlet	11/09/2020	DW-A2_032	Not visible	6.60	0	Discharge from Sydney Water main
A3.22	Basins and settling containers	Stormwater inlet	11/09/2020	DW-A3_016	Not visible	8.03	0	Discharge from dewatering from deep excavation at Grand Avenue

