


CONSTRUCTION MONITORING REPORT
Sydney Metro City & Southwest
Package 5 & 6
Customer: Sydney Metro

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Compliance Matrix

Condition	Requirement	Compliance
MCoA C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	This Construction Monitoring Report

Introduction

This Construction Monitoring Report has been prepared in accordance with Condition C14 of Critical State Significant Infrastructure Planning Approval 8256. It contains the results of Noise and Vibration Monitoring Program and the Water Quality Monitoring Programs, conducted as part of the station upgrades and Metro Services Building (MSB) construction at:

- Dulwich Hill (Package 5)
- Hurlstone Park (Package 6)
- Campsie (Package 5)
- Belmore (Package 6)
- Wiley Park (Package 6)
- Punchbowl (Package 5)

This report details the results of the noise, vibration and surface water conducted during the first six (6) months of construction of Package 5 and Package 6 of the Sydney Metro Southwest Project. Construction of these packages commenced on 21 April 2021 and this report details the results of the monitoring undertaken from 21 April 2021 to 7 November 2021 (being approximately six months). The extension to November captured a run of possessions which included monitoring results and has been included for completeness.

SUBMISSION REQUIREMENTS

In accordance with condition the Ministers Conditions of Approval (MCoA) C14, Construction Monitoring Report will be submitted to the following agencies for information:

- Inner West Council
- City of Canterbury Bankstown
- DPIE

The Independent Environmental Representative for DPIE will review the report prior to submission.

Surface Water Monitoring

The project sites are located within the rail corridor on the T3 Bankstown line between Dulwich Hill and Punchbowl, NSW. The project sites form part of the overall Cooks River catchment with water from the area discharging into the Cooks River via local stormwater drainage or overland flow. The catchment area is highly urbanised with mixed residential, commercial and industrial properties.

The closest Project worksite to an existing watercourse is the Wiley Park Station services building, which is located approximately 100m from an unnamed concrete-lined channel, which forms the upper reaches

of Cocks Creek and is identified as a first-order stream within the Cooks River Catchment. Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW Office of Environment and Heritage as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. Water quality within the Cooks River catchment is influenced by stormwater, fertilisers, industrial discharges and sewage contamination. Objectives for water quality management during construction are:

- Minimise pollution of surface water through appropriate erosion and sediment control
- Maintain existing water quality of surrounding surface watercourses

The water quality monitoring program, in accordance with Table 13 of the SWMP, is to be undertaken quarterly in response to wet weather events (four wet weather events - >20mm of rain per 24 hours - per year), and also including dry weather sampling. Additional surface water monitoring is undertaken during construction to monitor the effectiveness of measures for managing soil and water impacts implemented. It must be conducted for the duration of construction or unless otherwise agreed to by Downer, Sydney Metro and the Independent Environmental Representative for DPIE. Details of the Water Quality Monitoring Program and the mitigation measures to reduce the impact of the construction activities are contained within the Soil and Water Management Plans listed below:

- Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Soil and Water Management Plan. This document can be accessed via the Downer Sydney Metro Environment Documents website.
https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Dulwich_Hill_Campsie_and_Punchbowl_Station_Upgrades_SWMP_Rev06.pdf
- Southwest Metro – Hurlstone Park, Belmore and Wiley Park Station Upgrades Soil and Water Management Plan. This document can be accessed on the Downer Sydney Metro Environment Documents website:
https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Hurlstone_Park_Belmore_and_Wiley_Park_Station_Upgrades_SWMP_Rev06.pdf

RESULTS - SURFACE WATER MONITORING

In accordance with Table 21.4 of the EIS, Vol. 1B, the water quality triggers values relevant for the project are the following:

Indicator	Criteria (lowland rivers)
Total phosphorus	50 ug/L
Total nitrogen	500 ug/L
Chlorophyll-a	5 ug/L
Turbidity	6-50 NTU
Salinity (electrical conductivity) ¹	125-2,200 uS/cm
Dissolved oxygen (per cent saturation)	85-110 %
pH	6.5-8.5

A summary of the Surface Water Monitoring Results is contained within the table below. The complete Surface Water Monitoring Reports are contained within Appendixes 1-3. Bold red text indicates initial criteria exceedances.

Parameter	10 March 2021		20 March 2021		5 May 2021		1 July 2021	
	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)
Monitoring Event	Dry weather pre-construction baseline measurement		Wet weather event (mid-construction)		Wet weather event (mid-construction)		Quarterly sampling mid-construction event	
Water Depth (m)	0.03	0.03	0.3	0.3	0.05	0.3	0.05	0.1
pH	7.9	7.61	8.10	7.58	7.8	7.73	9.01	8.83
Electrical Conductivity (µS/cm)	54	363	246.2	133.4	2500	92.9	910	530.3
Dissolved Oxygen (mg/L)	5.64	4.09	4.79	3.92	6.35	5.95	11.21	7.92
Dissolved Oxygen (%)	63	45.9	52.87	43.18	65.3	62.8	108.8	77.9
SHE1 Redox Potential (mV)	140.7	181.0	122.3	135.9	164.6	109.2	53.7	122.4
Total Suspended Solids (TSS) (mg/L)	<1	<1	9.2	35	4	47	4	4.4
Turbidity (NTU)	2.9	<1	9.3	13	4.3	21	4.1	6.3
Total phosphorus (mg/L)	0.34	0.12	<0.5	<0.5	0.21	0.15	0.18	0.13
Total nitrogen (mg/L)	2.5	1.68	2.3	2.3	5	1	1.3	3.1
Chlorophyll-a (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001
Condition	Clear Low turbidity Sheen observed	Clear Low turbidity Sheen observed	Brown Medium turbidity	Brown Medium turbidity	Clear Low to medium turbidity Sheen observed	Clear Low to medium turbidity	Clear Minor sheen observed	Clear Low turbidity
Oil and Grease (mg/L)	<10	29	<10	<10	<10	<10	<10	<10



Figure 1: WP1 and WP2 location map. Please note that only WP1-DP1 and WP2-DP1 are Downer's discharge points.

Baseline Dry Weather Event: 10 March 2021

The results of the monitoring event indicates that:

- Electrical Conductivity ($\mu\text{S}/\text{cm}$) was within the adopted assessment criteria at all sample locations;
- Dissolved Oxygen (%Sat) was reported outside of the target range (85%-110%) with results ranging from 63% saturation upstream at WP1 and 45.9% saturation downstream at WP2;
- Concentrations of tested inorganics (phosphorous and nitrogen) were reported below the adopted assessment criteria, with the exception of nitrogen and phosphorous which exceeded the ANZECC criteria at both sample locations. Upstream concentrations at WP1 were higher than concentrations downstream at WP2;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations, with the exception of the downstream sample WP2;
- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at all sample locations;
- Total Suspended Solids (TSS) was not detected above the laboratory limit of reporting in both sample locations; and
- Turbidity ranged from 2.9 NTU at WP1 and <1 NTU at WP2.

These results reflect the status of the waterline during dry weather prior to construction commencement, when works had not yet started. Therefore, documented values are not related to any Downer activity.

Mid Construction Wet Weather Event: 20 March 2021

Rainfall recorded at this wet-weather event was of 56.8 mm. The results of the monitoring event indicated that:

- Electrical Conductivity ($\mu\text{S}/\text{cm}$) was within the adopted assessment criteria at all sample locations;
- Dissolved Oxygen (%Sat) was reported outside of the target range (85%-110%) with results ranging from 52.9% saturation upstream at WP1 and 43.2% saturation downstream at WP2. Results are consistent with the baseline measurement;
- Concentrations of analysed inorganics were reported below the adopted assessment criteria, with the exception of nitrogen within both the WP1 and WP2 samples, and phosphorous within a triplicate quality assurance sample from WP2 which exceed the ANZECC criteria. Results are consistent with the baseline measurement;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at all sample locations;
- Total Suspended Solids (TSS) concentrations were detected within both WP1 and WP2, with concentrations of 9.2 mg/L at WP1 and 35 mg/L at WP2; and
- Turbidity ranged from 9.3 NTU at WP1 to 13.2 NTU at WP2.

Mid Construction Wet-weather Event: 5 May 2021

Rainfall recorded at this wet-weather event was of 22.6 mm. The results of the monitoring event indicate that:

- Electrical Conductivity ($\mu\text{S}/\text{cm}$) was reported outside of the target range (125-2,200 $\mu\text{S}/\text{cm}$) with results ranging from 2,500 $\mu\text{S}/\text{cm}$ upstream at WP1 and 92.9 $\mu\text{S}/\text{cm}$ downstream at WP2. Readings were re-checked in the field using the WQM from the water collected as a bulk sample and consistent results were observed when re-checking both the WP1 and WP2 sampled water. No point source was observed at WP1;
- Dissolved Oxygen (%Sat) was reported outside of the target range (85%-110%) with results ranging from 65.3% saturation upstream at WP1 and 62.8% saturation downstream at WP2;
- Concentrations of analysed inorganics were reported above the adopted assessment criteria with the total nitrogen concentration within both the WP1 and WP2 samples, and the total phosphorous concentration within both the WP1 and WP2 samples. Results are generally consistent with baseline measurement;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at all sample locations;
- Total Suspended Solids (TSS) concentrations were detected within both WP1 and WP2, with concentrations of 4 mg/L at WP1 and 21 mg/L at WP2; and
- Turbidity ranged from 4.3 NTU at WP1 to 21 NTU at WP2.

During the wet-weather sampling event the two discharge points (including the one connecting the construction site and the unnamed channel) within the rail corridor immediately upstream / south from WP2 were observed to be not flowing and not contributing to the channel. Therefore, exceedances are not related to Downer's construction activities.

Quarterly Mid-Construction Event – 1 July 2021

The results of the monitoring event indicate that:

- Field measurements – physio-chemical parameters:
 - pH was reported outside of the target range (6.5-8.5) with results ranging from 9.01 upstream at WP1 and 8.83 downstream at WP2. The PH is higher upstream and gets closer to target closer to downstream, so pH values are not a result of Downer's works;
 - Electrical Conductivity ($\mu\text{S}/\text{cm}$) was reported within of the target range (125-2,200 $\mu\text{S}/\text{cm}$) at both sampling locations with results ranging from 910 $\mu\text{S}/\text{cm}$ upstream at WP1 and 530.3 $\mu\text{S}/\text{cm}$ downstream at WP2; and
 - Dissolved Oxygen (%Sat) was reported outside of the target range (85%-110%) at downstream sampling point WP2. The results are ranging from 108.8% saturation upstream at WP1 and 77.9% saturation downstream at WP2. Dissolved oxygen saturation was below the adopted threshold at WP2 but within range at WP1. This is not considered to be a significant issue, due to the pre-construction monitoring results showing saturations of 63% and 45.9% for WP1 and WP2 respectively indicating mid-construction results are closer to the adopted thresholds than the pre-construction event.
- Laboratory analytical results:
 - Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at all sample locations;
 - Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
 - Concentrations of analysed inorganics were reported above the adopted assessment criteria with the total nitrogen concentration within both the WP1 and WP2 samples, and the total phosphorous concentration within both the WP1 and WP2 samples. Concentration of inorganics is lower downstream, so results cannot be attributed to Downer's works.
 - Total Suspended Solids (TSS) concentrations were detected within both WP1 and WP2, with concentrations of 4 mg/L at WP1 and 4.4 mg/L at WP2; and
 - Turbidity ranged from 4.1 NTU at WP1 to 6.3 NTU at WP2.

Nitrogen and turbidity results within the samples were observed to be higher in the downstream WP2 sampling point. In addition, dissolved oxygen saturation was below the adopted range within WP2. Based on comparison to the criteria, and pre-construction monitoring event, these results are not considered to reflect an adverse impact to water quality due to Downer's construction activities.

DISCUSSION - SURFACE WATER MONITORING

The results of the surface water monitoring showed that monitored parameters were generally within the adopted ANZECC screening criteria; however, some results showed parameters outside of the screening criteria. In these instances, the recommended actions were:

- Undertake an inspection of the adjacent works and controls within the current worksite area and propose actions where required in accordance with the SMWP; and
- Assess the area downstream of sampling point WP1 to confirm whether there are additional discharge points downstream of WP1 which may contribute the stormwater in-flow to the unnamed channel during the rainfall events.

In response to these recommendations inspections of the site were conducted to ensure that all sediments and erosion controls were in place, well maintained and functioning correctly. The stormwater system was also inspected, and it was noted that there were stormwater intake points and most likely other stormwater connections between WP1 and WP2, this being the case there are other sources of potential pollution between the two sampling locations.

It should also be noted that Downer conducts regular inspection of the environmental controls, including sediment and erosion controls at Wiley Park. These inspections are conducted by the Project Team and Environmental Team. This proactive approach ensures that environmental controls are functioning properly rather than reactively inspecting the worksite following monitoring and reporting.

Noise and vibration

The area surrounding the project sites contains a variety of land-use types and receivers, including residential, commercial, industrial and sensitive non-residential receivers. These land-uses are mixed within the identified noise catchments, although in general there are clusters of industrial and commercial areas surrounding stations, primarily residential areas between stations. The area surrounding the project sites are affected by rail noise and vibration. The majority of works will occur within the rail corridor, on the station platforms and buildings and within the Metro Services Building Areas, works will mainly occur adjacent to residential properties.

Noise and vibration monitoring must be carried out for the duration of Construction. The predominant reason for monitoring noise and vibration associated with the construction works is to ensure compliance with modelled results for noisy works and to ensure compliance with modelled results and the project's Conditions of Approval(s) and NVMP. Modelling undertaken prior to noisy construction activities assesses if Respite Offers (RO) and Alternate Accommodation (AA) are required to be provided to sensitive receivers that are impacted by noise from works conducted outside of standard working hours. Other reasons to conduct noise and vibration monitoring include:

- In response to noise or vibration complaints;
- If requested by Sydney Metro, the ER, DPIE or EPA;
- To augment baseline noise levels, if the noise environment at a receiver is considered to be different from the noise logger locations used for the EIS;
- To validate predicted noise levels associated with each works scenario assessed in the CNVIS, at the commencement of works and new construction activities or location;
- To confirm baseline vibration levels currently experienced at heritage-listed structures and at any vibration-sensitive equipment;
- Where vibration levels are predicted to exceed the vibration screening level, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure, in accordance with Revised Environmental Mitigation Measure (REMM) NVC12; and
- As part of a plant noise audit;

The methodology and rationale for conducting noise and vibration monitoring is contained within the relevant Noise and Vibration Monitoring Plans, being:

- Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Noise and Vibration Management Plan. This document can be accessed via the Downer Sydney Metro Environment Documents website, https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Dulwich_Hill_Campsie_and_Punchbowl_Station_Upgrades_NVMP_Rev02_210302_W_.pdf
- Southwest Metro – Hurlstone Park, Belmore and Wiley Park Station Upgrades Noise and Vibration Management Plan. This document can be accessed via the Downer Sydney Metro Environment Documents website, https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Southwest_Metro_-_Hurlstone_Park_Belmore_Wiley_Park_Station_Upgrades_-_Noise_and_Vibration_Management_Plan.pdf

RESULTS – NOISE MONITORING

The table below contains a summary of the noise monitoring results. The complete reports are provided in Appendixes 4 - 17

Assessment Point	Measured Plant	Predicted noise level dB(A)	Measured noise level		Above predicted noise level	Comments
			LAeq(15min)	LAmx		
19 th – 20 th April 2021	TL927-1-02F02 WE42 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIXES 4					
1 Ewart Lane, Dulwich Hill	Demo Saw	72	61	66	No	Temporary noise barriers were setup correctly during the measurement. The measured LAeq, 15min is lower than the predicted noise level.
	Lighting tower	68	61	61	No	Lighting tower setup on 19.04.2021. The measured LAeq, 15min is lower than the predicted noise level.
	Lighting tower	68	55	55	No	Lighting tower setup on 20.04.2021. Note that a different lighting tower was setup on the Tuesday night, which produced lower noise levels. The measured LAeq, 15min is lower than the predicted noise level.
107 Duntroon Street, Hurlstone Park	Demo saw	67	52	57	No	Temporary noise barriers were setup correctly during the measurement. The measured LAeq, 15min is lower than the predicted noise level.
	Hand tools	56	46	53	No	Temporary noise barriers were setup correctly during the measurement. The measured LAeq, 15min is lower than the predicted noise level.
13-15 Anglo Rd, Campsie	Lighting tower	68	49	61	No	The lighting tower was not audible at this monitoring location. As a result, the noise contribution from the lighting tower can be assumed to be at least 10dB less than the measured LAeq, 15min.
	Excavator with clamp attachment	68	61	78	No	The measured LAeq, 15min is lower than the predicted noise level during the demolition of shed works.
1-3 Shadforth Street, Wiley Park	Hand tools	72	54	61	No	The measured LAeq, 15min is lower than the predicted noise level.
	Hand tools	72	70	85	No	The measured LAeq, 15min is lower than the predicted noise levels. Note that this measurement included the activity of hammering which produced higher noise levels.
14 Arthur Street, Punchbowl	Vacuum truck	46	52	64	No	The vacuum truck was not audible at this monitoring location. As a result, the noise contribution from the lighting tower can be assumed to be at least 10dB less than the measured LAeq, 15min.
28 th May – 29 th May 2021	TL927-1-07F01 WE48 NOISE AND VIBRATION MONITORING REPORT (R1) - APPENDIXES 5					
1A Shadforth Street, Wiley Park	Concrete saw (south platform), vacuum truck, lighting tower	73	71	83	No	The measured LAeq, 15min is lower than the predicted noise level.
	Concrete (north)	73	67	72	No	The measured LAeq, 15min is

	platform), vacuum truck, lighting tower					lower than the predicted noise level.
	Jackhammering	73	66	83	No	The measured LAeq, 15min is lower than the predicted noise level.
2 Shadforth Street, Wiley Park	Concrete saw	80	63	78	No	The measured LAeq, 15min is lower than the predicted noise level. During this measurement, the station platform building was in between the measured plant and the receiver. As a result, the measured noise level is significantly lower than the predicted noise level.
	Chainsaw, wood chipper	82	70	80	No	The measured LAeq, 15min is lower than the predicted noise level.
1 Cornelia Street, Wiley Park	Crane mounted truck	78	72	100	No	The measured LAeq, 15min is lower than the predicted noise level. The measured L _{Amax} of 100 dB(A) was caused by dropping chocks.
2A Cornelia Street, Wiley Park	Crane mounted truck	69	60	74	No	The measured LAeq, 15min is lower than the predicted noise level.
1 Ewart Lane, Dulwich Hill	Excavator	77	65	80	No	The measured LAeq, 15min is lower than the predicted noise level.
	Excavator with bucket, lighting tower, truck and dogs	78	67	82	No	The measured LAeq, 15min is lower than the predicted noise level.
41 Uranga Parade, Punchbowl	5T Excavator with auger attachment	68	63	77	No	The measured LAeq, 15min is lower than the predicted noise level.
13-15 Anglo Road, Campsie	Excavator with bucket, generator	79	60	62	No	The measured LAeq, 15min is lower than the predicted noise level. During this measurement, only the generator was audible at the closest residential receiver. Furthermore, noise barriers were installed around the generator. As a result, the measured noise level is significantly lower than the predicted noise level.
103 Duntroon Street, Hurlstone Park	Excavator with hammer attachment	93	66	74	No	The measured LAeq, 15min is lower than the predicted noise level. The predicted noise level was calculated for the most affected facade. Note that there was no access to the most affected facade. The property building provided shielding from the measured plant. As a result, the measured noise level is significantly lower than the predicted noise level.
1 Acacia Street, Belmore	Vac truck	71	71	78	No	The measured LAeq, 15min is consistent with the predicted noise level.
2 Hopetoun Street, Hurlstone Park	Excavator with hammer, lighting tower, moxy trucks, boring and trenching activities	69	57	62	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the boring and trenching activities were not audible at this monitoring location.
5th June 2021	TL927-1-08F01 WE49 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIX 6					
7 Bedford Crescent,	Flatbed truck, excavator, generator	67	54	66	No	The measured LAeq, 15min is lower than the predicted noise level. The

Dulwich Hill						hoardings on the station platform provided partial shielding for this monitoring location.
3A Commons Street, Hurlstone Park	Generator, excavator, hi-rail loading vehicles	73	69	77	No	The measured LAeq, 15min is lower than the predicted noise level.
12 Railway Street, Hurlstone Park	Telescopic crane, flatbed truck and van	72	59	90	No	The measured LAeq, 15min is lower than the predicted noise level. Explain about the distance of the measured plant.
5-9 London Street, Campsie	Chainsaw	74	61	80	No	The measured LAeq, 15min is lower than the predicted noise level.
1A Shadforth Street, Wiley Park	Excavator with hammer attachment	80	66	87	No	The measured LAeq, 15min is lower than the predicted noise level.
41 Uranga Parade, Punchbowl	Hiab truck, excavator	68	53	79	No	The measured LAeq, 15min is lower than the predicted noise level. Occasional distant noise impacts from the excavator was audible at this monitoring location.
1 Acacia Street, Belmore	Vacuum truck, excavator with bucket and auger attachment	68	57	80	No	The measured LAeq, 15min is lower than the predicted noise level.
28 th June – 1 st July 2021	TL927-1-09F01 WE52 WK1 NOISE AND VIBRATION MONITORING REPORT (R3) - APPENDIXES 7					
2 Shadforth Street, Wiley Park	Excavators with bucket attachment, handheld grinder, truck deliveries	81	64	84	No	The measured LAeq, 15min is lower than the predicted noise level.
30 Redman Parade, Belmore	3.5T excavator with rockhammer attachment, excavators with bucket attachment	65	63	76	No	The measured LAeq, 15min is lower than the predicted noise level.
103/105 Duntroon Street, Hurlstone Park	Excavators with bucket attachment, Moxy trucks	82	65	85	No	The measured LAeq, 15min is lower than the predicted noise level
	Excavator with rockhammer attachment, excavator with bucket attachment, generator	84	66	76	No	Note that there was no access to the most affected facade. The property building provided shielding between the rockhammering activity and the measurement location. As a result, the measured LAeq, 15min noise level is significantly lower than the predicted noise level.
1 Ewart Lane, Dulwich Hill	Generator, truck deliveries, excavator with rockdrill attachment	74	73	86	No	The measured LAeq, 15min is lower than the predicted noise level.
71 Ewart Street, Dulwich Hill	Excavator with rockdrill attachment	84	64	75	No	The measured LAeq, 15min is lower than the predicted noise level. During this measurement, only the rockdrilling activity is audible from the works. There were no concurrent works in the work area directly across from the monitoring location. As a result, the measured noise level is significantly lower than the predicted noise level.
5 Bedford Crescent, Dulwich Hill	Excavator with rockdrill attachment and generator	74	69	78	No	The measured LAeq, 15min is lower than the predicted noise level.
199 Beamish Street, Campsie	Two 5T excavators with bucket and gripper attachment, truck deliveries	70	75	92	Not applicable	le These measurements were deemed invalid as the environmental conditions caused adverse effect on the measured

	(construction bin) Two 5T excavators with gripper attachment	70	75	91	Not applicable	noise levels.
8 -10 Shadforth Street, Wiley Park	15T excavator with bucket attachment and Moxy truck	64	55	73	No	The measured LAeq, 15min is lower than the predicted noise level.
115 Duntroon Street, Hurlstone Park	Excavator with rockhammer attachment	67	63	83	No	The measured LAeq, 15min is lower than the predicted noise level.
5 Commons Street, Hurlstone Park	Excavator with bucket attachment, Moxy trucks, lighting tower, concrete agitator	68	54	75	No	The measured LAeq, 15min is lower than the predicted noise level
41 Urunga Parade, Punchbowl	Excavator with bucket attachment, stockpile management, Moxy truck	73	58	72	No	The measured LAeq, 15min is lower than the predicted noise level.
50 Floss Street, Hurlstone Park	Two excavators with rockhammer attachment, concrete saw	73	68	74	No	The measured LAeq, 15min is lower than the predicted noise level.
107 Duntroon Street, Hurlstone Park	Concrete saw, excavator with rockhammer attachment, generator, electric rotary cutter	79	66	87	No	The measured LAeq, 15min is lower than the predicted noise level.
5 Railway Street, Hurlstone Park	15T Excavator with bucket attachment, truck delivery, fuel truck, 8T roller	83	63	82	No	The measured LAeq, 15min is lower than the predicted noise level.
	35T Pilling rig with auger, concrete truck	83	65	72	No	The measured LAeq, 15min is lower than the predicted noise level.
7 Commons Street, Hurlstone Park	5T Excavator with bucket attachment, concrete truck, jackhammer	75	59	74	No	The measured LAeq, 15min is lower than the predicted noise level. Jackhammering was not the dominant noise source, as it was just audible at this monitoring location. As a result, the measured noise level is compared to the predicted noise level for a typical activity.
7th July – 11th July 2021						
TL927-1-10F01 WK52-WE2 NOISE AND VIBRATION MONITORING REPORT (R3) - APPENDIXES 8						
5 Railway Street, Hurlstone Park	35T piling rig, generator, delivery truck	82	56 (58)*	80	No	Note that there was no access to the most affected facade. As a result, the measured LAeq, 15min noise level in the bracket was the estimated noise level at the nearest residential façade, based on distance correction.
5A Foord Ave, Hurlstone Park	Concrete pumping, cleaning	82-84	60 (67)*	73	No	Note that there was no access to the most affected facade. As a result, the measured LAeq, 15min noise level in the bracket was the estimated noise level at the nearest residential façade, based on distance correction. Plant in use different to predicted plant.
5 Foord Ave, Hurlstone Park	Excavator 15T with bucket	82-84	56 (59)*	81	No	Measurement was performed at 7m from the worst effected façade. The measured LAeq, 15min is

			represents estimated noise level at the nearest residential façade, based on distance correction			lower than the predicted noise level.
5 Railway Street, Hurlstone Park	35T pilling rig with auger, Excavator 15T (2)	82	67 (69)* *Bracketed value represents estimated noise level at the nearest residential façade, based on distance correction	89	No	Note that there was no access to the most affected façade. As a result, the measured LAeq, 15min noise level in bracket was the estimated noise level at the nearest residential façade, based on distance correction.
5 Foord Ave, Hurlstone Park	Crane Truck delivery	73-75	55	68	No	Measurement was performed at 7m from the worst effected façade. The measured LAeq, 15min is lower than the predicted noise level.
5 Railway st. Hurlstone Park	35T pilling rig with auger, 15T excavator with bucket, Crane Truck delivery	82	60 (62)* *Bracketed value represents estimated noise level at the nearest residential façade, based on distance correction	77	No	Note that there was no access to the most affected façade. As a result, the measured LAeq, 15min noise level in bracket was the estimated noise level at the nearest residential façade, based on distance correction.
	35T pilling rig with auger, 15T excavator with bucket	82	63 (65)* *Bracketed value represents estimated noise level at the nearest residential façade, based on distance correction	78	No	Note that there was no access to the most affected facade. As a result, the measured LAeq, 15min noise level in bracket was the estimated noise level at the nearest residential façade, based on distance correction.
254 Wardell Rd, Dulwich Hill	Concrete pumping, Crane truck idling, 13T excavator with Moxy truck	58	50	61	No	Measurement performed on the Wardell Rd. facing Dullwich Hill station. The measured LAeq, 15min is lower than the predicted noise level.
5 Foord Ave, Hurlstone Park	Crane Truck delivery	73-75	48	45	No	Measurement was performed at 7m from the worst effected façade. The measured LAeq, 15min is lower than the predicted noise level.
17 Burnett St, Hurlstone Park	Crane Truck delivery	64	51	70	No	The measured LAeq, 15min is lower than the predicted noise level.
5 Railway St. Hurlstone Park	35T pilling with auger, 15T excavator with bucket. Electric rotary cutter	82	61 (63)* *Bracketed value represents estimated noise level at the nearest residential façade, based on distance correction	79	No	Note that there was no access to the most affected facade. As a result, the measured LAeq, 15min noise level in bracket was the estimated noise level at the nearest residential façade, based on distance correction.
7 Bedford Cresnet, Dulwich Hill	Concrete truck, excavators with bucket, hand tools	73	60	78	No	The measured LAeq, 15min is lower than the predicted noise level.
1 Ewart Lane,	Concrete truck,	72	69	86	No	The measured LAeq, 15min is

Dulwich Hill	delivery trucks					lower than the predicted noise level.
1 Acacia Street, Belmore	Lighting tower	62	57	77	No	The measured LAeq, 15min is lower than the predicted noise level.
30 Redman Parade, Belmore	Excavator with bucket, power tools	63	59	85	No	The measured LAeq, 15min is lower than the predicted noise level.
3 Wilfred Avenue, Campsie	Excavator with bucket, dump trucks	69	57	72	No	The measured LAeq, 15min is lower than the predicted noise level.
13 Angelo Road, Campsie	Excavator with bucket, wackerpacker	74	62	79	No	The measured LAeq, 15min is lower than the predicted noise level. Measurement location is on the corridor boundary fence. Sensitive receivers are on upper floors only.
279 The Boulevard, Punchbowl	Excavator with auger, hand tools, concrete pump	76	68	85	No	The measured LAeq, 15min is lower than the predicted noise level. Measurement location is affected by road traffic. Sensitive receivers are on upper floors only.
709 Punchbowl Road, Punchbowl	Pressure washer, hand tools	73	71	84	No	Dominated by road traffic. Sensitive receivers are on upper floors only
103 Duntroon Street, Hurlstone Park	Concrete truck and pump	82	72	90	No	The measured LAeq, 15min is lower than the predicted noise level.
5 Foord Ave, Hurlstone Park	Excavator with bucket, skip bin truck	84	61 (64)*	79	No	The measured LAeq, 15min is lower than the predicted noise level.
			*Bracketed value represents estimated noise level at the nearest residential façade, based on distance correction			
12 Railway Street, Hurlstone Park	Concrete truck, excavator with bucket, street sweeper	71	70	88	No	The measured LAeq, 15min is lower than the predicted noise level.
107 Duntroon St, Hurlstone Park	Electric jackhammer, Generator	73	58	63	No	The measured LAeq, 15min is lower than the predicted noise level.
16 th October 2021	TL927-1-15F01 WE16 NOISE AND VIBRATION MONITORING REPORT (R6) - APPENDIXES 9					
2 Hopetoun Street, Hurlstone Park	Two 15T excavator with bucket attachment	73	64	89	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is lower than the predicted noise level because only the two 15T excavator with bucket attachment were operating during this measurement.
103-105 Duntroon Street, Hurlstone Park	Two 5T excavator with bucket attachment	84	65	78	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the two 5T excavator with bucket attachment were operating during this measurement. Furthermore, access to the most affected facade for this receiver was not provided. As a result, the measurement was

						taken on the facade facing Duntroon Street. In the prediction model, the distance between the closest work area and the most affected facade is approximately 4 metres. However, it was noted on site that the two 5T excavators with bucket attachment were approximately 12 to 25 metres away from the measurement location.
24 Floss Street, Hurlstone Park	Electrical chainsaw and BC1800 shredder	Not Applicable	85	98	Not Applicable	This activity was undertaken during standard construction hours, from 08:00 to 18:00 - for confirmation of this refer to the timing of the noise verification monitoring contained within the report, being 10:28 to 10:43. This being the case the OoHWA is not applicable to this activity. However, the activity was scheduled between 06:00 and 18:00 in the endorsed OoHWA, and as such has a modelled noise level. It has been noted that the recorded noise level is above the modelled noise level.
41 Urunga Parade, Punchbowl	Electrical chainsaw and BC1800 shredder	78	58	71	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the electrical chainsaw and the BC1800 shredder were operating during this measurement. Furthermore, it was noted on site that the electrical chainsaw and the BC1800 shredder were approximately 150 metres away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 30 metres.
7 Common Street, Hurlstone Park	Two 15T excavator with bucket attachment, plate compactor	77	62	80	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the two 5T excavator with bucket attachment and a plate compactor were operating during this measurement. Furthermore, it was noted on site that the two 15T excavator with bucket attachment and the plate compactor were approximately 20 to 40 metres away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres.
23 rd October 2021	TL927-1-16F01 WK17 NOISE AND VIBRATION MONITORING REPORT (R3) - APPENDIXES 10					
7 Commons Street, Hurlstone Park	2T excavator unloading with delivery truck, 7T hi-rail excavator transporting materials,	77	63	86	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level

	concrete saw					because only the 2T excavator unloading with delivery truck, 7T hi-rail excavator transporting materials and concrete saw were operating during this measurement. Furthermore, it was noted on site that the measured concrete sawing activity was approximately 100 metres away from the measured location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 15 metres.
3A Commons Street, Hurlstone Park	7T excavator with bucket attachment, 5T excavator idling, fencing removal	82	65	96	No	The measured LAeq, 15min is lower than the predicted noise level. LMax caused by nearby steel fence dropping. Note that the measured noise level is significantly lower than the predicted noise level because only the 7T excavator with bucket attachment and 5T excavator were operating during this measurement. Furthermore, it was noted on site that there were no high impact activities occurring during this measurement. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 10 metres.
20 Redman Parade, Belmore	Hi-rail dump truck, stockpile management, 5T excavator with bucket attachment	66	58	75	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is lower than the predicted noise level because only the hi-rail dump truck, stockpile management and 5T excavator with bucket attachment were operating during this measurement. Furthermore, it was noted on site that the measured construction activity was approximately 40 metres away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 30 metres.
17 Redman Parade, Belmore	Hi-rail dump truck, stockpile management, 5T Excavator with bucket	60	60	82	No	The measured LAeq, 15min is consistent with the predicted noise level.
1A Shadforth Street, Wiley Park	5T Excavator with hammer attachment, handheld jackhammer	83	62	74	No	The measured LAeq, 15min is lower than the predicted noise level. It was noted on site that the hammering works were occurring underneath the station concourse. As a result, the noise source was shielded by the station structure. Furthermore, only the 5T Excavator with hammer attachment and the handheld jackhammer were operating during this measurement. It was also noted on site that the measured construction activity was approximately 50 metres away from the measurement location. In

						the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 15 metres. Therefore, the measured noise level is significantly below the predicted noise level.
	5T excavator with hammer attachment, handheld jackhammer	83	63	82	No	The measured LAeq, 15min is lower than the predicted noise level. It was noted on site that the hammering works were occurring underneath the station concourse. As a result, the noise source was shielded by the station structure. Furthermore, only the 5T Excavator with hammer attachment and the handheld jackhammer were operating during this measurement. It was also noted on site that the measured construction activity was approximately 50 metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 15 metres. Therefore, the measured noise level is significantly below the predicted noise level.
51 Ewart Lane, Dulwich Hill	8T excavator with hammer attachment, concrete truck	74	69	81	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is lower than the predicted noise level because only the 8T excavator with hammer attachment and concrete truck were operating during this measurement.
57 Ewart Lane, Dulwich Hill	8T excavator with hammer attachment, concrete truck	77	70	82	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is lower than the predicted noise level because only the 8T excavator with hammer attachment and concrete truck were operating during this measurement.
2 Hopetoun Street, Hurlstone Park	Vacuum truck, hi-rail dump truck	73	69	76	No	The measured LAeq, 15min is lower than the predicted noise level.
3A Commons Street, Hurlstone Park	Power hand tools, 5T excavator with bucket attachment, 5T excavator with hammer attachment, hi-rail dump truck	82	62	78	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the power hand tools, 5T excavator with bucket attachment, 5T excavator with hammer attachment and a hi-rail dump truck were operating during this measurement. Furthermore, it was noted that the measured construction activity was approximately 7 to 40 metres away from the measurement location. In the prediction model, the distance

						between the closest high impact work area and the most affected facade is approximately 10 metres.
	Power hand tools, 5T excavator with bucket attachment, 5T excavator with hammer attachment, hi-rail dump truck	82	63	78	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the power hand tools, 5T excavator with bucket attachment, 5T excavator with hammer attachment and a hi-rail dump truck were operating during this measurement. Furthermore, it was noted that the measured construction activity was approximately 7 to 40 metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 10 metres.
105 Duntroon Street, Hurlstone Park	Two 5T Excavator with bucket attachment, two hi-rail dump truck, handheld power drill	84	67	86	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the two 5T Excavator with bucket attachment, two hi-rail dump truck and a handheld power drill were operating during this measurement. Furthermore, access to the most affected facade for this receiver was not provided. As a result, the measurement was taken on the facade facing Duntroon Street. In the prediction model, the distance between the closest work area and the most affected facade is approximately 4 metres. However, it was noted on site that the measured construction activity were approximately 23 metres away from the measurement location.
48 Floss Street, Hurlstone Park	Concrete saw, two 5T excavator with bucket attachment, two hirail dump truck	76	52	69	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the concrete saw, two 5T excavator with bucket attachment and two hi-rail dump truck were operating during this measurement. Furthermore, access to the most affected facade for this receiver was not provided. As a result, the measurement was taken on the facade facing Floss Street. In the prediction model, the distance between the closest work area and the most affected facade is approximately 20 metres. However, it was noted on site that the measured construction activity were approximately 47 to 50 metres away from the measurement location.

6 th November 2021		TL927-1-17F01 WK19 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIXES 11				
51A Ewart Lane, Dulwich Hill	5T excavator with hammer attachment, delivery truck and vacuum truck	74	74	82	No	The measured LAeq, 15min is consistent with the predicted noise level.
57A Ewart Lane, Dulwich Hill	5T excavator with hammer attachment, 3T excavator moving materials	77	70	86	No	The measured LAeq, 15min is lower than the predicted noise level. The measured L _{Amax} was caused by a construction worker dropping materials. Note that the measured noise level is lower than the predicted noise level because the rockhammering activity is intermittent during the measurement. Furthermore, the rockhammering work area is at a lower ground level compared to the measurement location. Therefore, the rockhammering activity was partially shielded at this monitoring location.
59 Ewart Steet, Dulwich Hill	5T excavator with hammer attachment, rotary cutter, reversing beeper and vacuum truck	74	63	78	No	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because the rockhammering activity is intermittent during the measurement. The rockhammering work area is at a lower ground level compared to the measurement location. Therefore, the rockhammering activity was partially shielded at this monitoring location. Furthermore, it was noted on site that the measured construction activity was approximately 50 metres away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 25 metres.

RESULTS – VIBRATION MONITORING

The table below contains a summary of the vibration monitoring results. The complete reports are provided in Appendixes 4 – 17. The established criteria for cosmetic damage in the Construction Noise & Vibration OOHW Assessments is as follows:

- Reinforced or frame structures: 25.0 mm/s
- Unreinforced or light framed structures: 7.5 mm/s
- Heritage structures: 2.5 mm/s

Station	Plant	Distance from source	95th percentile PPV (mm/s)	Maximum PPV (mm/s)	Above predicted vibration level	Comments
19 th – 20 th April 2021		TL927-1-02F02 WE42 NOISE AND VIBRATION MONITORING REPORT (R1) - APPENDIXES 4				
Hurlstone Park Station	Demo saw	0.2m	2.38	2.72	Yes (for heritage structures) No (for reinforced,	At 0.2 metres away, the concrete saw produced a maximum PPV value of 2.72 mm/s. This maximum PPV value exceeds the screening level for Heritage structures (2.5

					unreinforced or light framed structures)	mm/s). New site specific minimum working distances for using a demo saw established for heritage structures (minimum 0.5m).
		0.5m	1.46	1.78	No	At 0.5 metres away, the concrete saw produced vibration levels that are below the established vibration criteria.
	12 th May 2021	TL927-1-03F01 HURLSTONE PARK STN VIB MON REPORT (R1) - APPENDIXES 12				
Hurlstone Park Station	96-pound handheld jackhammer	0.5m	1.17	1.35	No	At 0.5 metres away, the 96 pounds handheld jackhammer produced vibration levels that are below the established vibration criteria.
		1m	0.97	1.11	No	At 1 metre away, the 96 pounds handheld jackhammer produced vibration levels that are below the established vibration criteria.
		2m	0.85	1.11	No	At 2 metres away, the 96 pounds handheld jackhammer produced vibration levels that are below the established vibration criteria.
		3m	0.30	0.32	No	At 3 metres away, the 96 pounds handheld jackhammer produced vibration levels that are below the established vibration criteria.
	14 th May 2021	TL927-1-04F01 WILEY PARK STN VIB MON REPORT (R1) - APPENDIXES 13				
Wiley Park Station	1.7T Kubota excavator with hammer attachment	3m	0.73	1.24	No	At a slant distance of 3 metres away, the 1.7T Kubota excavator with hammer attachment produced vibration levels that are below the established vibration criteria.
		4m	0.23	0.56	No	At a slant distance of 4 metres away, the 1.7T Kubota excavator with hammer attachment produced vibration levels that are below the established vibration criteria.
		5m	0.20	0.24	No	At a slant distance of 5 metres away, the 1.7T Kubota excavator with hammer attachment produced vibration levels that are below the established vibration criteria.
	18 th May 2021	TL927-1-05F01 PUNCHBOWL STN VIB MON REPORT (R1) - APPENDIXES 14				
Punchbowl Station	80kg plate compactor	1m	2.26	2.38	No	At a distance of 1 metre away, the 80kg plate compactor produced vibration levels that are below the established vibration screening criteria.
		2m	0.85	1.22	No	At a distance of 2 metres away, the 80kg plate compactor produced vibration levels that are below the established vibration screening criteria.
		3m	0.75	0.86	No	At a distance of 3 metres away, the 80kg plate compactor produced vibration levels that are below the established vibration screening criteria.
	20 th May 2021	TL927-1-06F01 BELMORE METRO BUILDING SITE VIB MON REPORT (R1) - APPENDIXES 15				
Belmore Station	10T smooth drum roller	3m - static	<0.5	<0.5	No	During this measurement, vibration signals from the source could not be detected.
		3m - vibratory	1.74	1.87	No	At a distance of 3 metres away with vibratory mode, the 10T smooth drum roller produced vibration levels that are below the established vibration screening criteria.
		4m - static	<0.5	<0.5	No	During this measurement, vibration signals from the source could not be detected.
		4m - vibratory	1.26	1.39	No	At a distance of 4 metres away with vibratory mode, the 10T smooth drum roller produced vibration levels that are below the established vibration screening criteria.
		5m - static	<0.5	<0.5	No	During this measurement, vibration signals from the source could not be detected.
		5m - vibratory	0.76	0.85	No	At a distance of 5 metres away with vibratory mode, the 10T smooth drum roller produced vibration levels that are below the established vibration screening criteria.
	28 th May – 29 th May 2021	TL927-1-07F01 WE48 NOISE AND VIBRATION MONITORING REPORT (R1) - APPENDIXES 6				
Wiley Park	Concrete saw	3m, measured at	<0.5	<0.5	No	The vibration monitor was mounted on the North platform building. During the concrete sawing activity, the vibration signals from the

		the affected heritage structure				concrete saw could not be detected. As a result, the concrete saw was allowed to be operated.
	Handheld jackhammer	3m	0.95	1.05	No	At 3m the jackhammer produced vibration levels that are below the established vibration criteria
		7m	0.13	0.26	No	At 7m the jackhammer produced vibration levels that are below the established vibration criteria
	90-pound handheld jackhammer	1m, Measured at the affected heritage structure	0.97	1.12	No	The vibration monitor was mounted on the North platform building. During the jackhammering activity, the 90-pound handheld jackhammer produced vibration levels that are below the established vibration criteria. As a result, the 90-pound handheld jackhammer was allowed to be operated.
Punchbowl Station	5T excavator with auger attachment	1m	0.35	1.15	No	The 5T excavator with auger attachment produced vibration levels that are below the established vibration criteria at 2 m, 1.5 m and 1 m away. Since the bored piling works are greater than 1 metre away from the platform building, the 5T excavator with auger attachment was allowed to be operated
		1.5m	0.29	0.96	No	
		2m	0.26	0.81	No	
Hurlstone Park	10T excavator with hammer attachment	2m	3.69	6.06	Yes	At 2 metres away, the 10T excavator with hammer attachment produced a 95th percentile PPV value of 3.69 mm/s. As a result, a new site specific minimum working distance for using a 10T excavator with hammer attachment was established for heritage structures (minimum working distance is 3m from heritage structures).
		3m	1.55	2.40	No	At 4 metres and 3 metres away, the 10T excavator with hammer attachment produced vibration levels that are below the established vibration criteria. As a result, the 10T excavator with hammer attachment can be operated with a minimum working distance of 3 metres for heritage structures.
		4m	0.90	1.20	No	
	2.5T excavator with hammer attachment (hp)	2m, Measured at the affected heritage structure	1.39	1.82	No	The vibration monitor was mounted on the South platform building. During the rockhammering activity, the 2.5T excavator with hammer attachment produced vibration levels that are below the established vibration criteria. As a result, the 2.5T excavator with hammer attachment was allowed to be operated.
	5 th June 2021	TL927-1-08F01 WE49 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIXES 6				
Belmore Station	XD9-1 excavator (piling works)	4m, measured at the affected heritage structure	0.12	0.29	No	The vibration monitor was mounted on the external platform building. During the piling activity, the vibration signals from the XD9-1 excavator produced vibration levels that are below the established vibration criteria. As a result, the XD9-1 excavator was allowed to be operated.
	28 th June – 1 st July 2021	TL927-1-09F01 WE52-WK1 NOISE AND VIBRATION MONITORING REPORT (R3) - APPENDIXES 7				
Wiley Park Station	14T excavator with bucket attachment	3m, measured at the affected heritage structure	0.55	1.00	No	The vibration monitor was mounted on the platform building. During the excavating activity, the vibration signals from the 14T excavator with bucket attachment produced vibration levels that are below the established vibration criteria. As a result, the 14T excavator with bucket attachment was allowed to be operated.
Belmore Station	3.5T excavator with rockhammer attachment	10m, measured at the affected heritage	0.25	0.45	No	The vibration monitor was mounted on the platform building. During the rockhammering activity, the vibration signals from the 3.5T excavator with rockhammer attachment produced vibration levels that are below the

		structure				established vibration criteria. As a result, the 3.5T excavator with rockhammer attachment was allowed to be operated.
Dulwich Hill Station	6T excavator with rockdrill attachment	15m, measured at the affected heritage structure	< 0.5	1.15	No	The vibration monitor was mounted on the platform building. During the rockdrilling activity, the vibration signals from the 6T excavator with rockdrill attachment produced vibration levels that are below the established vibration criteria. As a result, the 6T excavator with rockdrill attachment was allowed to be operated.
Punchbowl Station	Station (refer to figure A.10) Handheld electric jackhammer	1m	0.90	1.65	No	The vibration monitor was mounted on the platform building. It was understood that the affected wall of the platform building is not heritage. As a result, the screening criterion for unreinforced structures (7.5 mm/s) was used for this measurement. During the jackhammering activity, the vibration signals from the handheld electric jackhammer produced vibration levels that are below the established screening criterion for unreinforced structures (7.5 mm/s). As a result, the handheld electric jackhammer was allowed to be operated.
Hurlstone Park Station	3T roller – static mode	10m, measured at the closest residential structure	< 0.5	< 0.5	No	During the rolling activity, the vibration signals from the 3T roller on static mode produced vibration levels that are below the established screening criterion for unreinforced structures (7.5 mm/s). As a result, the 3T roller on static mode was allowed to be operated.
	8T roller – static mode	5m	0.90	1.50	No	During the rolling activity, the vibration signals from the 8T roller on static mode produced vibration levels that are below the established screening criterion for unreinforced structures (7.5 mm/s). As a result, the 8T roller on static mode can be operated at a minimum distance of 5 metres from unreinforced structures.
	35T piling rig with auger	20m, measured at the closest residential structure	< 0.5	< 0.5	No	During the piling activity, the vibration signals from the 35T piling rig with auger produced vibration levels that are below the established screening criterion for unreinforced structures (7.5 mm/s). As a result, the 35T piling rig with auger was allowed to be operated.
8th July 2021 TL927-1-10F01 WK52-WE2 NOISE AND VIBRATION MONITORING REPORT (R3) - APPENDIXES 8						
Hurlstone Park Station	Vibratory plate compactor	1m, measured at the affected Station building	3.0	3.8	No	The vibration monitor was mounted on the platform building. During the asphalt compacting activity, the vibration signals from the vibratory plate produced vibration levels that are below the established vibration criteria. As a result, the Vibratory plate compactor was allowed to be operated.
Wily Park Station	5T Asphalt Roller (nonvibratory)	1m	<0.5	<0.5	No	The vibration monitor was mounted on the platform. During the asphalt compacting activity, the vibration signals from the 5T non-vibratory roller produced vibration levels that are below the established vibration criteria. As a result, the 5T nonvibratory roller was allowed to be operated.
Wily Park Station	Vibratory plate compactor	1m	3.0	3.2	No	The vibration monitor was mounted on the platform. During the asphalt compacting activity, the vibration signals from the vibratory plate produced vibration levels that are below the established vibration criteria. As a result, the Vibratory plate compactor was allowed to

						be operated.
	7 th October 2021	TL927-1-12F01 HURLSTONE PARK STN VIB MON REPORT (R1) - APPENDIXES 16				
Hurlstone Park Station	96 pound handheld jackhammer	1m	3.93	4.05	No	At 1 metre away, the 96 pound handheld jackhammer produced vibration levels that are below the established vibration screening level for unreinforced or light framed structures (including sound heritage structures).
		2m	1.99	2.02	No	At 2 metres away, the 96 pound handheld jackhammer produced vibration levels that are below the establish- APPENDIXES 5ed vibration screening levels.
	7 th October 2021	TL927-1-13F01 DULWICH HILL STN VIB MON REPORT (R1) - APPENDIXES 17				
Dulwich Hill Station	5T excavator with hammer attachment	7m	1.74	1.78	No	At the affected property boundary, the 5T excavator with hammer attachment produced vibration levels that are below the established vibration screening levels.
	16 th October 2021	TL927-1-15F01 W16 NOISE AND VIBRATION MONITORING REPORT (R6) - APPENDIXES 9				
Hurlstone Park Station	Two 5T excavator with bucket attachment	12m	0.03	0.04	No	The accelerometer was mounted on the residential building at 103-105 Duntroon Street, Hurlstone Park. The measured results show that the baseline value did not change during the excavation work. Therefore, the vibration signals from the two 5T excavators with bucket attachment could not be detected at this measurement location. As a result, the 5T excavators with bucket attachment was allowed to be operated.
	5T excavator with hammer attachment	12m	0.04	0.09	No	The accelerometer was mounted on the residential building at 103-105 Duntroon Street, Hurlstone Park. The measured results show that the baseline value did not change during the excavation work. Therefore, the vibration signals from the 5T excavator with hammer attachment could not be detected at this measurement location. As a result, the 5T excavator with hammer attachment was allowed to be operated.
Punchbowl Station	2T Excavator with hammer	1m	1.09	2.28	No	The accelerometer was mounted on the station structure at the station building. During the hammering activity, the vibration signals from the hammer produced vibration levels that are below the established vibration criteria. As a result, the 2T excavator with hammer attachment was allowed to be operated.
	23 rd October 2021	TL927-1-16F01 W17 NOISE AND VIBRATION MONITORING REPORT (R3) - APPENDIXES 10				
Wiley Park Station, location 1	Handheld jackhammer	10m	0.64	0.88	No	The accelerometer was mounted on the concourse station structure at Wiley Park Station. During the hammering activity, the handheld jackhammer produced vibration levels that were below the established vibration criteria. As a result, the handheld jackhammer was allowed to be operated.
Wiley Park Station, location 2	5T excavator with hammer attachment	10m	0.25	0.56	No	The accelerometer was mounted on the concourse station structure at Wiley Park Station. During the hammering activity, the handheld jackhammer produced vibration levels that were below the established vibration criteria. As a result, the 5T excavator with hammer attachment was allowed to be

						operated.
6 th November 2021						TL927-1-17F01 WK19 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIXES 11
Dulwich Hill Station	5T excavator with hammer attachment	6m	0.90	0.95	No	At a distance of 6 metres away, the 5T excavator with hammer attachment produced vibration levels that are below the established vibration screening criteria
	5T excavator with hammer attachment	5m	1.08	1.13	No	At a distance of 5 metres away, the 5T excavator with hammer attachment produced vibration levels that are below the established vibration screening criteria.
	5T excavator with hammer attachment	3m	1.60	1.66	No	At a distance of 3 metres away, the 5T excavator with hammer attachment produced vibration levels that are below the established vibration screening criteria.

DISCUSSION – NOISE AND VIBRATION MONITORING

The noise monitoring results did not identify any exceedances of the predicted noise levels. This shows that the provision of construction noise mitigation measures has been appropriate.

The vibration monitoring results have indicated that a majority of the construction activities that have occurred have not caused vibration impacts above the screening levels, however it was noted in TL927-1-07F01 WE48 NOISE AND VIBRATION MONITORING REPORT (R1) that at 2 metres away, a 10T excavator with hammer attachment produced a 95th percentile PPV value of 3.69 mm/s. As a result, 10T excavators with hammer attachment have a minimum working distance of 3m from heritage structures. Also, as noted in report TL927-1-02F02 WE42 Noise and Vibration Monitoring Report (r1), monitoring the use of a demo saw at 0.2m showed maximum PPV parameters were exceed for heritage structures, establishing the use of this equipment to 0.5m, where maximum PPV demonstrated to be within the established parameters.

It should also be noted that Downer conducts regular inspection of the environmental controls, including noise and vibration mitigation measures, across all work sites. These inspections are conducted by the Project Team and the Environmental Team. This proactive approach ensures that environmental controls are functioning properly rather than reactively inspecting the worksite following monitoring and reporting.

Appendix 1 – Surface Water Monitoring Report - Wiley Park Station - 4NE30187_R001_SWM_WileyPark_RevA

Appendix 2 – Surface Water Monitoring Report - 4NE30187_R002_SWM_WileyPark_RevA

Appendix 3 – Surface Water Monitoring Report – Wiley Park Station
NE30161_R003_SWM_WileyPark_Rev0_R1

Appendix 4 – TL927-1-02F02 WE42 NOISE AND VIBRATION MONITORING REPORT (R2)

Appendix 5 – TL927-1-07F01 WE48 NOISE AND VIBRATION MONITORING REPORT (R1)

Appendix 6 – TL927-1-08F01 WE49 NOISE AND VIBRATION MONITORING REPORT (R2)

Appendix 7 – TL927-1-09F01 WE52 WK1 NOISE AND VIBRATION MONITORING REPORT (R3)

Appendix 8 – TL927-1-10F01 WK52-WE2 NOISE AND VIBRATION MONITORING REPORT (R1)

Appendix 9 – TL927-1-15F01 WK16 NOISE AND VIBRATION MONITORING REPORT (R6)

Appendix 10 – TL927-1-16F01 WK17 NOISE AND VIBRATION MONITORING REPORT (R3)

Appendix 11 – TL927-1-17F01 WK19 NOISE AND VIBRATION MONITORING REPORT (R2)

Appendix 12 – TL927-1-03F01 HURLSTONE PARK STN VIB MON REPORT (R1)

Appendix 13 – TL927-1-04F01 WILEY PARK STN VIB MON REPORT (R1)

Appendix 14 – TL927-1-05F01 PUNCHBOWL STN VIB MON REPORT (R1)

Appendix 15 – TL927-1-06F01 BELMORE METRO BUILDING SITE VIB MON REPORT (R1)

Appendix 16 – TL927-1-12F01 HURLSTONE PARK STN VIB MON REPORT (R1)

Appendix 17 – TL927-1-13F01 DULWICH HILL STN VIB MON REPORT (R1)