



Noise and Vibration Construction Monitoring Report February 2025 to July 2025

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Parklife Metro D&C

Document Approval

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Glossary/Abbreviations

Abbreviation	Expanded Text
BRD	Bradfield Station
CEMF	Construction Environmental Management Framework
CNVS	Sydney Metro Construction Noise and Vibration Standard
Condition	Planning Minister's Condition of Approval
Construction	Includes all work required to construct the CSSI as described in the documents listed in Conditions A1, including commissioning trials of equipment and temporary use of any part of the CSSI, but excluding Low Impact Work.
dB(A)	A-weighted decibels is an expression of the relative loudness of sounds in the air as perceived by the human ear.
DNVIS	Detailed Noise and Vibration Impact Statement
EPA	NSW Environmental Protection Authority – The Appropriate Regulatory Authority for project activities on NSW land (off-airport land), as defined in Section 6(2)(c) of the POEO Act 1997
EPL	Environmental Protection Licence
ER	Independent Environmental Representative
LA_{eq}	Equivalent Continuous Sound Level
LDN	Luddenham Station
LP or SPL	Sound Pressure Level
LW or SWL	Sound Power Level
LWD	Linewide
NCA	Noise Catchment Area
NML	Noise Management Level
NVCMR	Noise and Vibration Construction Monitoring Report
NVMP	Noise and Vibration Monitoring Program
OHE	Orchard Hills Station
OOHW	Out of Hours Works
Parklife Metro (PLM)	Consortium comprising entities of Plenary, Siemens, RATP Dev and Webuild as the Applicant for the Sydney Metro Western Sydney Airport SSTOM Package.
Parklife Metro D&C	Parklife Metro Design and Construct. Consists of Webuild S.P.A, Siemens Mobility Pty Ltd and Richard Crookes Constructions Pty Ltd. Responsible for the construction of SSTOM Works
RBL	Rating Background Noise Level
SMF	Stabling and maintenance facility
SMWSA	Sydney Metro Western Sydney Airport
SPL	Sound Pressure Level
SSTOM	Stations, Systems, Trains, Operations and Maintenance
STM	St Marys Station
SWL	Sound Power Level
the Project	Sydney Metro Western Sydney Airport

1 Introduction

1.1 Background

Sydney Metro is Australia's biggest public transport program comprising four main packages of work including Metro North-West Line, Sydney Metro City and Southwest, Sydney Metro West, and Sydney Metro Western Sydney Airport (SMWSA, the Project). The SMWSA will become the transport spine for Greater Western Sydney, connecting communities and travellers with the new Western Sydney International (Nancy-Bird Walton) Airport and the growing region.

The Project involves the construction and operation of a new metro railway line around 23km in length to connect Western Sydney suburbs from Bradfield in the south with St Marys in the north. The alignment includes a combination of tunnel, surface, bridges and viaduct sections, and comprises of six new metro stations between St Marys and Bradfield Station, as well as a stabling and maintenance facility and operational control centre to support the operation of the new metro railway line (refer to Figure 1).

Parklife Metro D&C (PLM) has been engaged to deliver the Stations, Systems, Trains, Operations and Maintenance (SSTOM) works. The scope of the SSTOM package comprises:

- construction of six new stations
- installation of tracks, signalling, mechanical and electrical systems
- supplying new driverless trains
- construction of stabling and maintenance facility at Orchard Hills
- operation and maintenance of the line and its assets, and
- handback of operations and maintenance at the end of term.

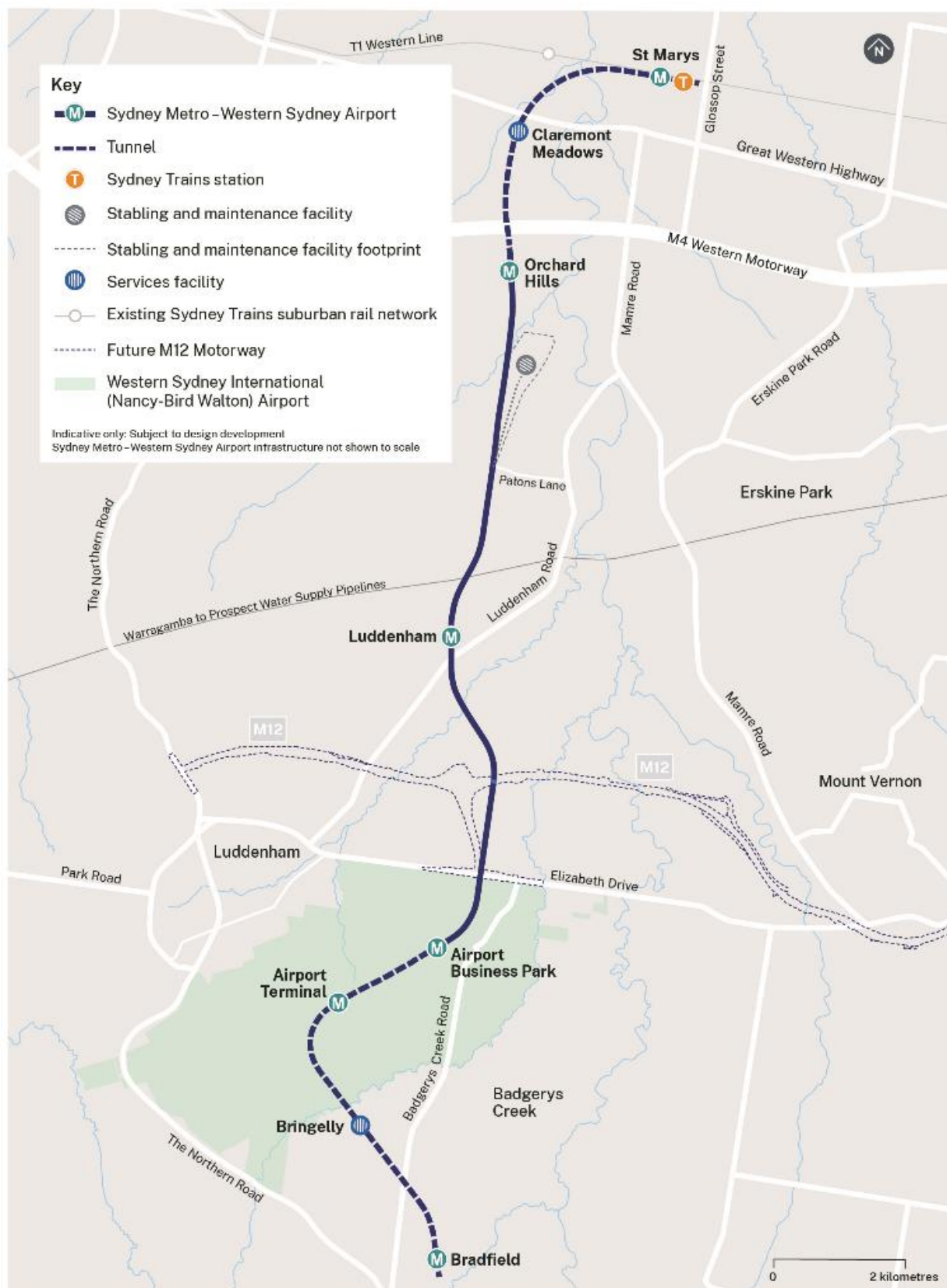


FIGURE 1 OVERVIEW OF SMWSA PROJECT

1.1.1 Scope of report

This Noise and Vibration Construction Monitoring Report (NVCMR) has been prepared for works approved under the Infrastructure Approval Critical State Significant Infrastructure (CSSI) -10051 associated with the delivery of the off-airport portion of the SMWSA SSTOM Works. This report provides the results of noise and vibration monitoring undertaken as part of the Noise and Vibration Monitoring Program (NVMP) during the reporting period from the 1 February 2025 to 31 July 2025. This noise and vibration construction monitoring report is the fourth issue since PLM construction works commenced in 2023.

The result of the monitoring is readily available in this report to the construction team, the proponent and Independent Environmental Representative (ER) and is provided to the Planning Secretary and Environment Protection Authority EPA upon request as per Condition C15 of CSSI 10051. This monitoring report will be submitted to the Planning Secretary, ER and relevant regulatory agencies in accordance with Condition C22 of CSSI 10051.

TABLE 1 REQUIREMENTS RELEVANT TO NOISE AND VIBRATION MONITORING REPORT

Condition	Requirement
C14	Each Construction Monitoring Program must provide: (a) details of baseline data available including the period of baseline monitoring; (b) details of baseline data to be obtained and when; (c) details of all monitoring of the project to be undertaken; (d) the parameters of the project to be monitored; (e) the frequency of monitoring to be undertaken; (f) the location of monitoring; (g) the reporting of monitoring results and analysis results against relevant criteria; (h) details of the methods that will be used to analyse the monitoring data; (i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicated unacceptable project impacts; (j) a consideration of SMART principles; (k) any consultation to be undertaken in relation to the monitoring programs; and (l) any specific requirements as required by Conditions C15 to C16.
C15	The Noise and Vibration Construction Monitoring Program must include: (a) noise and vibration monitoring at representative residential and other locations (including at the worst- affected residences), subject to property owner approval, to confirm construction noise and vibration levels; (b) monitoring undertaken during the day, evening and night-time periods throughout the construction period and cover the range of activities being undertaken; (c) method and frequency for reporting monitoring results; and (d) a process to undertake real time noise and vibration monitoring. The results of the monitoring must be readily available to the construction team, the Proponent and ER. The Planning Secretary and EPA must be provided with access to the results on request.
C22	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, ER and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.
E38	Work must only be undertaken during the following hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 1:00pm Saturdays; and (c) at no time on Sundays or public holidays. (c) at no time on Sundays or public holidays.

E43	Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration criteria: (a) construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009); (b) preferred vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure); (c) Australian Standard AS 2187.2 - 2006 "Explosives - Storage and Use - Use of Explosives" (for human exposure); (d) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and (e) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage). Any work identified as exceeding the noise management levels and / or vibration criteria must be managed in accordance with the Noise and Vibration CEMP Sub-plan.
E44	All reasonable and feasible mitigation measures must be applied when the following residential ground-borne noise levels are exceeded: (a) evening (6:00 pm to 10:00 pm) — internal LAeq(15 minute): 40 dB(A); and (b) night (10:00 pm to 7:00 am) — internal LAeq(15 minute): 35 dB(A). The mitigation measures must be outlined in the Noise and Vibration CEMP Sub-plan, including in any Out-of-Hours Work Protocol, required by Condition E42.
E47	Detailed Noise and Vibration Impact Statements (DNVIS) must be prepared for any work that may exceed the NMLs, vibration criteria and / or ground-borne noise levels specified in Conditions E43 and E44 at any residence outside construction hours identified in Condition E38, or where receivers will be highly noise affected or subject to vibration levels above those otherwise determined as appropriate by a suitably qualified structural engineer under Condition E87. The DNVIS must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the works. A copy of the DNVIS must be provided to the ER before the commencement of the associated works. The Planning Secretary and the EPA may request a copy (ies) of the DNVIS.
CEMF 3.16a	Issue specific environmental monitoring will be undertaken as required or as additionally required by any approval, permit or licence conditions.
CNVS 6.1	Measurements of sound power level.
CNVS 6.2	Monitoring to be undertaken where a DNVIS predicts NMLs will be exceeded.
CNVS 5.1	Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals, noise or vibration monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal has been exceeded so that additional management measures may be implemented.
EPL - 21807	
L3.1	The licensee must minimise noise and vibration impacts at residences and other sensitive land uses. To meet the requirements of this condition the licensee must: a) implement the guidance in the Interim Construction Noise Guideline (DEC, 2009) and the Assessing Vibration: a technical guideline (DEC, 2006); b) implement all reasonable and feasible measures to minimise noise impacts in accordance with the Interim Construction Noise Guideline (DEC, 2009); and c) implement vibration mitigation in accordance with the Assessing Vibration: a Technical Guideline (DEC, 2006). In this condition, 'reasonable' and 'feasible', in relation to noise management, have the same meaning as defined in the Interim Construction Noise Guideline (DEC, 2009).

2 Monitoring

This section provides a summary of the monitoring completed in the six-month reporting period from the start of February 2025 to the end of July 2025.

PLM construction activities subject to noise monitoring within the reporting period was predominantly for concrete works at the station box sites. Other construction activities monitored included deliveries, earth works, batch plant operations, railway track construction, steel fixing, ventilation fans and crane lifting. Construction activities undertaken during the reporting period are summarised in Table 2.

Detailed monitoring results for each program are presented in the Appendix A.

TABLE 2 CONSTRUCTION ACTIVITIES DURING THIS REPORTING PERIOD

Site	Construction Activities
St Marys Station	• General operation of ancillary facility* • Site establishment of office sheds, laydown areas and temporary stockpile areas • Tower crane pad construction • Station Box – Formwork Reinforced Steel Pour (FRP)* • Station Box fitout* • Tunnel fitout* • Precast beams and installations* • Crane lifts* • Water treatment plant operation*
Claremont Meadows	• Site establishment • Tunnel fitout* • Water treatment plant operation* • Ventilation installation and commissioning*
Orchard Hills Station	• General operation of ancillary facility • Site establishment (north) • Station Box – FRP* • Batch plant operation* • Precast beam delivery and installation • Rail activities* • Tunnel fitout* • Deliveries* • Crane lifts*

Stabling Maintenance Facility	• General operation of ancillary facility* • Bulk earthworks • Basin excavation • Power supply installation* • In-ground utility installation* • FRP* • Structural building
Luddenham Station	• General operation of ancillary facility • Bulk earthworks • In-ground utility installation • Station structures FRP • Precinct works • Delivery of Equipment*
Bradfield Station	• General operation of ancillary facility* • Station Box – FRP* • Delivery of Equipment* • Precast beam delivery and installation* • Temporary car park works • Permanent car park earthworks
Bringelly Service Facility	• Site Establishment • Tunnel fitout* • Ventilation installation and commissioning* • Water treatment plant operation
Linewide	• Site establishment • In-ground utility installation • Galvanised steel trough (GST) installation • FRP works* • Track and rail installation*

NOTE * REFERS TO WORKS UNDERTAKEN OUT OUTSIDE OF STANDARD CONSTRUCTION HOURS

2.1 Attended Noise Monitoring

Attended noise monitoring is required to validate noise predictions, including Noise Management Level (NML) compliant works, as well as measure the effectiveness of mitigation measures outlined in the management plans and detailed noise and vibration impact statement (DNVIS). Noise monitoring may also be conducted in response to complaints. Twelve (12) noise complaints were received for this project during the reporting period. One (1) vibration complaint was received however monitoring was not required as all vibration intensive works were located outside of the minimum working distances for cosmetic damage.

All noise monitoring conducted both during standard construction hours and out of hours (OOH), demonstrated compliance within the reporting period. All complaint-triggered monitoring was completed and confirmed that PLM's works were compliant. Out of the twelve (12) complaints, five (5) of the complaints triggered additional noise monitoring. Ample monitoring data was already available for all other complaints to verify compliance with predictions.

All out of standard construction hours works were completed under an out of hours permit which outlines the additional noise mitigation measures triggered for that construction activity.

No high impact works triggering monitoring were conducted during this monitoring period.

Summary results of all attended noise monitoring conducted by PLM in the reporting period are provided in Appendix A (Attended activity-specific noise monitoring).

All monitoring locations are presented in Appendix B and NATA accredited noise calibration certificates are provided in Appendix C.

2.2 Unattended noise monitoring

The unattended loggers are in targeted areas based on risk assessments to stakeholders from the planned works. Within the reporting period, PLM set up unattended noise monitors at the Stabling and Maintenance Facility, Luddenham Station Linewide and Bradfield based on these sites undertaking the most work outside of standard construction hours. Whilst data can be used for targeted unattended noise monitoring, PLM conducted all targeted monitoring via attended measurements. Unattended noise monitoring summary is provided in Appendix A (Unattended site monitoring data).

Where noise levels were observed to exceed the predicted worst-case levels by more than 2dB, an investigation into the source was undertaken. The unattended noise monitoring devices collect audio and footage of the potential noise exceedance. This is evaluated to determine the source and cause. In all instances, extraneous sources were responsible for the exceedances. No exceedances of the predicted levels were attributed to PLM works at the unattended loggers during this monitoring period.

2.3 Plant/Equipment Verification

. Verification spot checks are performed for noise-intensive plant where it is required in the NVMP to check noise levels against the manufacturer's specifications. These checks are conducted on significant noise generating items of plant and would be monitored at first opportunity. Summary of sound power level (SWL) checks for plant and equipment are listed in Table 3. In many instances, distances greater than 7m were required due to safety restrictions.

During this reporting period, sound power level checks indicated no exceedance of maximum allowable LA_{eq} for the equipment listed in Table 3.

TABLE 3 SUMMARY OF PLANT/EQUIPMENT NOISE VERIFICATION AGAINST APPROVED MAXIMUM SOUND POWER LEVELS

Date	Machinery	Activity location	Recorded SWL (dBA)	Maximum SWL (dBA) ¹	Exceedance of Predicted (dBA)	Comments
02/05/2025	Pile Boring Rig > 800 mm diameter	Bradfield Station	105	112	No	Piling rig is compliant. Measurement was taken from 12m away. Monitoring was completed from a safe and compliant distance.
12/05/2025	Mobile/Crawler Crane 200T	Luddenham Station	88	113	No	The crane is compliant. Measurement was taken safely from 9m distance from the front to avoid other plant movement. Monitoring was completed from a safe and compliant distance.
12/05/2025	Concrete Truck	Luddenham Station	81	109	No	Concrete truck is compliant. Measurement was taken safely from 5m front. Monitoring was

Date	Machinery	Activity location	Recorded SWL (dBA)	Maximum SWL (dBA) ¹	Exceedance of Predicted (dBA)	Comments
						completed from a safe and compliant distance.
15/05/2025	Trench roller	Luddenham Station	102	109	No	Trench roller is compliant. Monitoring was conducted from the back 10m away. Monitoring was completed from a safe and compliant distance.
15/05/2025	Vibratory Roller 8T	Luddenham Station	108	109	No	Vibratory roller is compliant. Roller was taken at 4m distance from the front. Monitoring was completed from a safe and compliant distance.
20/06/2025	14T Excavator	Stabling Maintenance Facility	103	105	No	14T excavator is compliant. Measurement taken from 20m at the back. Monitoring was completed from a safe and compliant distance.
20/06/2025	Concrete Truck	Stabilising Maintenance Facility	99	109	No	Concrete truck is compliant. Measurement taken from 10m away at the back. Monitoring was completed from a safe and compliant distance.
20/06/2025	Excavator 20T	Stabilising Maintenance Facility	102	105	No	Excavator is compliant. Measurement was taken from 20m whilst the excavator was moving material. Monitoring was completed from a safe and compliant distance.

1. MAXIMUM ALLOWABLE SOUND POWER LEVELS AS LISTED IN THE NOISE AND VIBRATION MANAGEMENT PLAN.

2.4 Vibration monitoring

Unattended vibration monitoring was undertaken adjacent to the heritage listed Warragamba Pipeline within Linewide's construction boundary. This was completed as a due diligence check on request of the project's Environment Representative.. No additional structural vibration monitoring has been triggered in the DNVIS approved at the time of this report. Table 4 summarises the unattended vibration monitoring completed near the Warragamba Pipeline. The results indicate the works are compliant and do not exceed the nominated Vibration Damage Control Level. During this reporting period, there was no human comfort trigger to conduct vibration monitoring that the construction activities' nearest receiver.

TABLE 4 UNATTENDED VIBRATION MONITORING – WARRAGAMBA PIPELINE

Date	Site Activity	Measured Maximum Vibration Level	Frequency	Vibration Damage Control Level	Assessment ¹
09/04/2025	Construction of a pad for flash butt welding near the rail alignment. 50m away from pipeline. Plant equipment included padfoot roller, 14T excavator and D6 Dozer. Works were within 50-150 m away from the pipeline	≥ 1.6mm/s	23 Hz	4.6 mm/s	Compliant
10/04/2025	Construction of a pad for flash butt welding near the rail alignment. 50m away from pipeline. Plant equipment included padfoot roller, 14T excavator and D6 Dozer. Works were within 50-150m away from the pipeline.	1.8 mm/s	19 Hz	4.2 mm/s	Compliant
11/04/2025	Construction of a pad for flash butt welding near the rail alignment. 50m away from pipeline. Plant equipment included padfoot roller, 14T excavator and D6 Dozer. Works were within 50-150m away from the pipeline.	1.3 mm/s	25 Hz	4.9 mm/s	Compliant

1. ASSESSMENT WAS COMPLETED IN ACCORDANCE WITH WATERNSW'S GUIDELINE FOR DEVELOPMENT ADJACENT TO THE UPPER CANAL AND WARRAGAMBA PIPELINES (2021) AND IN LINE WITH GERMAN STANDARD DIN 4150.3-2016

2.5 Detailed Noise and Vibration Impact Statement (DNVIS)

DNVIS are required for any works that may exceed the NMLs, vibration criteria and / or ground-borne noise levels in Condition E43 and E44 at any residence outside construction hours specified in condition E38 or where receivers will be highly noise affected or subject to vibration levels above those determined by a suitably qualified structural engineer. The DNVIS includes specific mitigation measures identified through consultation with affected sensitive land user(s) and mitigation measures that must be implemented for the duration of works in accordance with the Interim Construction Noise Guideline (DEC, 2009).

DNVIS are required for approvals where different construction hours are permitted or required under an EPL in force in respect of the CSSI 10051 Conditions of Approval.

Noise or vibration monitoring is conducted at the affected receivers or nominated representative locations (typically the nearest receiver where one or more receivers are affected that are identified). Monitoring is usually in the form of attended monitoring but can be in the form of unattended logging. PLM uses noise monitoring data to indicate when additional noise management measures are required.

A summary for DNVIS applicable to this reporting period is provided listed in Table 5. They give an indication of potential works that may exceed NML, vibration criteria and/or ground-borne noise levels.

TABLE 5 DNVIS APPLICABLE DURING THE REPORTING PERIOD

Title	Revision	Approval Date	Site	Scope of work
St Marys Station – Concrete Works	02	3/10/2024	St Marys	Predominantly concrete works and crane operations
St Marys	00	16/04/2024	St Marys	Tower Crane Installation
Claremont Meadows Services Facility – OOH Works	00	13/01/2025	Claremont Meadows	Tunnel fit-out, deliveries and ventilation
Orchard Hills Station – OHE Batch Plant and Concrete OOH	05	8/04/2025	Orchard Hills	DNVIS updated to include tunnel fitout, precast beam installation, demolition and station precinct activities.
Orchard Hills Utility Works	00	30/04/2024	Orchard Hills	Utility investigation and installation
Stabling and Maintenance Facility	02	18/12/2024	SMF	Concrete works, utility and bulk power supply installation
Linewide	00	24/02/2025	Linewide Off-Airport	DNVIS approved for track work.
Bringelly Services Facility	00	13/01/2025	Bringelly	Tunnel fit-out, deliveries and ventilation
Bradfield Station – Concrete Works OOH	04	7/11/2024	Bradfield	Predominantly concrete works and crane operations

2.6 Conclusion

Summary results of attended and unattended noise monitoring conducted by PLM during the reporting period (Appendix A), demonstrates compliance with project requirements set out in the NVMP.

2.7 Correction Log

It is possible from time to time for incorrect data to get published in good faith. As soon as practicable after the licensee becomes aware that the published pollution monitoring data is incorrect or misleading, licensees must then publish a correction log to correct this data that is incorrect or misleading.

There are no matters included in the correction log for this reporting period.

Appendices

Noise and Vibration Construction Monitoring Report February 2025 to July 2025

Appendix A Noise Monitoring Results

Attended activity-specific noise monitoring

Date	Time	Time Period	Construction Activity ²	Site Location	Monitoring Location/Address/DNVIS ID	NCA ¹	NML dB(A)	Predicted LAeq(15min) dB(A)	Recorded LAeq(15min) dB(A)	L _{Amax} dB(A)	L ₉₀ (A)	Exceedance of Predicted LAeq(15min)?	Comments
03/02/2025	19:39	OOH-Evening	Concrete batch plant operations, concrete pouring works.	OHE	106 Samuel Marsden Road, Orchard Hills	8	49	49	55.1	79.2	42.5	Yes	PLM works audible during breaks in traffic and recorded below NML. Dominant noise source was from traffic hence the exceedance. Note, this location was not triggered in the DNVIS. PLM works compliant.
07/02/2025	06:20	OOH-Night	Boral batch plant and concrete pouring	OHE	83-95 Samuel Marsden Road, Orchard Hills	8	45	51	49.5	72.4	45.9	No	PLM works were barely audible during breaks in traffic and recorded under the predicted noise level (PNL). Batch plant machinery was barely audible and below the PNL. PLM works compliant.
13/02/2025	06:12	OOH-Night	Concrete pouring	SMF	43-85 Luddenham Road, Orchard Hills	8	45	52	46.1	66.9	44.8	No	PLM works were barely audible and were below predicted. Concrete truck was faintly audible. PLM works compliant
19/02/2025	18:36	OOH-Evening	Concrete finishing and steel fixing	BRD	145 Badgerys Creek Road, Bradfield	12	40	43	41.3	63	38.1	No	Construction noise inaudible, dominant noise source was traffic on Badgerys Creek Road, PLM work compliant
25/02/2025	20:10	OOH-Evening	Track Construction	Linewide P3	644-652 Luddenham Road, Luddenham	10	35	54.4	65	83.1	40.1	Yes	Dominant noise source was traffic hence exceedance. The generator noise recorded was below predicted noise level. PLM works compliant
25/02/2025	20:28	OOH-Evening	Track Construction	Linewide P3	611a Luddenham Road, Luddenham	10	35	54	66.6	88.7	52.5	Yes	Dominant noise source was traffic hence exceedance. The generator noise recorded below predicted noise level. PLM works compliant
25/02/2025	21:49	OOH-Evening	Track Construction	Linewide P3	23 Halmstad Boulevard, Luddenham	10	35	43	48.9	72.8	36.1	Yes	Dominant noise source was traffic on Kent Road and Lansdowne Road hence the exceedance. The generator noise recorded below predicted noise level. PLM works compliant
25/02/2025	22:05	OOH-Night	Track Construction	Linewide P3	23 Halmstad Boulevard, Luddenham	10	35	43.1	46	69.1	40.1	Yes	Dominant noise source was insects hence the exceedance to the predicted noise level. PLM works faintly audible and compliant
25/02/2025	22:32	OOH-Night	Track Construction	Linewide P3	644-652 Luddenham Road, Luddenham	10	35	54.5	62.7	86.7	57.6	Yes	Construction noise very faintly audible and recorded below predicted. External environment factors caused the exceedance to overall 15 minute recording PLM works compliant
25/02/2025	23:03	OOH-Night	Track Construction	Linewide P3	611a Luddenham Road, Luddenham	10	35	54	61.1	84.7	32.7	Yes	Generator noise very faintly audible, dominant noise source was traffic hence the predicted noise level exceedance. PLM works compliant and below the predicted noise level.
26/02/2025	20:33	OOH-Evening	Track Construction	Linewide P3	644-652 Luddenham Road, Luddenham	10	35	54.4	56	80	50.1	Yes	Generator noise very faintly audible and recorded below predicted noise level. External environment factors caused the exceedance to overall 15 minute recording. , PLM works compliant
26/02/2025	20:56	OOH-Evening	Track Construction	Linewide P3	611a Luddenham Road, Luddenham	10	35	54	48	85	49.3	No	Construction noise very faintly audible, dominant noise source was traffic on Samuel Marsden Road and the M4, PLM works compliant
26/02/2025	21:40	OOH-Evening	Track Construction	Linewide P3	23 Halmstad Boulevard, Luddenham	10	35	43	40	48	37.2	No	Construction activity audible and below predicted, PLM works compliant
26/02/2025	22:50	OOH-Night	Track Construction	Linewide P3	644-652 Luddenham Road, Luddenham	10	35	54.4	58	76	44.8	Yes	Construction noise inaudible and below predicted noise level. External environment factors caused the exceedance to .overall 15 minute recording. PLM works compliant
26/02/2025	23:07	OOH-Night	Track Construction	Linewide P3	611a Luddenham Road, Luddenham	10	35	54	59	83	46.6	Yes	Construction noise audible and below predicted noise level. External environment factors caused the exceedance to the overall 15 minute recording. PLM works compliant
27/02/2025	06:18	OOH-Night	Concrete pouring	STM	3 Station Street, St Marys	3	41	61	56.5	75.7	51.9	No	Construction noise inaudible, dominant noise source was insects and frogs, PLM works compliant
01/03/2025	07:19	OOH-Evening	Tower Crane 2 installation	STM	2B Chesham Street, Street Marys	3	42	64	49.8	68.6	43.7	No	Construction noise inaudible, dominant noise source was traffic, insects and frogs, PLM works compliant
02/03/2025	12:13	OOH-Day	Tower Crane 2 installation	STM	4 Chesham Street, St Marys	3	41	65	50.3	65.7	43.2	No	Construction activities faintly audible and below predicted, PLM works compliant

Date	Time	Time Period	Construction Activity ²	Site Location	Monitoring Location/Address/DNVIS ID	NCA ¹	NML dB(A)	Predicted LAeq(15min) dB(A)	Recorded LAeq(15min) dB(A)	LAmx dB(A)	L90(A)	Exceedance of Predicted LAeq(15min)?	Comments
06/03/2025	18:19	OOH-Evening	Concrete Pour	BRD	25 The Retreat, Bradfield	12	40	44	38.4	64.2	34.8	No	Construction noise inaudible and below predicted, PLM works compliant
08/03/2025	09:08	OOH-Day	Tower Crane 2 installation -	STM	2 Chesham Street, Street Marys	3	47	64	50.9	72.5	46.3	No	Construction noise audible and below predicted, PLM works compliant
13/03/2025	10:15	OOH-Night	CSR works	SMF	43 A Luddenham Road, Orchard Hills	9	39	46	44	51.6	42	No	Construction noise inaudible, dominant noise source was animal activity (frogs and dogs), road and air traffic, PLM works compliant
14/03/2025	22:06	OOH-Night	CSR works	SMF	10 Cabernet Circuit, Orchard Hills	8	45	46	49.9	70.7	42.3	Yes	Construction noise faintly audible and below predicted noise level. External environment factors caused the exceedance to the overall 15 minute recording. This monitoring was completed in relation to a complaint close out. Works were compliant.
18/03/2025	19:51	OOH-Evening	Loading precast support beams and installation	BRD	145 Badgerys Creek Road, Bradfield	12	40	42	46.8	69.3	42.5	No	Construction noise inaudible and below predicted, PLM works compliant
19/03/2025	00:25	OOH-Night	Precast beam installation	STM	3 Station Street, St Marys	3	41	57	51.8	65.9	49.4	No	Construction noise inaudible and below predicted, PLM works compliant
19/03/2025	22:36	OOH-Night	CSR works	SMF	3 Verdelho Way, Orchard Hills	8	45	45	47.6	72.2	37	No	Dominant noise source was birds hence the exceedance to the predicted value.. This monitoring was completed in relation to a complaint close out. Works were compliant.
19/03/2025	23:06	OOH-Night	CSR works	SMF	10 Cabernet Circuit, Orchard Hills	8	45	46	47.3	59	41.5	No	Construction noise audible and below predicted, PLM works compliant
20/03/2025	01:09	OOH-Night	Loading of precast beams into trucks	OHE	77 Kent Road, Orchard Hills	8	45	48	47.4	69.4	41.8	No	Construction noise audible and in line with prediction, PLM works compliant. This monitoring was completed in relation to a complaint close out.
20/03/2025	21:00	OOH-Evening	Track Construction	Linewide P4	644-652 Luddenham Road, Luddenham	10	35	54.4	64.2	85	47.7	No	Construction noise source faintly audible, dominant noise source was fauna and traffic, PLM works compliant
20/03/2025	21:17	OOH-Evening	Track Construction	Linewide P4	611a Luddenham Road, Luddenham	10	35	54	62.9	88.6	51.8	No	Construction noise faintly audible and below predicted, PLM works compliant
20/03/2025	21:41	OOH-Evening	Track Construction	Linewide P4	23 Halmstad Boulevard, Luddenham	10	35	43	46.5	70.7	40.6	No	Construction noise inaudible and below predicted, PLM works compliant
20/03/2025	22:00	OOH-Night	Track Construction	Linewide P4	23 Halmstad Boulevard, Luddenham	10	35	43	48.4	69.8	40.6	No	Below predicted, PLM works compliant
20/03/2025	22:22	OOH-Night	Track Construction	Linewide P4	644-652 Luddenham Road, Luddenham	10	35	54	60.6	86.1	47.5	No	Below predicted, PLM works compliant
20/03/2025	22:41	OOH-Night	Track Construction	Linewide P4	611a Luddenham Road, Luddenham	10	35	54.4	64.1	83.3	49.9	No	Construction noise audible and in line with predictions during breaks in dominant noise sources, dominant noise source was traffic and birds, PLM works compliant
20/03/2025	22:04	OOH-Night	Crane Usage	BSF	38 Derwent Road, Bradfield	12	39	49	47.9	69.1	44.4	No	Construction noise audible and in line with predictions during breaks in dominant noise sources, dominant noise source was traffic and birds, PLM works compliant
20/03/2025	00:01	OOH-Night	Precast beam installation	STM	2 Station Street, St Marys	3	41	59	53.3	76.3	51.4	No	Construction noise faintly audible, dominant noise source was birds, PLM works compliant
21/03/2025	20:21	OOH-Evening	Loading of precast beams into trucks	OHE	77 Kent Road, Orchard Hills	8	45	45	58.3	79.1	41.8	No	Construction noise inaudible and below predicted, PLM works compliant
27/03/2025	05:36	OOH-Night	Batch Plant Operations	OHE	122-126 Samuel Marsden Road, Orchard Hills	8	45	49	47.3	58.4	42.6	No	Construction noise audible and below predicted, PLM works compliant
28/03/2025	06:12	OOH-Night	Concrete pouring and supporting formwork	STM	2 Station Street, St Marys	3	41	61	61.8	80.1	55.7	No	Construction works faintly audible, dominant noise source was traffic and birds, PLM works compliant

Date	Time	Time Period	Construction Activity ²	Site Location	Monitoring Location/Address/DNVIS ID	NCA ¹	NML dB(A)	Predicted LAeq(15min) dB(A)	Recorded LAeq(15min) dB(A)	LAmx dB(A)	L90(A)	Exceedance of Predicted LAeq(15min)?	Comments
02/04/2025	21:23	OOH-Evening	Utility works Caddens/Kent - Saw cutting	OHE	13 Harrier Place, Claremont Meadows	6	37	69	83.1	96.2	67.4	No	Construction noise faintly audible and below predicted, dominant noise source was from traffic and residential ambience. PLM works compliant
02/04/2025	21:40	OOH-Evening	Utility works Caddens/Kent - Saw cutting	OHE	75 Blackwood Street, Claremont Meadows	6	37	59	71.7	94.5	56.9	No	Construction noise faintly audible and in line with predictions during breaks in dominant noise sources, dominant noise source was traffic and birds, PLM works compliant
02/04/2025	22:00	OOH-Night	Utility works Caddens/Kent - 5t excavator rip out asphalt layer	OHE	35A Kent Road, Claremont Meadows	6	37	62	66	96.4	49.1	No	Construction noise inaudible, dominant noise source was birds, PLM works compliant
02/04/2025	22:48	OOH-Night	Utility works Caddens/Kent - 5t excavator rip out asphalt layer	OHE	13 Harrier Place, Claremont Meadows	6	37	70	70.9	96.2	57.9	No	Construction noise faintly audible and below predicted, dominant noise source was from traffic and residential ambience. PLM works compliant
02/04/2025	23:05	OOH-Night	Utility works Caddens/Kent - 5t excavator rip out asphalt layer	OHE	75 Blackwood Street, Claremont Meadows	6	37	60	64.5	77.8	56.6	No	Construction noise faintly audible, dominant noise source was traffic on Kent and Lansdowne Roads, PLM works compliant
15/04/2025	22:04	OOH-Night	Gantry Crane Operations for Tunnel support and fit out works	OHE	77 Kent Road, Orchard Hills	8	45	53	60.9	83.1	38.2	No	Construction noise very faintly audible, dominant noise source was traffic, PLM works compliant
16/04/2025	22:21	OOH-Night	Tunnel Fitout	OHE	77 Kent Road, Orchard Hills	8	45	53	55.8	81.8	38.3	No	Construction noise inaudible and below predicted, low traffic audible. PLM works compliant
16/04/2025	23:12	OOH-Night	SMF CSR works	SMF	9 Bordeaux Place, Orchard Hills	8	45	48	37.1	67.5	34.7	No	Construction noise audible and below predicted, residential background was dominant noise source. PLM works compliant
17/04/2025	00:39	OOH-Night	STM precast beam installation works	STM	31 Phillips Street, St Marys	3	41	55	56	76.6	48.4	No	Construction noise faintly audible and below predicted, residential background was dominant noise source. PLM works compliant. This monitoring was completed in relation to a complaint close out.
17/04/2025	05:34	OOH-Night	Batch Plant Operations	OHE	122-126 Samuel Marsden Road, Orchard Hills	8	45	45	55.9	82.1	46.3	No	Construction noise faintly audible and below predicted, low traffic flow was dominant. PLM works compliant
17/04/2025	06:13	OOH-Night	Concrete pouring and supporting formwork	STM	2 Station Street, St Marys	3	41	61	60	78.4	51.4	No	Construction noise audible and below predicted, residential background was the dominant noise source. PLM works compliant
07/05/2025	05:24	OOH-Night	Batch Plant Operations	OHE	40 Lansdowne Road, Orchard Hills	8	45	45	58.8	82.2	52.3	No	Construction noise audible and below predicted. M4 traffic was the dominant noise source. PLM works compliant.
07/05/2025	06:06	OOH-Night	Concrete pouring and supporting formwork	STM	3 Station Street, St Marys	3	41	61	61.5	83.6	50.4	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
15/05/2025	00:12	OOH-Night	Precast beam installation	STM	2 Station Street, St Marys	3	41	59	57.5	70.9	54.4	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
20/05/2025	21:43	OOH-Evening	SMF CSR Works	SMF	9 Bordeaux Place, Orchard Hills	8	45	55	38.9	51.2	37.3	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
20/05/2025	22:54	OOH-Night	Formwork installation	Linewide P1	372 Luddenham Road, Luddenham	9	39	58	35.3	51.9	33.3	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
21/05/2025	22:34	OOH-Night	Tunnel fit out	OHE	62 Doncaster Avenue, Claremont Meadows	6	36	43	49	68.7	42.6	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
21/05/2025	18:26	OOH-Evening	Concrete Pour	BRD	25 The Retreat, Bradfield	12	40	44	41.4	68.4	38.2	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.

Date	Time	Time Period	Construction Activity ²	Site Location	Monitoring Location/Address/DNVIS ID	NCA ¹	NML dB(A)	Predicted LAeq(15min) dB(A)	Recorded LAeq(15min) dB(A)	LAmx dB(A)	L90(A)	Exceedance of Predicted LAeq(15min)?	Comments
23/05/2025	22:30	OOH-Night	Supporting formworks	Linewide P1	9 Bordeaux Place, Orchard Hills	8	45	55	44.1	56.1	43.2	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant. This monitoring was completed in relation to a complaint close out.
23/05/2025	23:07	OOH-Night	Rail pulling into tunnel	OHE	40 Lansdowne Road, Orchard Hills	8	45	45	49.4	66.7	44.4	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
27/05/2025	22:00	OOH-Night	Bringelly ventilation fans	BSF	38 Derwent Road, Bradfield	12	39	49	47.7	53	46	No	Construction noise audible and below predicted, residential ambience was dominant noise source. PLM works compliant.
27/05/2025	23:05	OOH-Night	Supporting formworks + cumulative SMF	Linewide P1	9 Bordeaux Place, Orchard Hills	8	45	50	47	63	48.2	No	Construction noise audible and below predicted, residential ambience was dominant noise source. PLM works compliant.
29/05/2025	06:13	OOH-Night	Bringelly ventilation fans	BSF	38 Derwent Road, Bradfield	12	39	49	48.7	71.2	45.8	No	Construction noise audible and below predicted, residential ambience was dominant noise source. PLM works compliant.
29/05/2025	05:13	OOH-Night	Claremont ventilation fans	CMSF	2 Putland Street, Claremont Meadows	6	36	43	52	76	44	No	Construction noise audible and below predicted, residential ambience was dominant noise source. PLM works compliant.
29/05/2025	05:46	OOH-Night	Claremont ventilation fans	CMSF	4 Dolphin Close, Claremont Meadows	6	36	42	52.5	76.1	48.1	No	Construction noise audible and below predicted, residential ambience was dominant noise source. PLM works compliant.
10/06/2025	22:18	OOH-Night	Track Construction	Linewide P1	16 Lansdowne Road, Orchard Hills	8	45	59	44.9	64.8	40.8	No	Construction noise audible and below predicted, residential ambience was dominant noise source. PLM works compliant.
10/06/2025	22:51	OOH-Night	Track Construction	Linewide P1	146 Samuel Marsden Road, Orchard Hills	8	45	56	41.2	54.9	37.8	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
12/06/2025	18:47	OOH-Evening	Track Construction	Linewide P1	146 Samuel Marsden Road, Orchard Hills	8	45	56	46.8	91.4	40.7	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
12/06/2025	22:12	OOH-Night	Track Construction	Linewide P1	146 Samuel Marsden Road, Orchard Hills	8	45	56	43.8	70.5	39.1	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
12/06/2025	23:06	OOH-Night	Track Construction	Linewide P1	9 Bordeaux Place, Orchard Hills	8	45	55	42	39.4	39.2	No	Construction noise audible and below predicted, traffic and natural ambience was dominant noise source. PLM works compliant.
19/06/2025	06:42	OOH-Night	Concrete Pouring	STM	3 Station Street, St Marys	3	41	61	65.4	68.7	61	No	Construction noise audible and below predicted, traffic and natural ambience was dominant noise source. PLM works compliant.
23/06/2025	19:47	OOH-Evening	Concrete Pouring	BRD	145 Badgerys Creek Road, Bradfield	12	40	47	41.4	55	38.1	No	Construction noise audible and below predicted, traffic and natural ambience was dominant noise source. PLM works compliant.
01/07/2025	00:15	OOH-Night	Pre-cast install	OHE	40 Lansdowne Road, Orchard Hills	8	45	46	38	56	41.5	No	Construction noise audible and below predicted, traffic and natural ambience was dominant noise source. PLM works compliant.
01/07/2025	00:36	OOH-Night	Pre-cast install	OHE	101 Kent Road, Orchard Hills	8	45	46	62.1	85.8	49	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
03/07/2025	00:35	OOH-Night	Pre-cast install	OHE	40 Lansdowne Road, Orchard Hills	8	45	46	43.3	73.7	41.5	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
10/07/2025	06:01	OOH-Night	Concrete Pouring	STM	4 Chesham Street, St Marys	3	41	53	54.8	66.6	52.3	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
11/07/2025	06:25	OOH-Night	Tunnel fitout	STM	3 Chesham Street, St Marys	3	41	53	56.4	72.4	52.3	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
14/07/2025	06:32	OOH-Night	Tunnel fit out	STM	2 Station Street, St Marys	3	41	61	68.9	97.7	53.8	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
15/07/2025	06:34	OOH-Night	Concrete batch plant	OHE	40 Lansdowne Road, Orchard Hills	8	45	45	61	83.9	52.6	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
16/07/2025	18:34	OOH-Evening	Concrete Pouring	BRD	145 Badgerys Creek Road, Bradfield	12	40	47	45.6	59.8	42.3	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.
16/07/2025	01:00	OOH-Night	Pre-cast Beams Install	BRD	145 Badgerys Creek Road, Bradfield	12	39	39	39.4	50.6	37.8	No	Construction noise audible and below predicted, traffic was dominant noise source. PLM works compliant.

1. REFER TO APPENDIX C FOR NCA MAPS

2. PLANT AND EQUIPMENT FOR CONSTRUCTION ACTIVITY CAN BE REVIEWED WITHIN THE RELEVANT DNVIS (REFER TO TABLE 5)

Unattended Site Monitoring Data

Unattended noise monitoring data is provided as an average LAeq for each 15 minute period over the representative period, during the date range of monitoring, and provides noise data during the various construction periods.

Date	Construction Activities	Activity Location	Monitoring Location	NML (dBA)			Recorded Day (7am to 6pm) Avg LAeq15min	Recorded Evening (6pm to 10pm) Avg LAeq	Recorded Night (10pm to 7am) Avg LAeq	Comments
				Day	Evening	Night				
01/02/2025 – 31/07/2025	Earthworks, drainage, road construction, services	SSTOM Portion 1 North	Linewide Portion 1 – North-East Site (NCA08)	54	49	45	50	47	48	Real time noise averages (LAeq) captured within the reporting period. Dominant noise source was from the natural environment.
01/02/2025 – 31/07/2025	Concrete works, beam installation	SSTOM Bradfield	Bradfield – south-east corner of site (NCA12)	48	40	39	53	54	56	Real time noise averages (LAeq) captured within the reporting period. Dominant noise source was from the natural environment.
01/02/2025 – 31/07/2025	Site establishment, deliveries, earthworks, concreting, craneage, FRP, structures	SSTOM Portion 1 South	Linewide Portion 1 – South-West site (NCA08)	54	49	45	58	57	58	Real time noise averages (LAeq) captured within the reporting period. Dominant noise source was from the natural environment.

Appendix B Monitoring Locations

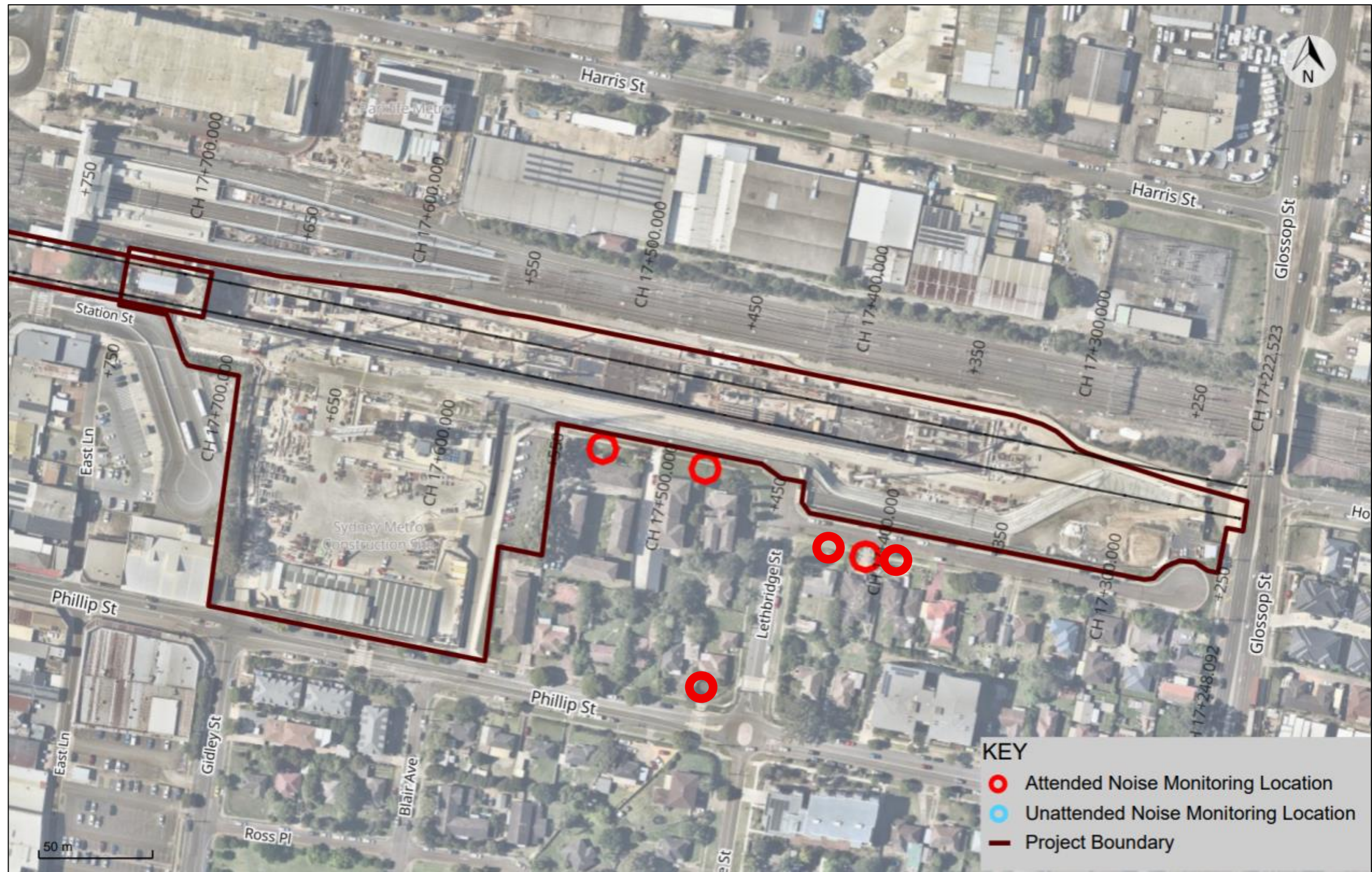


FIGURE 2 LOCATIONS OF NOISE MONITORING UNDERTAKEN THIS REPORTING PERIOD (ST MARYS)



FIGURE 3 LOCATIONS OF NOISE MONITORING UNDERTAKEN THIS REPORTING PERIOD (CLAREMONT MEADOWS SHAFT FACILITY)



FIGURE 4 NOISE MONITORING UNDERTAKEN DURING THIS MONITORING PERIOD (ORCHARD HILLS N)

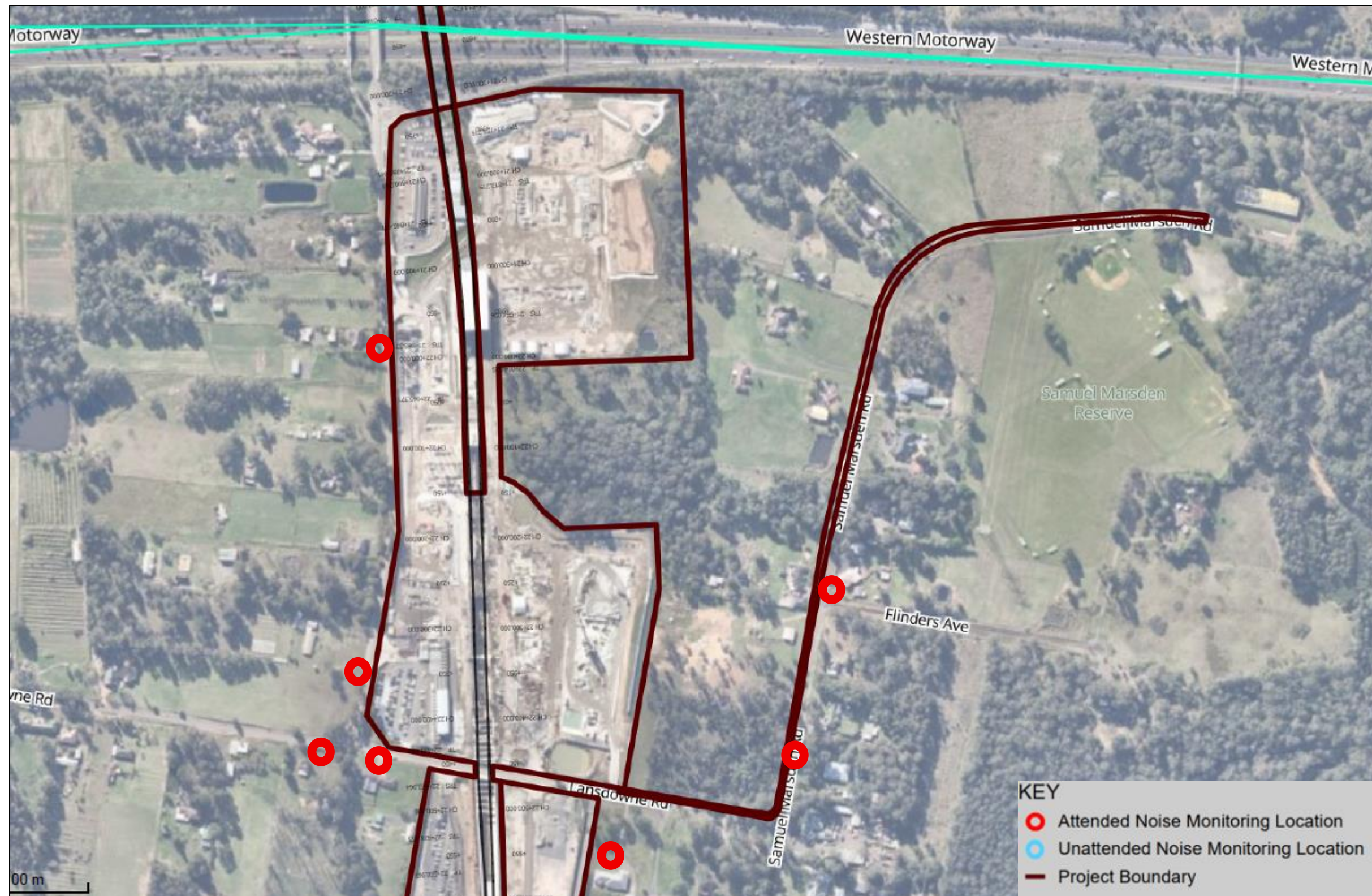


FIGURE 5 NOISE MONITORING UNDERTAKEN DURING THIS MONITORING PERIOD (ORCHARD HILLS)

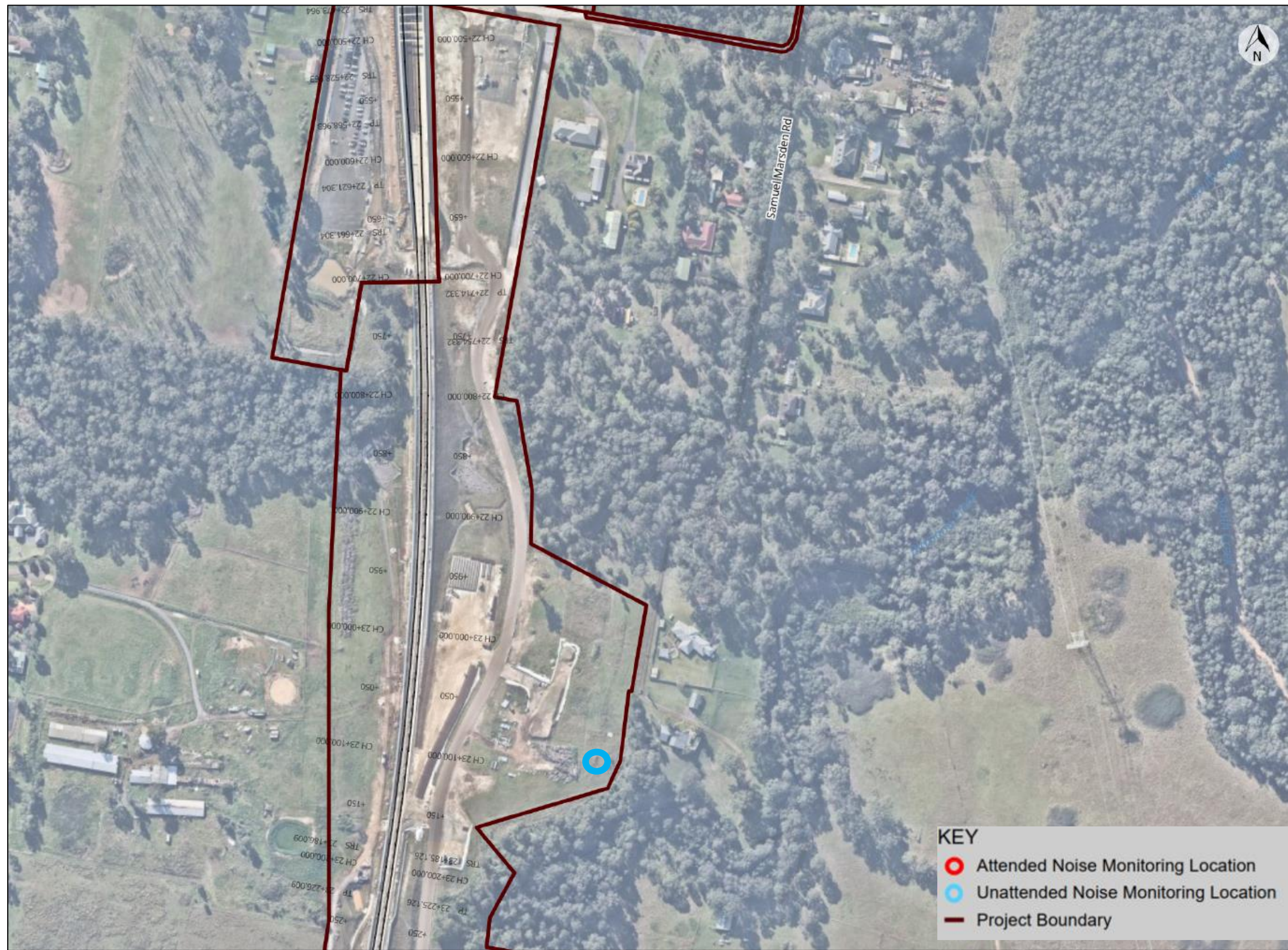


FIGURE 6 NOISE MONITORING UNDERTAKEN DURING THIS MONITORING PERIOD (LINEWIDE PORTION 1)

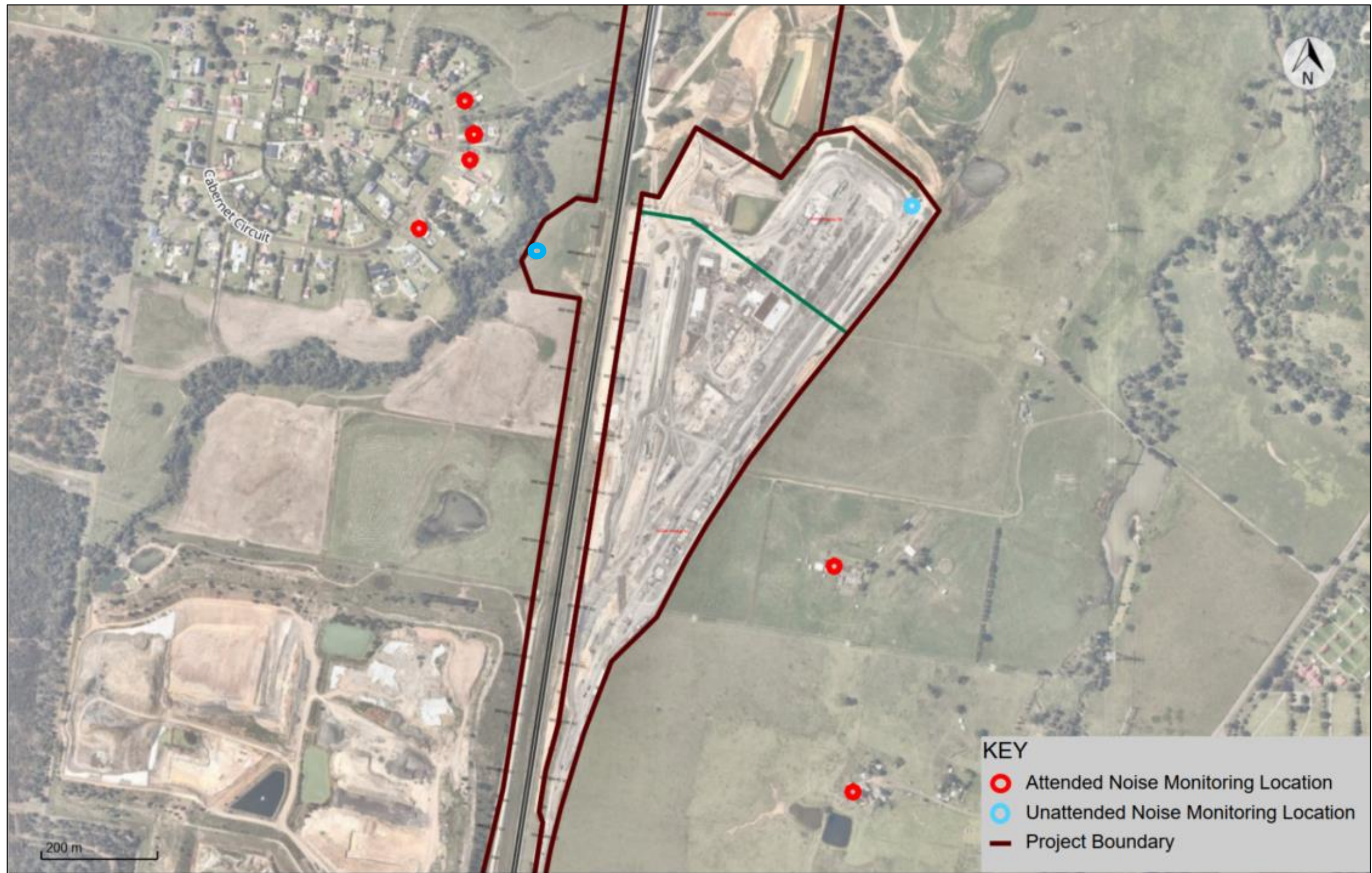


FIGURE 7 LOCATIONS OF NOISE MONITORING UNDERTAKEN THIS REPORTING PERIOD (STABLING AND MAINTENANCE FACILITY AND LINEWIDE)



FIGURE 8 NOISE MONITORING UNDERTAKEN DURING THIS MONITORING PERIOD (LINEWIDE)

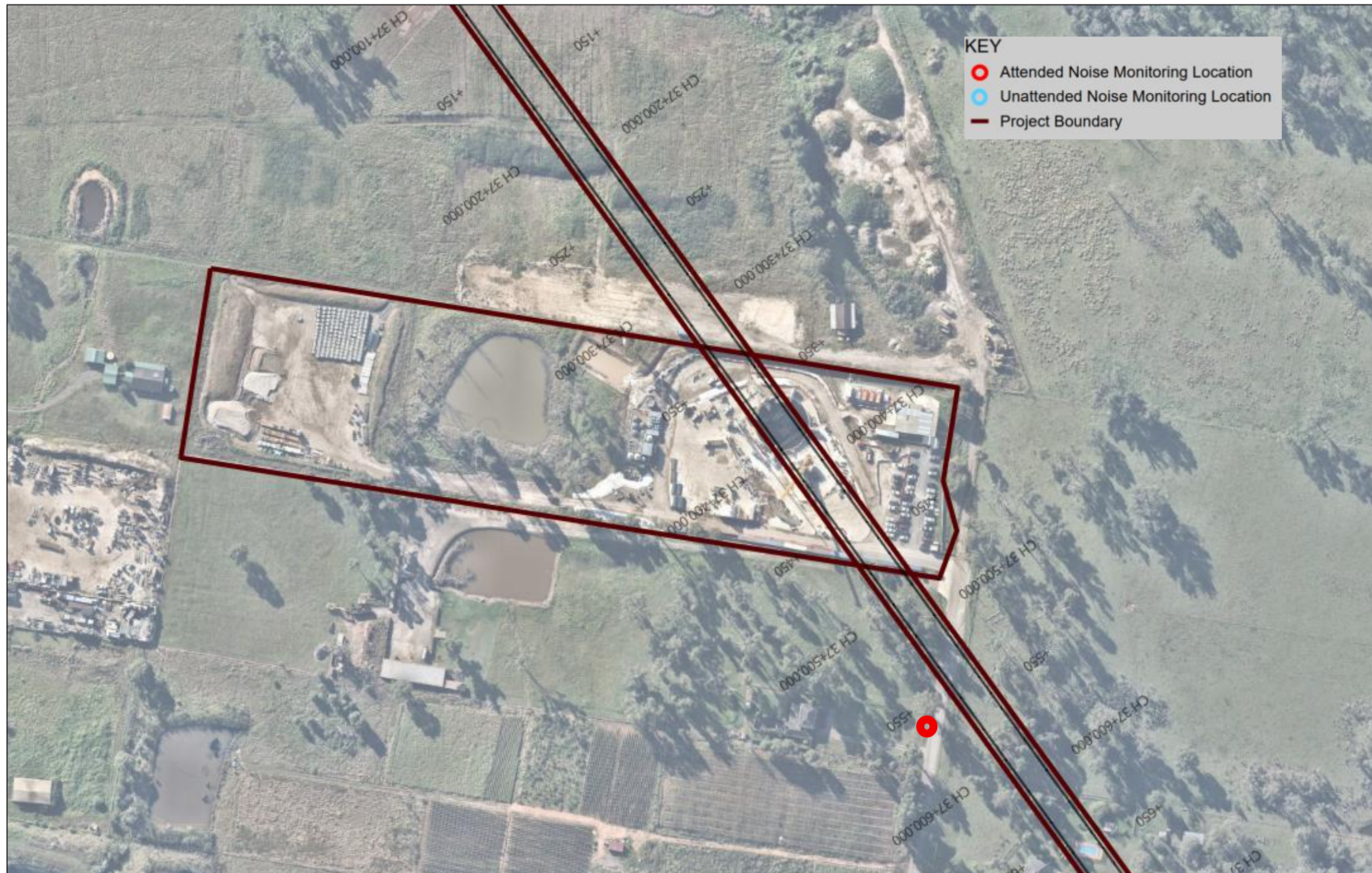


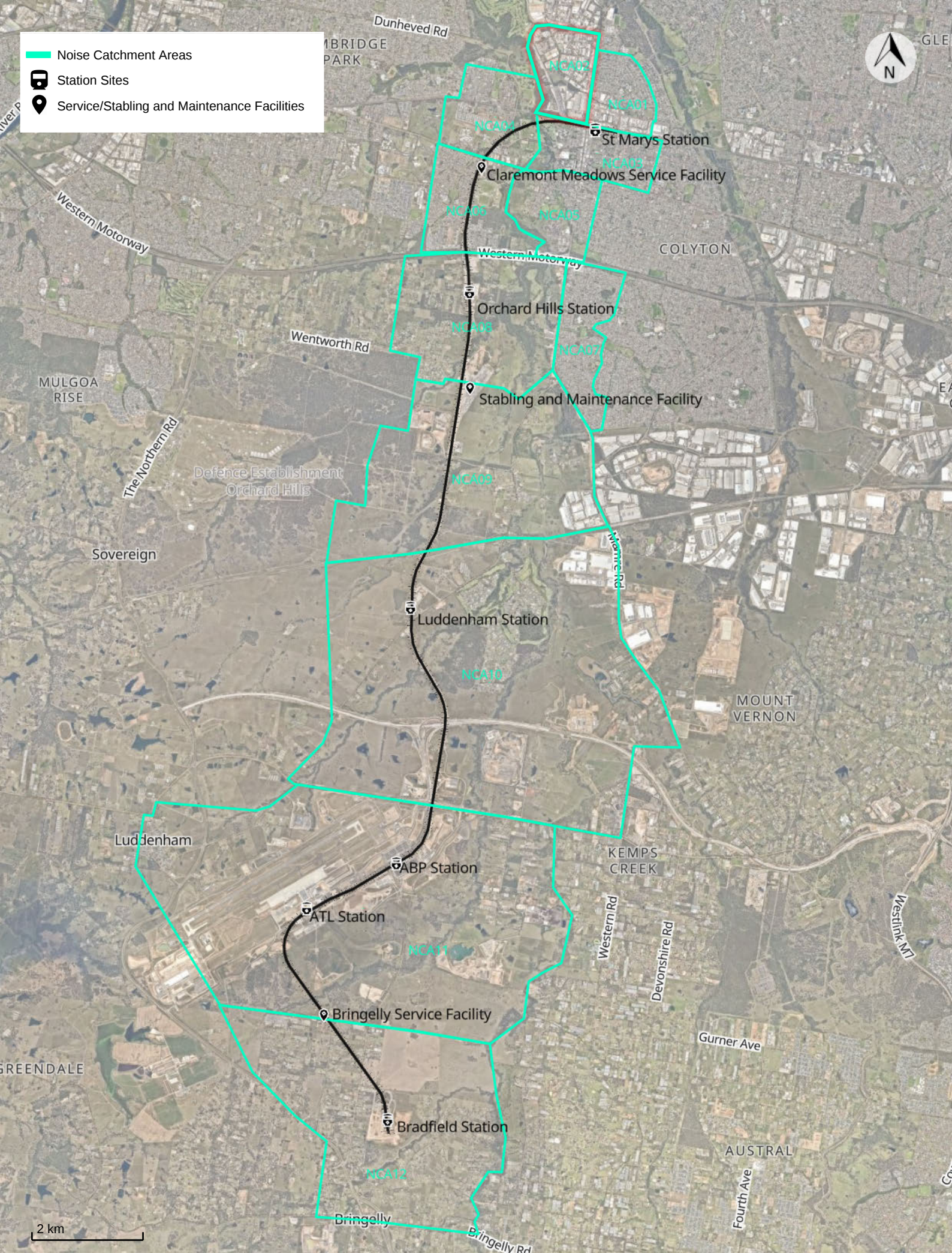
FIGURE 9 NOISE MONITORING UNDERTAKEN DURING THIS MONITORING PERIOD (BRINGELLY)



FIGURE 10 NOISE MONITORING UNDERTAKEN DURING THIS MONITORING PERIOD (BRADFIELD)

Appendix C

Noise Catchment Areas



Appendix D Certificate of Calibration



Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C24733

Client Details	PARKLIFE METRO D&C Level 7, 175 Liverpool Street Sydney NSW, 2000
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Equipment Tested/ Model Number :	Rion NL-53
Instrument Serial Number :	00630296
Microphone Serial Number :	23664
Pre-amplifier Serial Number :	33121
Firmware Version :	01.02

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 23.2 °C	Ambient Temperature : 22.7 °C
Relative Humidity : 44.1 %	Relative Humidity : 44.6 %
Barometric Pressure : 101.17 kPa	Barometric Pressure : 101.18 kPa

Calibration Technician : Peter Elters	Secondary Check: Cooper Sallway
Calibration Date : 8 Oct 2024	Report Issue Date : 9 Oct 2024

Approved Signatory :

Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13 dB	Temperature	±0.1 °C
1kHz	±0.13 dB	Relative Humidity	±1.9 %
8kHz	±0.14 dB	Barometric Pressure	±0.11 kPa
Electrical Tests	±0.13 dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.



Sound Level Meter IEC 61672-3:2013 Calibration Test Report

Calibration Number C24733

Client Details PARKLIFE METRO D&C Level 7, 175 Liverpool Street Sydney NSW, 2000	
Equipment Tested/ Model Number : Rion NL-53 Instrument Serial Number : 00630296 Microphone Serial Number : 23664 Pre-amplifier Serial Number : 33121 Firmware Version : 01.02	
Pre-Test Atmospheric Conditions Ambient Temperature : 23.2 °C Relative Humidity : 44.1 % Barometric Pressure : 101.17 kPa	Post-Test Atmospheric Conditions Ambient Temperature : 22.7 °C Relative Humidity : 44.6 % Barometric Pressure : 101.18 kPa
Calibration Technician : Peter Elters Calibration Date : 8 Oct 2024	Secondary Check: Cooper Sallway Report Issue Date : 9 Oct 2024

Approved Signatory :

Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13 dB	Temperature	±0.1 °C
1kHz	±0.13 dB	Relative Humidity	±1.9 %
8kHz	±0.14 dB	Barometric Pressure	±0.11 kPa
Electrical Tests	±0.13 dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This report applies only to the item tested and shall only be reproduced in full, unless approved in writing by Acoustic Research Labs.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.



Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C24734

Client Details		PARKLIFE METRO D&C Level 7, 175 Liverpool Street Sydney NSW 2000	
Equipment Tested/ Model Number :		Rion NL-53	
Instrument Serial Number :		00440980	
Microphone Serial Number :		25418	
Pre-amplifier Serial Number :		33881	
Firmware Version :		01.02	
Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature : 23.3 °C		Ambient Temperature : 23.8 °C	
Relative Humidity : 47.8 %		Relative Humidity : 46.3 %	
Barometric Pressure : 101.26 kPa		Barometric Pressure : 101.21 kPa	
Calibration Technician : Jeff Yu		Secondary Check: Emanuel Eid	
Calibration Date : 8 Oct 2024		Report Issue Date : 8 Oct 2024	
Approved Signatory : 		Ken Williams	

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Acoustic Tests		Uncertainties of Measurement -	
125Hz	±0.13 dB	Environmental Conditions	
1kHz	±0.13 dB	Temperature	±0.1 °C
8kHz	±0.14 dB	Relative Humidity	±1.9 %
Electrical Tests	±0.13 dB	Barometric Pressure	±0.11 kPa

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.



Sound Level Meter IEC 61672-3:2013 Calibration Test Report

Calibration Number C24734

Client Details PARKLIFE METRO D&C Level 7, 175 Liverpool Street Sydney NSW 2000	
Equipment Tested/ Model Number : Rion NL-53 Instrument Serial Number : 00440980 Microphone Serial Number : 25418 Pre-amplifier Serial Number : 33881 Firmware Version : 01.02	
Pre-Test Atmospheric Conditions Ambient Temperature : 23.3 °C Relative Humidity : 47.8 % Barometric Pressure : 101.26 kPa	Post-Test Atmospheric Conditions Ambient Temperature : 23.8 °C Relative Humidity : 46.3 % Barometric Pressure : 101.21 kPa
Calibration Technician : Jeff Yu Calibration Date : 8 Oct 2024	Secondary Check: Emanuel Eid Report Issue Date : 8 Oct 2024

Approved Signatory : 

Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13 dB	Temperature	±0.1 °C
1kHz	±0.13 dB	Relative Humidity	±1.9 %
8kHz	±0.14 dB	Barometric Pressure	±0.11 kPa
Electrical Tests	±0.13 dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This report applies only to the item tested and shall only be reproduced in full, unless approved in writing by Acoustic Research Labs.

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Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C24735

Client Details		PARKLIFE METRO D&C Level 7, 175 Liverpool Street Sydney NSW, 2000	
Equipment Tested/ Model Number :		Rion NL-53	
Instrument Serial Number :		00741209	
Microphone Serial Number :		25783	
Pre-amplifier Serial Number :		34164	
Firmware Version :		01.02	
Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature : 22.6 °C		Ambient Temperature : 22.3 °C	
Relative Humidity : 44 %		Relative Humidity : 43.5 %	
Barometric Pressure : 101.19 kPa		Barometric Pressure : 101.2 kPa	
Calibration Technician : Peter Elters		Secondary Check: Cooper Sallway	
Calibration Date : 8 Oct 2024		Report Issue Date : 9 Oct 2024	
Approved Signatory : 		Ken Williams	

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Acoustic Tests		Uncertainties of Measurement -	
125Hz	±0.13 dB	Environmental Conditions	
1kHz	±0.13 dB	Temperature	±0.1 °C
8kHz	±0.14 dB	Relative Humidity	±1.9 %
Electrical Tests	±0.13 dB	Barometric Pressure	±0.11 kPa

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

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Sound Level Meter IEC 61672-3:2013 Calibration Test Report

Calibration Number C24735

Client Details PARKLIFE METRO D&C Level 7, 175 Liverpool Street Sydney NSW, 2000	
Equipment Tested/ Model Number : Rion NL-53 Instrument Serial Number : 00741209 Microphone Serial Number : 25783 Pre-amplifier Serial Number : 34164 Firmware Version : 01.02	
Pre-Test Atmospheric Conditions Ambient Temperature : 22.6 °C Relative Humidity : 44 % Barometric Pressure : 101.19 kPa	Post-Test Atmospheric Conditions Ambient Temperature : 22.3 °C Relative Humidity : 43.5 % Barometric Pressure : 101.2 kPa
Calibration Technician : Peter Elters Calibration Date : 8 Oct 2024	Secondary Check: Cooper Sallway Report Issue Date : 9 Oct 2024

Approved Signatory : 

Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13 dB	Temperature	±0.1 °C
1kHz	±0.13 dB	Relative Humidity	±1.9 %
8kHz	±0.14 dB	Barometric Pressure	±0.11 kPa
Electrical Tests	±0.13 dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



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NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

Hexanode Calibration Certificate

06 Nov 2023

Thank you for choosing SiteHive for your realtime environmental management. This calibration certificate is valid for the device below.

Noise

The Hexanode sound level meter has been pressure calibrated by SiteHive using a NATA Certified (IEC 60942: Sound calibrators) Sound Level Calibrator, at 2 Foveaux Street, Surry Hills, NSW, 2010.

Serial Number	Calibration Date	Calibration Value
HEX-000080	06 Oct 2023	3.37246

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dB SPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source

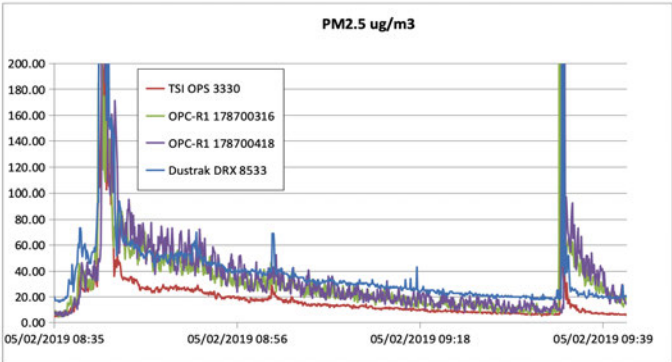
The SiteHive Hexanode uses innovative digital MEMS microphones, and as such cannot achieve full pattern approval in line with international standard IEC 61672, which is written for analogue condenser microphones. However, the SiteHive Hexanode sound level meter has been rigorously tested by the the [National Measurement Institute \(NMI\)](#), the division of the Australian Federal Government Department of Industry, Science, Energy & Resources responsible for providing world-class measurement services to support a fair, safe, healthy and competitive Australia. The National Measurement Institute's (NMI) [acoustic, ultrasound and vibration measurement services](#) are the most accurate in Australia, and include providing the certification for NATA (National Association of Testing Authorities) testing facilities, who provide class certification for noise meters. NMI undertook all of the possible tests outlined in IEC 61672-2, with the Hexanode passing all precision requirements within the criteria of a class 2 device.

Dust

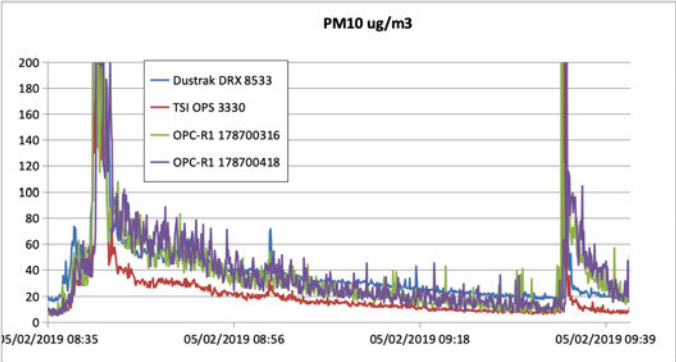
The Hexanode utilises the Alphasense R2 Optical Particle Sensor, to provide real-time dust measurements. Whilst the R2 does not have any gravimetric sampling capabilities, measurements can be adjusted using a K-Factor if one is available. SiteHive software will also provide measurements from the nearest Government air quality station for reference. The full data sheet for the Alphasense R2 is available [here](#).

Particle range	µm spherical equivalent size (based on RI of 1.5)	0.30 to 12.4
Size categorisation	Number of software bins	16
Sampling interval	Histogram period (seconds)	2 to 30
Total flow rate	L/min (typical)	0.24
Max particle count rate	particles/second	10,000
Max coincidence probability	% concentration at 10 ⁶ particles/L	0.7

Prior to deployment, the R2 is tested against [TSI Optical Particle Sizer 3330](#) and [DustTrak instruments](#).



Comparison of PM2.5 monitoring by OPC-R2 sensor and TSI OPS 3330 and DustTrak instruments. All are set at 5s averaging and are sampling the ambient air of a workshop, the raw 3330 data has been used to calculate a PM figure.



Comparison of PM10 monitoring by OPC-R2 sensor and TSI OPS 3330 and DustTrak instruments. All are set at 5s averaging and are sampling the ambient air of a workshop, the raw 3330 data has been used to calculate a PM figure.

Hexanode Calibration Certificate



10 Sep 2024

Thank you for choosing SiteHive for your realtime environmental management. This calibration certificate is valid for the device below.

Noise

The Hexanode sound level meter has been pressure calibrated by SiteHive using a NATA Certified (IEC 60942: Sound calibrators) Sound Level Calibrator, at 2 Foveaux Street, Surry Hills, NSW, 2010.

Serial Number	Calibration Date	Calibration Value
HEX-000641	22 Aug 2024	2.850183

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source

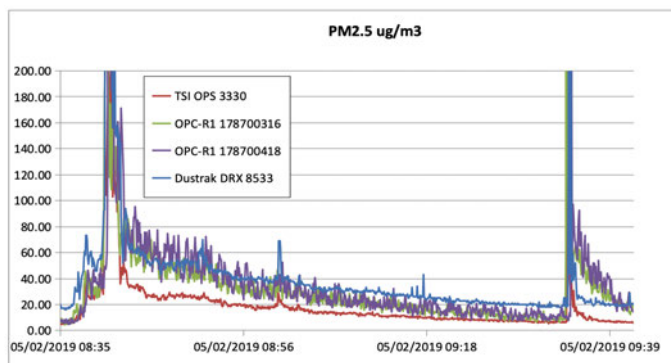
The SiteHive Hexanode uses innovative digital MEMS microphones, and as such cannot achieve full pattern approval in line with international standard IEC 61672, which is written for analogue condenser microphones. However, the SiteHive Hexanode sound level meter has been rigorously tested by the the [National Measurement Institute \(NMI\)](#), the division of the Australian Federal Government Department of Industry, Science, Energy & Resources responsible for providing world-class measurement services to support a fair, safe, healthy and competitive Australia. The National Measurement Institute's (NMI) [acoustic, ultrasound and vibration measurement services](#) are the most accurate in Australia, and include providing the certification for NATA (National Association of Testing Authorities) testing facilities, who provide class certification for noise meters. NMI undertook all of the possible tests outlined in IEC 61672-2, with the Hexanode passing all precision requirements within the criteria of a class 2 device.

Dust

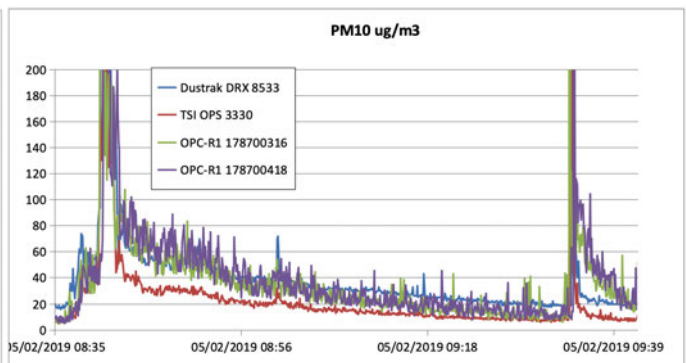
The Hexanode utilises the Alphasense R2 Optical Particle Sensor, to provide real-time dust measurements. Whilst the R2 does not have any gravimetric sampling capabilities, measurements can be adjusted using a K-Factor if one is available. SiteHive software will also provide measurements from the nearest Government air quality station for reference. The full data sheet for the Alphasense R2 is available [here](#).

Particle range	µm spherical equivalent size (based on RI of 1.5)	0.30 to 12.4
Size categorisation	Number of software bins	16
Sampling interval	Histogram period (seconds)	2 to 30
Total flow rate	L/min (typical)	0.24
Max particle count rate	particles/second	10,000
Max coincidence probability	% concentration at 10 ⁶ particles/L	0.7

Prior to deployment, the R2 is tested against [TSI Optical Particle Sizer 3330](#) and [DustTrak](#) instruments.



Comparison of PM2.5 monitoring by OPC-R2 sensor and TSI OPS 3330 and DustTrak instruments. All are set at 5s averaging and are sampling the ambient air of a workshop, the raw 3330 data has been used to calculate a PM figure.



Comparison of PM10 monitoring by OPC-R2 sensor and TSI OPS 3330 and DustTrak instruments. All are set at 5s averaging and are sampling the ambient air of a workshop, the raw 3330 data has been used to calculate a PM figure.

Hexanode Calibration Certificate



02 Sep 2025

Noise

Thank you for choosing SiteHive for your realtime environmental management. This calibration certificate is valid for the device below.

The Hexanode sound level meter has been pressure calibrated by SiteHive using a NATA Certified (IEC 60942: Sound calibrators) Sound Level Calibrator, at 104 Commonwealth Street, Surry Hills, NSW, 2010.

Serial Number	Noiseboard ID	Calibration Value	Calibration Date	Calibration Due
HEX-001114	4273865-009-0425000072	4.319225	24 Aug 2025	24 Aug 2027

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source
Reference Sound Level Calibrator:	Lutron SC-941
Calibration Reference Level:	94dB
Calibration Reference Frequency:	1 KHz
Environmental Conditions:	The environmental conditions remained within the acceptable limits as defined in IEC 61672.3

NATA Certificates of Calibration that comply with the Class 2 performance requirements of IEC 61672.3 are available on request.