JOHN HOLLAND

Waterloo OSD Southern Precinct

Quarterly Out of Hours Noise Monitoring Report

October 2024 to December 2024

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Document and Revision History

Document Details	
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Client	WL Developer Pty Ltd

Revisions

Rev #	Date	Description	Prepared by	Reviewed by	Approved by
0	21/01/2025	Final Report	T. Rodrigues	N. Topouzian	E.Choo

Glossary

Term	Explanation
CEMP	Construction Environmental Management Plan
CNVIA	Construction Noise & Vibration Impact Assessment
CNVMP	Construction Noise and Vibration Management Plan
CoA	Condition of Approval
CoS	City of Sydney
DPHI	Department of Planning, Housing and Infrastructure
ICNG	Interim Construction Noise Guideline
JH	John Holland
MQD	Metro Quarter Development
NML	Noise Management Level
OOH	Out of Hours
OSD	Over-station Development
PNL	Predicted Noise Level
RBL	Rating Background Level
SPL	Sound Power Level
SSD	State Significant Development
WLD	Waterloo Developer Pty Ltd

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1. Introduction

1.2 Background

The Waterloo Metro Quarter Over Station Development (OSD) comprises four separate buildings, a basement carpark and public domain works adjacent to the Waterloo Metro station. Separate SSD applications have been determined for the design, construction and operation of each building in the precinct.

- Southern Precinct SSD-10437,
- Basement Car Park SSD-10438,
- Central Precinct SSD-10439, and
- Northern Precinct-SSD-10440.

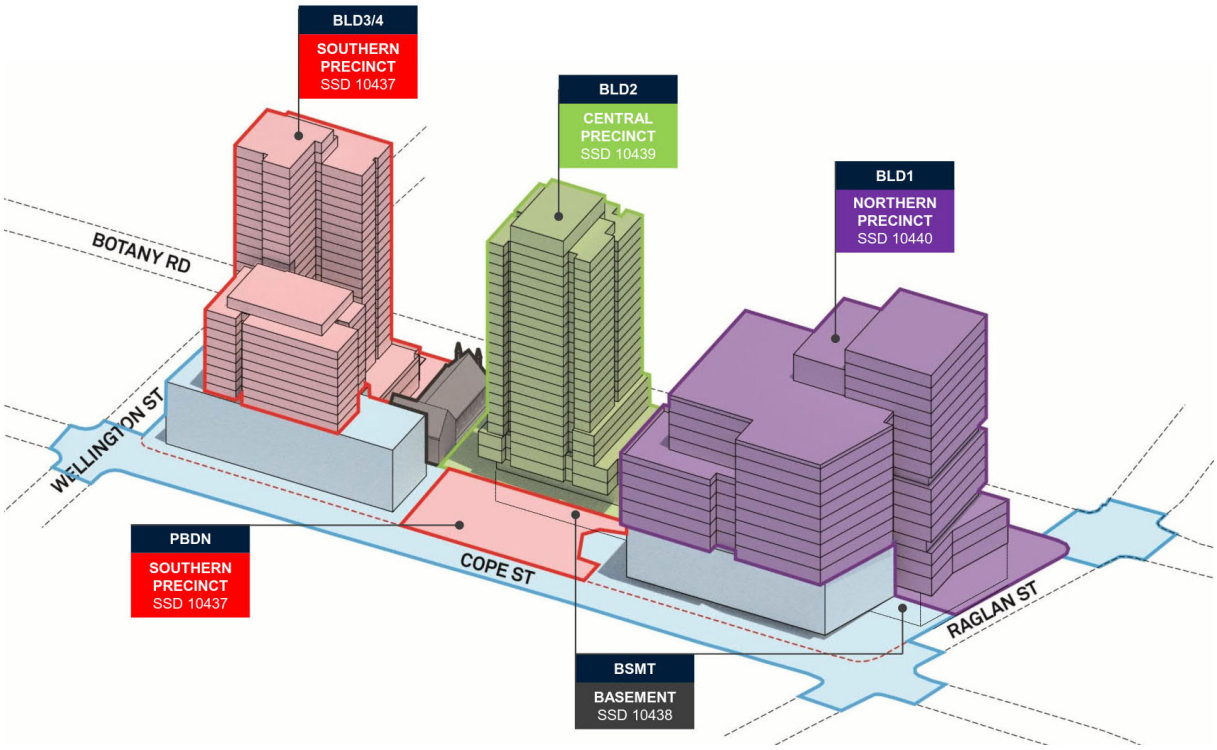

Figure 1 Waterloo Metro Quarter site, with sub-precincts identified

The site is located within the City of Sydney Local Government Area (LGA). The site is situated about 3.3 kilometres south of Sydney CBD and eight kilometres northeast of Sydney International Airport within the suburb of Waterloo.

The Waterloo Metro Quarter site comprises land to the west of Cope Street, east of Botany Road, south of Raglan Street and north of Wellington Street (refer to **Figure 2**). The heritage-listed Waterloo Congregational Church at 103–105 Botany Road is within this street block but does not form a part of the Waterloo Metro Quarter site boundaries.

Figure 2 Aerial image of the site

1.3 Purpose

This Waterloo OSD Quarterly Out of Hours Noise Monitoring Report is a summary of all Out of Hours (OOH) noise monitoring identified under Condition of Approval (CoA) C22. CoA C22 c) i) requires a program of regular, no less frequent than monthly intervals, of attended noise monitoring at the identified noise sensitive receivers during extended construction hours approved under Condition D5 (as modified on 3 July 24)

The Construction Noise and Vibration Management Plan (CNVMP) (Rev I), which was approved by the Department of Planning, Housing and Infrastructure (DPHI) on 9 July 2024, outlines the details of the monitoring program required by CoA C22 and the frequency of reporting.

The CNVMP (Rev I) recommends short term noise monitoring:

- Be carried out at no less frequent than monthly intervals, of attended noise monitoring at the identified noise sensitive receivers during extended construction hours approved under the modified Condition D5 and C22(c) i.

- Respond directly to complaints as part of the complaints handling procedure (Section 8.4 and Appendix A). The results of the short-term monitoring may indicate a requirement for long-term monitoring. This will be determined on a case-by-case basis with the input from the acoustic engineer.
- When a new noisy item of plant is brought onto site for the first time noise measurements may be required to determine compliance with Schedule 1 of the City of Sydney Construction Hours/Noise within the Central Business District (Appendix E).
- It is recommended that results of construction noise monitoring are reported on a quarterly basis. Where requested in response to complaints, real time monitoring results should be provided as soon as practicable

As such this report outlines the above noise monitoring conducted over the period commencing from 1 October 2024 to 31 December 2024. The consolidated noise monitoring report for OOH works approved under Condition D5 will be made publicly available on the project website in accordance with Condition C3 (iv).

Details of the compliance requirements are included in **Table 1-1**.

Table 1-1 Conditions of Approval relating to the Construction Monitoring Program of OOH works

Condition	Requirement	Reference
C3	– At least 48 hours before the commencement of construction until the completion of all works under this consent, or such other time as agreed by the Planning Secretary, the Applicant must: – (a) make the following information and documents (as they are obtained or approved) publicly available on its website: o (i) the documents referred to in condition A2 of this consent; o (ii) all current statutory approvals for the development; o (iii) all approved strategies, plans and programs required under the conditions of this consent; o (iv) regular reporting on the environmental performance of the development in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent; o (v) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; o (vi) a summary of the current stage and progress of the development; o (vii) contact details to enquire about the development or to make a complaint; o (viii) a complaints register, updated monthly; (ix) audit reports prepared as part of any independent environmental audit of the development and the Applicant's response to the recommendations in any audit report;	Section 8.6.2 of the Construction Noise and Vibration Management Plan. In accordance with CoA C3, this report will be publicly displayed on the project website.

Condition	Requirement	Reference
	○ (x) any other matter required by the Planning Secretary; and – (b) keep such information up to date, to the satisfaction of the Planning Secretary. – (c) any other matter relating to compliance with the terms of this consent or requested by the Planning Secretary.	
C22	c) prior to carrying out any works under Conditions D5(c) to (f), an amended Construction Noise and Vibration Management Sub-Plan (CNVMP) must be prepared, and a copy submitted to the satisfaction of the Planning Secretary and a copy be submitted to the Certifying Authority. The Amended Sub-Plan shall incorporate procedures for: (i) a program of regular, no less frequent than monthly intervals, of attendant noise monitoring at the identified noise sensitive receivers during extended construction hours approved under Condition D5 (ii) an additional long-term noise monitor to be installed at the southern end of the construction site as identified in Figure 4 of the Construction Noise and Vibration Impact Assessment for OOH Works dated 15 May 2024 prepared by Stantec (iii) the results of the above attendant and long-term monitoring shall be used by the project environmental representative to identify all feasible measures to reduce noise related impacts of these works. Records of the monitoring and response by the acoustic consultant and project team, as well as complaints register and response, are to be provided to the Planning Secretary upon request.	The results of the Construction Noise Monitoring Program for OOH works are discussed in Section 4.
D5	Work/Activities may be undertaken outside of the hours specified in Conditions D3 and D4 under the following circumstances: (a) if required by the Police or a public authority for the delivery or removal of vehicles, plant or materials, or (b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm, or (c) if a relevant utility service operator has advised the Applicant in writing that carrying out the works and activities would result in a high risk to the operation and integrity of the utility network, or (d) concrete pours or finishing works may finish after 6pm and no later than 10pm Monday to Friday on a maximum of two occasions per calendar month, or (e) hoist and crane climbing or dismantling between 8am and 5pm on Sunday for a maximum of two Sundays over the duration of the project where it can be demonstrated that the	Construction Noise and Vibration Management Plan. & CNVIA

Condition	Requirement	Reference
	work cannot be undertaken during the standard construction hours in Condition D3, or (f) internal fit-out and services installation/commissioning up to 24 hours a day (excluding Sunday and public holidays) behind a closed facade capable of achieving a minimum of 30dB(A) noise reduction from the equipment used and subject to the use of the goods lifts only.	

2. Monitoring Program Criteria

2.1 Noise criteria

The NSW EPA Interim Construction Noise Guideline (ICNG) requires project specific Noise Management Levels (NMLs) to be established for noise affected receivers. A site-specific Construction Noise and Vibration Impact Assessment (CNVIA) (Rev 07) has been prepared in accordance with CoA C22 which predicts noise impacts to nearby sensitive receivers.

Site specific residential construction NMLs for Waterloo OSD have been nominated in Section 4.1 of the CNVMP (Rev I). These NMLs have been reproduced in **Table 2-1.**

Table 2-1 Residential Construction Noise Management Levels

Receiver Types	LAeq (15minute) Construction NMLs (dBA)				
	Daytime[1]	Saturday Daytime OOH[2]	Sunday OOHW (Day)	OOHW (Evening)[3]	OOHW (Night)[4]
NCA01 (Commercial)	70	70	70	70	70
NCA01 (Residential)	64	65	59	53	46
NCA02 (Residential)	59	55	54	53	45
NCA03 (Residential)	54	55	49	47	41
Place of Worship	45 (internal) 55 (external)	45 (internal) 55 (external)	45 (internal) 55 (external)	45 (internal) 55 (external)	45 (internal) 55 (external)

Note 1: The Daytime period includes Monday to Friday 7.00 am to 6.00 pm and Saturdays 7:30 am to 6.00 pm, except for Public Holidays.

Note 2: The Daytime Out of Hours period includes Saturday 3:30pm – 6:00 pm, Sunday 7:00am – 6:00 pm

Note 3: The Evening period includes 6.00 pm to 10.00 pm.

Note 4: The Night-time period includes 10.00 pm to 7.00 am.

The Project specific $L_{Aeq(15minute)}$ NMLs for non-residential noise sensitive receivers from the ICNG are provided in **Table 2-2.**

Table 2-2 Non-Residential Sensitive Receivers Noise Management Levels

Land Use	Area	NML $L_{Aeq\ (15minute)}$ Noise Levels	
		External	Internal
Hotel[1]	Bars and Lounges	70 dBA	50[2,3] (Daytime & Evening)
	Sleeping Areas: - Hotels near major roads	As per Table 6 for residential[4]	40[4] (Night-time)
Café[1]	Coffee bar	70 dBA[3]	50[2,3] (when in use)
Bar/Restaurant[1]	Bars and Lounges / Restaurant	70 dBA[3]	50[2,3](when in use)

Land Use	Area	NML $L_{Aeq\ (15minute)}$ Noise Levels	
		External	Internal
Library[1]	Reading Areas	70 dBA	45[5](when in use)
Recording Studio[1]	Music Recording Studios	70 dBA	25[6](when in use)
Theatre/ Auditorium[1]	Drama Theatres	70 dBA	30[6](when in use)
Childcare Centres	Internal Play Area	65 dBA	55 dBA
	Sleeping Area	50 dBA (when in use)	40 dBA (when in use)
Classrooms at schools and other education institutions		55 dBA	45 dBA[7] (when in use)
Hospital wards and operating theatres		70 dBA	45 dBA
Places of Worship		70 dBA	45 dBA
Active recreation areas[8]		65 dBA	-
Passive recreation areas[9]		60 dBA	-
Community centres		Depends on the intended use of the centre. Refer to the recommended upper internal design sound levels in AS 2107 for specific uses.	
Commercial premises[10]	offices, retail outlets and small commercial premises	70 dBA (when in use)	45 dBA (when in use)
Industrial premises[10]		75 dBA (when in use)	-

Note 1: Design noise levels specified in AS 2107 internal noise levels.

Note 2: Where no external seating has been identified, fixed window glazing and air conditioning is assumed to mitigate high existing ambient noise levels and/or control internal noise break-out. A minimum outside-to-inside attenuation of 20 dB is assumed. The internal ICNG noise goal then corresponds to a façade level of 70 dBA.

Note 3: Where an open frontage or outdoor seating area has been identified, the external noise goal is taken as 60 dBA.

Note 4: Hotels (sleeping areas during the night-time) are assumed to have incorporated acoustic façade design in order to mitigate high existing ambient noise levels (refer to CNVMP Section 9.7) to achieve the internal design noise level of 40 dBA specified in AS 2107. Notwithstanding, the more conservative external NML corresponding to residential receivers (refer to CNVMP Table 6) has been applied to the sleeping areas of hotels.

Note 5: These receivers are typically well insulated from external noise break-in.

Note 6: These receivers are typically well insulated from external noise break-in, with significant acoustic mitigation included in the façade design.

Note 7: Assumed based on external noise levels being 10 dB higher than internal noise levels when windows are open.

Note 8: Characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.

Note 9: Characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion (eg reading and meditation).

Note 10: Assess at the most affected occupied point on the premises.

3. Methodology

The Construction Noise and Vibration Monitoring Program is designed to compare actual performance of construction of the project against predicted performance and to assess the effectiveness of the mitigation measures applied during construction of the Project. The program has been executed in accordance with Section 8.6.2 of the CNVMP (Rev I). The Construction Monitoring Program commenced 9 July 2024 with approval of the updated CNVMP (Rev I) and will continue for the duration of the project for OOH works.

3.1 OOH Construction Activities

An indicative scope of OOH activities is provided below:

- Stage 1: Deliveries, Materials handling, Office areas, Storage areas, Car parking.
- Stage 2: Formwork, Concrete pours, Structural steel.
- Stage 3: Internal fit out and finishes

Note Stage 3 Internal fit out and services installation/commissioning up to 24 hours a day (excluding Sundays and public holidays) must be undertaken behind a closed facade capable of achieving a minimum of 30dB(A) noise reduction from the equipment used and subject to the use of the goods lift only.

- Utility service installation works

Utility installation works are required at the corner of Raglan Street and Botany Road and Wellington Street. These works are dictated by ROL approval from TfNSW and can only be completed outside standard construction hours due to the location of works and impact on the transport network.

3.2 Sensitive Receivers

The Waterloo OSD Construction Noise and Vibration Impact Assessment (CNVIA) (Rev 07) and CNVIA for OOH Utility works (Rev 04) assessed the sensitive receivers potentially affected by construction noise. The noise affected receiver locations are outlined in **Table 3-1** and shown in **Figure 3.**

Table 3-1: Summary of noise sensitive receivers

Noise Catchment Area (NCA)	Noise Catchment Area Receivers Description	Most affected Address from the proposed construction noise works
NCA 01	Commercial and retail receivers	110 Botany Road – 132 Botany Road
	Various Residential Receivers	47 Botany Road
		62-72 Botany Road
		128 Botany Road

Noise Catchment Area (NCA)	Noise Catchment Area Receivers Description	Most affected Address from the proposed construction noise works
NCA 02	Various Residential Receivers	209 Cope Street
NCA 03	Various Residential Receivers	219 Cope Street & 123 Wellington Street
		122 Wellington Street – 134 Wellington Street
Waterloo Congregational Church	Place of Worship	103 Botany Road

Figure 3 Noise Sensitive Receivers

3.3 Noise Monitoring

Attended noise monitoring has been undertaken at representative sensitive receivers identified in **Table 3-1** by a suitably qualified person for the noise monitoring program outlined below in accordance with Section 8.6.2 of the CNVMP (Rev I):

- Be carried out at no less frequent than monthly intervals, of attendant noise monitoring at the identified noise sensitive receivers during extended construction hours approved under Condition D5 and C22(c) (i).
- Respond directly to complaints as part of the complaints handling procedure (Section 8.4 and Appendix A). The results of the short-term monitoring may indicate a requirement for long-term monitoring. This will be determined on a case-by-case basis with the input from the acoustic engineer.
- When a new noisy item of plant is brought onto site for the first time noise measurements may be required to determine compliance with Schedule 1 of the City of Sydney Construction Hours/Noise within the Central Business District (Appendix E).
- It is recommended that results of construction noise monitoring are reported on a quarterly basis. Where requested in response to complaints, real time monitoring results should be provided as soon as practicable.

4. Results

4.1 Summary of activities

A summary of activities conducted over the reporting period for the extended construction hours identified in Condition D5 is provided in **Table 4-1**.

Table 4-1 Activities by Month

Month	Approved out of hours activities
October 2024	Nil to report
November 2024	- Utility service installation works
December 2024	- Utility service installation works

4.2 Noise results

4.2.1 Attended noise monitoring

Attended noise monitoring was conducted for selected plant and monthly verification monitoring where OOH works were completed. No complaints were received during the reporting period.

A summary of noise monitoring results for the reporting period is outlined in **Table 4-2**. For plant and equipment monitoring, obtaining the noise data is constrained due to the high number of activities also occurring at the same time in the same location. Plant and equipment monitoring was completed during the reporting period, refer to **Table 4-3** for details.

Table 4-2: Noise monitoring results

Reporting Month	Reporting Quarter	Construction Activity	Date	Time	Location of Construction	Location of Monitoring	RBL	NML	PNL	LAeq	LAFmax	LAFmin	LAF90	Exceedance of RBL		Exceedance of NML		Exceedance of PNL		Exceedance construction related?	Onsite Observations	Offsite Observations
Nov-24	Q4 2024	Activity 1	2024-11-19	22:00:00	Botany Rd/ Raglan St	62-72 Botany Rd, Alexandria	41	46	69	**68.7**	91.7	53.1	60.9	Yes	27.7	Yes	22.7	No	-0.3	No	Excavator in use lifting asphalt ~67dB,	Passing traffic through recording ~77-79 dB. Passing truck contributing to max reading.
Nov-24	Q4 2024	Activity 1	2024-11-19	22:20:00	Botany Rd/ Raglan St	58 Botany Rd, Alexandria	41	46	66	**62.8**	85	51.4	55.8	Yes	21.8	Yes	16.8	No	-3.2	No	Excavator in use ~55-58dB, works inaudible over Botany Rd traffic	Medium traffic on Botany Rd and Henderson St ~62dB
Nov-24	Q4 2024	Activity 1	2024-11-19	22:45:00	Botany Rd/ Raglan St	47 Botany Rd, Alexandria (Abbotts Hotel)	41	46	79	**66**	85.9	56.9	58.9	Yes	25	Yes	20	No	-13	No	Excavator in use, Works inaudible over Botany Rd traffic.	Passing buses ~75-83dB, air conditioner unit on Abbotts hotel 62dB through duration of recording
Nov-24	Q4 2024	Activity 1	2024-11-19	23:05:00	Botany Rd/ Raglan St	62-72 Botany Rd, Alexandria	41	46	69	**65.6**	74	56.3	58.8	Yes	24.6	Yes	19.6	No	-3.4	No	Excavator in use lifting pipe ~62dB	Intermittent traffic on Botany Rd ~68-70dB
Dec-24	Q4 2024	Stage 6 - Structure	2024-12-08	21:40:00	Stage 6 - Structure	132 Wellington St, Waterloo	44	49	63	**60.2**	83.4	56.1	57.4	Yes	16.2	Yes	11.2	No	-2.8	No	Crane climbing, delivery trucks on Botany Rd, intermittent use of rattle gun (62dB)	Medium traffic on Botany Rd 62-65dB, passing truck attributed to max reading
Dec-24	Q4 2024	Activity 1	2024-12-12	22:30:00	Botany Rd/ Raglan St	62-72 Botany Rd, Alexandria	41	46	69	**66.9**	89.1	59.6	62.1	Yes	25.9	Yes	20.9	No	-2.1	No	Sydney water connection works ~63dB, hand tools and saw cutting 67dB	Passing traffic and buses 66-75dB. Passing motorcycle attributed to max reading
Dec-24	Q4 2024	Activity 1	2024-12-12	23:00:00	Botany Rd/ Raglan St	58 Botany Rd, Alexandria	41	46	66	**65**	80.5	57.2	60.1	Yes	24	Yes	19	No	-1	No	Hand tools in excavation ~62-66dB	Passing traffic and buses ~65dB
Dec-24	Q4 2024	Activity 1	2024-12-12	23:30:00	Botany Rd/ Raglan St	47 Botany Rd, Alexandria (Abbotts Hotel)	41	46	79	**69.3**	84.6	57.9	61.3	Yes	28.3	Yes	23.3	No	-9.7	No	Hand tools cutting pipe for connection ~74-76 dB intermittent use, hand tools in excavation 60dB	Pedestrian crossing tone 80dB spike intermittent through recording, passing traffic on Botany Rd 67-72dB, passing bus 75dB

Table 4-3: Plant Noise monitoring results

Reporting Month	Reporting Quarter	Construction Activity	Date	Time	Location of Construction	Location of Monitoring	Maximum allowable construction plant sound levels – dBA		1-min SPL recorded	Exceedance of SPL at 7m		Onsite Observations	Offsite Observations
							Sound Power Level[1]	Sound Pressure Level (SPL) at 7m[2]					
Nov-24	Q4 2024	Utility OOH	2024-11-19	21:45:00	Plant/Equipment	7m from plant 5T excavator	97	80	**66.2**	No	-13.8	7m from 5T excavator with bucket attachment in use	minor traffic on Botany Rd during recording.
Dec-24	Q4 2024	Utility OOH	2024-12-12	22:00:00	Plant/Equipment	7m from plant Vac truck	108	85	**78.5**	No	-6.5	7m from Vac truck	minor traffic on Botany Rd during recording

[1] Sound Power level adopted from CNVIS (Rev 4)

[2] City of Sydney Construction Hours/Noise within the Central Business District – Schedule 1

5. Community Consultation

5.1 Management measures

Each month a project update which outlines the upcoming construction works was distributed to residents and businesses in the local area. Additionally weekly e-news are emailed out to residences providing an update on the upcoming weeks work. Regular doorknocks and briefings and specific notifications were provided by the Waterloo Community Team to inform the stakeholders of proposed works and likely impacts.

5.2 Complaints summary

During the reporting period, no complaints were received from the community related to noise. Refer **Table 5-1**.

Table 5-1 Complaints breakdown

Month	Noise	Monthly Total
October 2024	0	0
November 2024	0	0
December 2024	0	0

6. Conclusion

The Construction Noise and Vibration Management Plan (Rev I) (CNVMP) outlines the details of the monitoring program required by Condition of Approval (CoA) C22 and the frequency of reporting. This quarterly noise monitoring report is a summary of all Out of Hours (OOH) noise monitoring conducted over the 3 month period commencing from 1 October 2024 to 31 December 2024.

A CNVIA (Rev 07) and CNVIA for OOH Utility Works (Rev 04) has been prepared for the project and outlines the predicted noise and vibration impacts as a result of construction works. Attended noise monitoring has been completed in accordance with the noise monitoring program to review actual noise levels with predicted noise. This data is used to determine if the noise management measures implemented are effective at minimising the impacts of construction on the surrounding community.

The attended monitoring determined the works were generally consistent with the Predicted Noise Levels (PNL). External factors such as traffic on the surrounding streets were noted to be contributing to the measured levels.