

## APPROVAL

### CITY & SOUTHWEST ACOUSTICS ADVISOR

<b>Review of:</b>	Sydney Metro City & Southwest - Line-wide Works - Barangaroo Concrete Pours	<b>Document reference:</b>	TK685-03-20F01 CNVIS Barangaroo concrete pours (r3)
<b>Prepared by:</b>	Daniel Weston Acoustics Advisor		Prepared by Renzo Tonin & Associates Pty Ltd
<b>Date of issue:</b>	24 February 2022		7 February 2022

As approved Acoustics Advisor for the Sydney Metro City & Southwest project, and as required under A27 (d) of the project approval conditions (SSI 15-7400), I have reviewed and provided comment on the Construction Noise and Vibration Impact Statement (CNVIS) for proposed Line Wide Works concrete pours at Barangaroo.

Based on this review and subsequent discussions with the head contractor (Systems Connect), I am satisfied that the CNVIS is technically valid and includes appropriate noise and vibration mitigation and management. On this basis, I endorse the CNVIS referenced herein.



Daniel Weston, City & Southwest Acoustics Advisor

21 February 2022

TK685-03-20F01 CNVIS Barangaroo concrete pours (r3)

Systems Connect

Level 1 116 Miller Street, North Sydney, NSW 2060

## Sydney Metro City & Southwest - Line-wide works - Barangaroo Concrete Pours

### 1 Introduction

#### 1.1 Overview of works

This technical memorandum is an addendum to the report *Construction Noise and Vibration Impact Statement: Portion 3 – Barangaroo Laydown Area (Laydown CNVIS<sup>1</sup>)* and has been prepared on behalf of Systems Connect in accordance with the Construction Noise and Vibration Management Plan (CNVMP<sup>2</sup>) [SMCSWLWC-SYC-1NL-PM-PLN-000032] for the Design and Construction of the Line-Wide Works (LWW) of the Sydney Metro City & Southwest Project (the Project).

As part of the tunnel fitout works, Systems Connect is proposing to deliver and discharge concrete from the Hickson Road acoustic shed (Figure 1), 6 days per week (Monday to Saturday from 7am to 10pm) approximately from February to August 2022. These extended working hours would allow the tunnel fitout works to be completed in a safe manner and to be completed on time avoiding any potential delays to the Project (see justification in Section 1.2).

This memorandum has been prepared to address the potential construction noise and vibration impacts from the Barangaroo concrete pours. These works have also been assessed in combination with other potentially concurrent works such as the Barangaroo station fitout works (*Besix Watpac – Station CNVIS<sup>3</sup>*), Barangaroo station civil works (*Besix Watpac – Civil CNVIS<sup>4</sup>*) and the Barangaroo laydown area works (*Systems Connect – Laydown CNVIS*).

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<sup>1</sup> Sydney Metro City & Southwest – Line Wide Works, Construction Noise and Vibration Impact Statement, Portion 3 – Barangaroo Laydown Area, dated 21 December 2021, revision 3

<sup>2</sup> Sydney Metro City & Southwest – Line Wide Works, Construction Noise and Vibration Management Plan (SMCSWLWC-SYC-1NL-PM-PLN-000032-A-CNVMP-C2B)

<sup>3</sup> Barangaroo Metro Station, CNVIS: Underground station fit-out works, ref: TM031-03F01 Station CNVIS, rev 2, 7/09/2021

<sup>4</sup> Barangaroo Metro Station, CNVIS: Civil works, ref: TM031-02F01 CIVIL CNVIS, rev 3, 7/09/2021

## 1.2 Justification for OOH construction works

The proposed concrete pours from Hickson Road acoustic shed are critical for the Project as Barangaroo station is the connection between Up and Down Tunnels as well as North and South tunnel sections. Since the closure of Blues Point Shaft, all materials and tunnel works have largely required to be conducted out of Marrickville and Chatswood worksites. Completing concrete pours from Barangaroo would provide access to sections of the tunnel where access is currently restricted due station construction and would also reduce the burden on Chatswood and Marrickville worksites.

Throughout the works program there is potential that the concrete pours will be required outside standard operating hours to manage the interface with BESIX Watpac. Undertaking the concrete pours in the evening would reduce potential hazards that arise from two adjacent construction projects and ensure safety standards are maintained.

These extended working hours would allow the tunnel fitout works to be completed in a safe manner and to be completed on time avoiding any potential delays to the Project.

In addition, EPL21423 condition L4.7 (consistently with planning approval condition E48) permits the following works to be undertaken 24 hours a day, 7 days per week for activities at Barangaroo stations:

- a) Station and tunnel fit out works and ancillary surface support works; and
- b) haulage and delivery of material.

## 2 Assessment methodology

### 2.1 Construction noise modelling

Results for the assessment of airborne noise were determined using a CadnaA computer noise model developed for the project. The CadnaA noise model incorporates ground elevation contours, building heights, the built environment and atmospheric conditions to predict construction noise in accordance with the International Standard ISO 9613-2:1996 implementing quality standard ISO 17534-1:2015.

A summary of the noise model input parameters is detailed in Table 1.

**Table 1: Summary of noise modelling parameters**

Parameters	Inputs
Calculation method	ISO 9613-2:1996 implementing quality standard ISO 17534-1:2015
Location of noise sources	Along Hickson Road and inside the Hickson Road shed
Height of receivers	1.5m above ground level to represent 1.5m above ground floor level Additional 3m height for every additional floor assessed (i.e. 4.5m above ground for first floor, 7.5m for second floor etc.)
Ground topography	1m digital ground contours
Sound Power Levels ( $L_w$ ) of plant and equipment	All $L_w$ data obtained from Renzo Tonin and Associates database Detailed in Section 2.2

Parameters	Inputs
Construction activities	Detailed in Section 2.2
Ground absorption	Varying from 1 for absorptive surfaces (e.g. park land), 0.5 (e.g. residential areas) to 0 for reflective surfaces (e.g. water, concrete, paving);
Noise barriers and screening	Existing

## 2.2 Construction activities and work areas

Key details regarding the construction work locations, the likely plant and equipment, and hours of operation are presented in Table 2.

**Table 2: Proposed plant and equipment and associated sound power levels**

Activity	Key plant and equipment	Day	Evening	Night	Sound power level, dB(A)		Comments
		7am-6pm	6pm-10pm	10pm-7am	L <sub>Aeq</sub>	L <sub>Amax</sub>	
Barangaroo concrete pours	Concrete agitator	4 p.h.	4 p.h.	-	108	111	Discharging inside the Hickson Road shed
	High-pressure concrete pump	1	1	-	117	119	Operating inside the Hickson Road shed
	Compressor	1	1	-	102	106	Only required at the end of the shift and after the last concrete pours

The proposed concrete pours are inside the Hickson Road shed (Figure 1).

**Figure 1: Construction work areas – Barangaroo concrete pours (inside Hickson Road shed)**



### 3 Construction noise and vibration impacts

#### 3.1 Predicted noise levels

##### 3.1.1 Construction $L_{Aeq,15min}$ assessment

Noise levels were determined by modelling the noise sources, receiver locations, and operating activities, based on the information presented in Table 2.

The noise predictions presented in this report represent a realistic worst-case scenario when construction occurs at the closest location within a specific work area. At each receiver, noise levels will vary during the construction period based on the position of equipment within the work area, the distance to the receiver, the construction activities being undertaken and the noise levels of plant and equipment in use. Actual noise levels will often be less than the predicted levels presented.

Table 3 presents a summary of the predicted noise impacts in terms of the number of receivers likely to be impacted by construction noise above the ICNG NML and the CoAs E37 and E41 NML.

**Table 3: Summary of receivers above relevant NMLs**

Construction Activity	NCA	No properties above relevant NML								
		ICNG 'Day' NML (dB above)			ICNG 'Evening' NML (dB above)				E37 NML <sup>2</sup>	E41 NML <sup>2</sup>
		1 – 10dB	>20dB	HNA <sup>1</sup>	0-5dB	6-15dB	16-25dB	>25dB	>60dB	>45dB
Concrete pour	BN01	0	0	0	0	0	0	0	0	0
	BN02	1	0	0	14	9	0	0	0	8
	BN03	0	0	0	23	1	0	0	0	1

Notes: 1) HNA = Highly noise affected (i.e. >75 dB(A))

2) Internal NML based on SSI 7400 CoA E37 and E41

As can be noted from Table 3, predicted noise levels are expected to be up to 15 dBA above the evening NMLs at the closest residential receivers in NCA BN\_02 and BN\_03. There are no receivers above the CoA E37 internal noise management level during the day-time period, however, there are 9 residential receivers (8 in NCA BN\_02 and 1 in NCA BN\_03) where internal noise levels are predicted to be above the CoA E41 internal noise management level during the evening period.

NMLs and predicted noise levels for the worst-affected receivers are provided in Table 4. Detailed results for all receivers are presented in APPENDIX B.

**Table 4: Predicted noise levels at the closest noise sensitive**

Address	NCA	Type of receiver	Predicted noise levels $L_{Aeq,15min}$		ICNG NMLs		Existing noise levels, $L_{Aeq,15min}$		CoA External equivalent NMLs	
			D <sup>1</sup>	E <sup>2</sup>	D <sup>1</sup>	E <sup>2</sup>	D <sup>1</sup>	E <sup>2</sup>	E37	E41
									7am to 8pm	8pm to 7am
18-18A High Street MILLERS POINT	BN_03	Residential	55	55	60	50	61	64	70 <sup>3</sup>	55 <sup>3</sup>
34-34A High Street MILLERS POINT	BN_03	Residential	51	51	60	50	61	64	70 <sup>3</sup>	55 <sup>3</sup>
35-35A Dalgety Road MILLERS POINT	BN_03	Residential	59	59	60	50	61	64	70 <sup>3</sup>	55 <sup>3</sup>
65-69 Kent Street MILLERS POINT	BN_03	Residential	53	53	60	50	61	64	70 <sup>3</sup>	55 <sup>3</sup>
89-105 Kent Street MILLERS POINT	BN_03	Hotel	49	49	60	60	61	64	80 <sup>4</sup>	N/A
35-37 Bettington Street MILLERS POINT	BN_02	Hotel	59	59	60	60	61	64	80 <sup>4</sup>	N/A
1-5 Towns Place MILLERS POINT	BN_02	Residential	63	63	60	50	61	64	92 <sup>5</sup>	77 <sup>5</sup>

- Notes
- 1) Day – 7am to 6pm Monday to Friday; 8am to 6pm Weekends and public holidays
  - 2) Evening – 6pm to 10pm
  - 3) Assuming 10dBA building façade loss (open window)
  - 4) Assuming a conservative 20dBA building façade loss (open window)
  - 5) Assuming a measured 32dBA building façade loss

As can be noted from Table 4, the most noise affected receiver in NCA BN\_02 (i.e. 1-5 Towns Place) is expected to experience noise levels up to 63dBA, which is 13dBA above the evening NML but below the external equivalent E41 noise management level. It is also noted that the existing ambient noise levels at this location are similar to the noise predictions.

### 3.1.2 Sleep disturbance

The sleep disturbance assessment is not required as the proposed works would stop at 10pm and resume at 7am.

## 3.2 Construction related road traffic assessment

### 3.2.1 Construction traffic sources

The number of concrete agitators accessing the Hickson Road shed are expected to be up to 4 per hour from 7am to 10pm, which equates to 120 heavy vehicle movements during the 15-hour day period. Light vehicle movements are expected to be up to 40 movements during the 15-hour day period.

The road that will be impacted by the proposed traffic sources is Hickson Road. Pre-construction traffic counts for Hickson Road over the week of 9 December 2017 to 15 December 2017 were used to predict the relative increase in road traffic noise levels from the proposed works. Construction traffic volumes

from the nearby Barangaroo Sydney Metro Station works (BSMS works) and Linewide laydown area (LWLD works) have also been included to determine potential cumulative impacts (Table 5).

**Table 5: Traffic noise modelling data - existing road network**

Road	Road category (RNP)	15-hour day period (7am-10pm)								9-hour night period (10pm-7am)							
		Existing		BSMS <sup>1</sup> Works		LWLD <sup>2</sup> works		LW concrete works		Existing		BSMS <sup>1</sup> Works		LWLD works		LW concrete works	
		TOTAL	HV	TOTAL	HV	TOTAL	HV	TOTAL	HV	TOTAL	HV	TOTAL	HV	TOTAL	HV	TOTAL	HV
Hickson Road	Arterial	9768	634	480	180	68	48	160	120	1614	157	180	108	24	16	-	-

Notes

1) Besix Watpac Station fitout works

2) Linewide laydown area works

### 3.2.2 Predicted construction traffic noise

The potential impact of construction road traffic noise to nearby residential receivers has been estimated using the United Kingdom Department of Environment's 'Calculation of Road Traffic Noise' (1988) method. For assessment purposes, closest residential receivers are along High Street.

Table 6 summarises the predicted construction traffic noise levels during day and night periods.

**Table 6: Predicted traffic noise levels (with/ without construction)**

Site	Road	Predicted noise level, dB(A)							
		Day period (7am to 10pm)				Night period (10pm to 7am)			
		Noise descriptor	No construction	Cumulative impacts <sup>1</sup>	RNP criteria	Noise descriptor	No construction	Cumulative impacts <sup>1</sup>	RNP criteria
Barang.	Hickson Road	L <sub>Aeq</sub> (15h) dB(A)	52.1	53.3	60	L <sub>Aeq</sub> (9h) dB(A)	47.8	49.8	55

Note:

1) Considering all potentially concurrent works

2) Bold text indicates more than 2dB(A) increase in traffic noise levels resulting from construction traffic.

The predicted road traffic noise levels indicate an increase in overall day L<sub>Aeq</sub>(15h) and night L<sub>Aeq</sub>(9h) noise levels due to cumulative construction traffic of no more than 2dB. As a result, construction traffic is predicted to have minimal impact on nearby road network used to access/exit the site. The proposed Linewide concrete works would have no additional impact on road traffic noise levels during the night period.

### 3.2.3 Traffic noise mitigation and management

No additional mitigation or management measures are required when construction vehicles are on public roads, provided hourly traffic movements associated with construction are consistent with the assumptions outlined above.

### 3.3 Vibration impact

The proposed works are not vibration intensive therefore the risk of construction vibration impact is negligible.

### 3.4 Ground-borne noise impact

The proposed works are not vibration intensive therefore the risk of ground-borne noise impact is negligible.

### 3.5 Cumulative noise impact

Systems Connect is aware of other ongoing, potentially concurrent construction activities within the vicinity of the Barangaroo concrete pours (Table 7). These works have been considered but it has been determined that, due to the nature of the other unrelated construction works, no additional physical mitigation measures are deemed reasonable. Nevertheless, Systems Connect will endeavour to take all reasonable steps to collaborate with other Projects to minimise cumulative noise where Systems Connect are above management levels and coordinate respite for affected sensitive receivers, whenever practicable.

**Table 7: Other construction works close to Barangaroo concrete pours**

Construction company	Project	Timing of activities	Hours of works	Works location	Activity types	General plant types
Lendlease	One Sydney Harbour	September 2020 to 2025	Standard construction hours only	100 Barangaroo Ave, Barangaroo	Building construction	Cranes, concrete and delivery trucks, power tools, forklift, EWP
BESIX Watpac	Barangaroo Sydney Metro Station works	September 2020 to 2023	Day and night	Hickson Road, above and underground station	Underground station fit out	Cranes, concrete delivery trucks, power tools, forklifts, EWP
BESIX Watpac	Barangaroo Sydney Metro Station works	September 2020 to 2023	Day and night	Hickson Road, above and underground station	Civil work on surface	Cranes, concrete delivery trucks, power tools, jackhammers, concrete saws, forklifts, EWP

Table 8 presents a quantitative comparison of potentially concurrent construction activities at Barangaroo.



Table 8: Comparison of predicted noise levels associated with potentially concurrent works

Address	NCA	Type of receiver	Predicted noise levels $L_{Aeq,15min}$								ICNG NMLs			Existing noise levels, $L_{Aeq,15min}$			External equivalent NMLs	
			Besix Watpac Station works		Besix Watpac Civil works		Linewide laydown area		Linewide concrete pours		D <sup>3</sup>	E <sup>4</sup>	N <sup>5</sup>	D <sup>3</sup>	E <sup>4</sup>	N <sup>5</sup>	CoA E37	CoA E41
			SH <sup>1</sup>	OOH <sup>2</sup>	SH <sup>1</sup>	OOH <sup>2</sup>	SH <sup>1</sup>	OOH <sup>2</sup>	SH <sup>1</sup>	E <sup>4</sup>							7am to 8pm	8pm to 7am
18-18A HIGH STREET MILLERS POINT	BN_03	Residential	61	49	81	81	47	46	55	55	60	50	45	61	64	51	70	55
34-34A HIGH STREET MILLERS POINT	BN_03	Residential	56	46	78	78	46	45	51	51	60	50	45	61	64	51	70	55
35-35A DALGETY ROAD MILLERS POINT	BN_03	Residential	46	44	75	75	30	30	59	59	60	50	45	61	64	51	70	55
65-69 KENT STREET MILLERS POINT	BN_03	Residential	58	46	78	78	47	46	53	53	60	50	45	61	64	51	70	55
89-105 KENT STREET MILLERS POINT	BN_03	Hotel	55	42	75	75	49	47	49	49	60	60	60	61	64	51	80	N/A
35-37 BETTINGTON STREET MILLERS POINT	BN_02	Hotel	51	45	80	79	44	44	59	59	60	60	60	61	64	51	80	N/A
1-5 TOWNS PLACE MILLERS POINT	BN_02	Residential	49	48	86	86	35	34	63	63	60	50	45	61	64	51	92	77

- Notes
- 1) Standard construction hours
  - 2) Out-Of-Hours
  - 3) Day
  - 4) Evening
  - 5) Night

During standard construction hours, construction noise levels from the Linewide concrete pours at Barangaroo are predicted to marginally comply (<3dB above) with the corresponding ICNG NMLs at nearby residential and non-residential receivers and below the CoA E37 external equivalent noise management levels. Predicted noise levels from the Besix WATPAC underground station fitout works at Barangaroo are up to 11 dB above the NML. Noise levels from the Linewide concrete pours would cause minimal increase in construction noise at the receivers (<2 dB) where occurring concurrently with the underground station works. Predicted noise levels taken from Besix WATPAC civil works at Barangaroo are more than  $L_{Aeq(15min)}$  75 dB(A) at the closest receivers. Predicted noise levels are more than 10 dB above the NML at the nearest other sensitive receivers. Noise levels from the Linewide concrete pours would cause minimal increase.

During the evening period, if the concrete pours are undertaken concurrently with Besix WATPAC underground station fitout works and Linewide laydown area works, the potential increase in construction noise levels would be less than 3 dB.

Construction noise generated by OOH civil works undertaken by Besix WATPAC, should this occur in the evening concurrent with Linewide concrete pours, would dominate the noise environment at all affected NCAs. The noise generated by the Linewide concrete pours would cause negligible increase in construction noise.

The proposed concrete pours are planned to be undertaken mainly during standard construction hours. If concrete pours need to be extended into the evening period, Systems Connect will endeavour to take all reasonable steps to coordinate works with Besix Watpac to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers (e.g. aligning respite evenings).

## 4 Noise mitigation and management

### 4.1.1 Site noise control measures

Table 9 presents additional noise control measures recommended to reduce and manage potential noise impacts.

**Table 9: Site noise control measures**

Control type	Control measure	Typical use
At-source control measures	Noise control kits	Plant that is brought to site for works should meet the sound power limits identified in Table C1. Where plant are above limits then the plant may require installation of 'noise control kits' to comply with the noise limits in Table C1. Such 'noise control kits' comprise: <ul style="list-style-type: none"> <li>high performance 'residential-grade' exhaust mufflers,</li> <li>additional engine cowling / enclosure lined inside with sound absorbent industrial-grade foam, and</li> <li>air intake and discharge silencers / louvres.</li> </ul> The need to fit 'noise control kits' onto the identified plant, will be confirmed once each plant item is tested prior to its regular use on site.
	Limit equipment in use	Only the equipment necessary during each stage of the works will be used.
	Timing of equipment in use	Where practicable, activities and plant will be limited as outlined in Table 2
	Limit activity duration	Any equipment not in use for extended periods shall be switched off. For example, heavy vehicles should switch engines off when not in use.
	Equipment selection	Use quieter and less noise/ vibration emitting construction methods where feasible and reasonable.  Double low pressure pumps were considered however they would not provide the required concrete pressure and flow.
	Truck movements	Where practicable, avoid the use of park air brakes at night. Set up relevant traffic management measures to minimise the use of air brakes when leaving site. Air brake silencers are to be correctly installed and fully operational for any heavy vehicles (as per CNVMP). Minimise unnecessary acceleration on site and avoid vigorous slamming of truck doors.

Control type	Control measure	Typical use
	Non-tonal reversing alarms	Alternative reverse alarms, such as 'quackers' will be installed on all vehicles & mobile plant regularly used on site and on all vehicles & mobile plant required for OOHV.
	Respite coordination	Consult with proponents of other construction works in the vicinity of the worksite and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers (e.g. aligning respite evenings).
Path mitigation measures	Acoustic shed	All operations will be undertaken inside the Hickson Road acoustic shed
	Noise barriers or temporary noise screens	Noise barriers were considered in the site design development stage however there are deemed not reasonable as the proposed works are inside the Hickson Rd shed.
	Additional enclosure	Systems Connect have investigated opportunities to install an additional enclosure with Besix Watpac. However, this measure is not considered feasible due to space constraints and operation requirements (e.g. any additional enclosures would prevent large deliveries).
	Pump relocation	Systems Connect have investigated opportunities to relocate the pump inside the tunnel. However, this measure is not considered feasible due to space constraints and concrete delivery limitations.
At-receiver	At-property treatments	At-property treatments for the noise affected receivers were considered, however, they were deemed unreasonable for the following reasons: <ul style="list-style-type: none"> <li>• Predicted levels are marginally exceeding the CoA E41 internal noise levels</li> <li>• On-site concrete pours will not be carried out throughout the entire night. Pours will stop by 10pm and will only recommence from 7am.</li> <li>• Implementation of at-property treatment is a relatively long process (i.e. at least one year). Considering the duration of the proposed works, noise affected receivers would receive acoustic treatments after the proposed works are completed.</li> </ul>
Noise management measures	Site inductions & Toolbox Talks	All employees, contractors and subcontractors will receive a Project induction. The environmental component may be covered in toolboxes and should include: <ul style="list-style-type: none"> <li>• location of nearest sensitive receivers</li> <li>• relevant project specific and standard noise and vibration mitigation measures;</li> <li>• permitted hours of work;</li> <li>• OOHV Procedure and Form</li> <li>• construction employee parking areas.</li> </ul>
	Community consultation	Inform community of construction activity and potential impacts.
	Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
	Noise monitoring	Noise monitoring is to be carried out as detailed in Section 4.1.3

#### 4.1.2 Additional noise mitigation measures

After application of all reasonable and feasible mitigation measures, where the  $L_{Aeq(15\text{minute})}$  airborne construction noise levels are still predicted to exceed the NMLs, additional airborne noise mitigation measures can be applied to limit the risk of annoyance from construction noise. The steps to be carried out to determine the additional management measures to be implemented are identified in Table 10.

**Table 10: Construction airborne noise mitigation measures**

Time Period		Mitigation Measures			
		Predicted LAeq(15minute) Noise Level Above Background (RBL)			
		0 to 10 dB	10 to 20 dB	20 to 30 dB	> 30 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	-	-	M, LB,	M, LB
	Sat (8.00 am - 1.00 pm)				
	Sun/Pub Hol (Nil)				
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm)	-	LB	M, LB	M, IB, LB, PC, RO, SN
	Sat (1.00 pm - 10.00 pm)				
	Sun/Pub Hol (8.00 am - 6.00 pm)				
OOHW 2	Mon-Fri (10.00 pm - 7.00 am)	-	M, LB,	M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
	Sat (10.00 pm - 8.00 am)				
	Sun/Pub Hol (6.00 pm - 7.00 am)				

Notes: LB = Letter box drops

SN = Specific notifications

RO = Project specific respite offer

M = Monitoring

IB = Individual Briefing

AA\* = Alternative accommodation

PC = Phone Call and email

Where OOHW occur in the evening/night shoulder period (10:00pm to 12:00am) or the night/morning shoulder period (5:00am to 7:00am) apply additional airborne mitigation measures from the OOHW Period 2, excluding AA.

\*AA applies where a construction activity impacts receivers over 2 or more consecutive nights.

APPENDIX C presents a summary of the additional noise mitigation measures applicable for construction activities where, after application of all reasonable and feasible mitigation options, construction noise levels are still above the relevant NMLs.

### 4.1.3 Noise monitoring

Attended noise monitoring will be undertaken to verify that the construction activities are consistent with the assessed noise modelling scenarios and that noise levels resulting from construction works are not higher than the levels predicted in this report. Attended monitoring on private property is subject to obtaining the property owner/occupier's consent (where required).

Attended noise monitoring will be undertaken in the NCAs most impacted by the works. The nominated monitoring locations are identified in Table 11, and have been selected as they present the best opportunity to validate the predicted noise levels.

**Table 11: Nominated verification monitoring locations**

NCA	Address	Monitoring location
BN_02	1-5 TOWNS PLACE MILLERS POINT	Along Hickson road
BN_03	18-18A HIGH STREET MILLERS POINT	Along High Street

If verification monitoring shows that the external noise levels from the construction works are above the predicted levels, investigation will be undertaken to understand the cause of the exceedance and relevant reasonable and feasible mitigation measures will be implemented.

## 5 Conclusion

This technical memorandum is an addendum to the *Laydown CNVIS* and was prepared to review the potential construction noise and vibration impacts from the proposed Barangaroo concrete pours. These works have also been assessed in combination with other potentially concurrent works such as the Besix Watpac Barangaroo station fitout works, Besix Watpac Barangaroo station civil works and the Linewide Barangaroo laydown area works.

### **Construction noise**

Predicted noise levels are expected to be up to 15 dBA above the evening NMLs at the closest residential receivers in NCA BN\_02 and BN\_03. There are no receivers above the CoA E37 internal noise management level during the day-time period, however, there are 9 residences where internal noise levels are predicted to be above the CoA E41 noise management level during the evening period.

The sleep disturbance assessment is not required as the proposed works would stop at 10pm and resume at 7am.

### **Construction traffic**

The predicted road traffic noise levels indicate an increase in overall day  $L_{Aeq(15h)}$  and night  $L_{Aeq(9h)}$  noise levels of no more than 2dB. As a result, construction traffic is predicted to have minimal impact on nearby road network used to access/exit the site.

### **Construction vibration and ground-borne noise**

The proposed works are not vibration intensive therefore the risk of ground-borne noise or vibration impact is negligible.

## Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Authorised
04.02.2022	First issue	0	1	M. Tabacchi	-	T. Gowen
07.02.2022	Systems Connect review	-	2	M. Tabacchi	-	T. Gowen
21.02.2022	AA's comments	-	3	M. Tabacchi	-	T. Gowen

### Important Disclaimer:

The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

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In preparing this report, we have relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, we have not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

We have derived data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination and re-evaluation of the data, findings, observations and conclusions expressed in this report.

We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

The information contained herein is for the purpose of acoustics only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.

## APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	<p>The units that sound is measured in. The following are examples of the decibel readings of every day sounds:</p> <p>0dB The faintest sound we can hear</p> <p>30dB A quiet library or in a quiet location in the country</p> <p>45dB Typical office space. Ambience in the city at night</p> <p>60dB CBD mall at lunch time</p> <p>70dB The sound of a car passing on the street</p> <p>80dB Loud music played at home</p> <p>90dB The sound of a truck passing on the street</p> <p>100dB The sound of a rock band</p> <p>115dB Limit of sound permitted in industry</p> <p>120dB Deafening</p>
dB(A)	A-weighted decibels. The A-weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L <sub>Max</sub>	The maximum sound pressure level measured over a given period.
L <sub>Min</sub>	The minimum sound pressure level measured over a given period.

L <sub>1</sub>	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L <sub>10</sub>	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L <sub>90</sub>	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L <sub>eq</sub>	The “equivalent noise level” is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain L <sub>eq</sub> sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.



## APPENDIX B OOH predicted construction noise levels

NCA	Address	Day (Standard)		Evening (OOHW)		E41 (OOHW)	
		NML	Predicted levels	NML	Predicted levels	NML	Predicted levels
BN_01	23 BARANGAROO AVENUE BARANGAROO	60	44	50	44	55	44
BN_01	400 Barangaroo Avenue, Barangaroo	60	-	50	-	55	-
BN_01	33 BARANGAROO AVENUE BARANGAROO	60	-	50	-	55	-
BN_02	24 MUNN STREET BARANGAROO	60	55	50	55	55	55
BN_02	40-48 MERRIMAN STREET MILLERS POINT	60	56	50	56	55	56
BN_02	38 MERRIMAN STREET MILLERS POINT	60	54	50	54	55	54
BN_02	36 MERRIMAN STREET MILLERS POINT	60	54	50	54	55	54
BN_02	32 MERRIMAN STREET MILLERS POINT	60	52	50	52	55	52
BN_02	30 MERRIMAN STREET MILLERS POINT	60	50	50	50	55	50
BN_02	28 MERRIMAN STREET MILLERS POINT	60	51	50	51	55	51
BN_02	26 MERRIMAN STREET MILLERS POINT	60	49	50	49	55	49
BN_02	24 MERRIMAN STREET MILLERS POINT	60	49	50	49	55	49
BN_02	22 MERRIMAN STREET MILLERS POINT	60	48	50	48	55	48
BN_02	20 MERRIMAN STREET MILLERS POINT	60	46	50	46	55	46
BN_02	18 MERRIMAN STREET MILLERS POINT	60	45	50	45	55	45
BN_02	14-16 MERRIMAN STREET MILLERS POINT	60	44	50	44	55	44
BN_02	7 DALGETY ROAD MILLERS POINT	60	43	50	43	55	43
BN_02	11-13A DALGETY ROAD MILLERS POINT	60	51	50	51	55	51
BN_02	15-15A DALGETY ROAD MILLERS POINT	60	49	50	49	55	49
BN_02	2-18 DALGETY ROAD BARANGAROO	60	51	50	51	55	51
BN_02	22 ARGYLE PLACE MILLERS POINT	60	39	50	39	55	39
BN_02	13 WINDMILL STREET MILLERS POINT	60	44	50	44	55	44
BN_02	13 WINDMILL STREET MILLERS POINT	60	40	50	40	55	40
BN_02	24 ARGYLE PLACE MILLERS POINT	60	35	50	35	55	35
BN_02	26 ARGYLE PLACE MILLERS POINT	60	38	50	38	55	38
BN_02	68 BETTINGTON STREET MILLERS POINT	60	60	50	60	55	60
BN_02	66 BETTINGTON STREET MILLERS POINT	60	57	50	57	55	57
BN_02	35-35A DALGETY ROAD MILLERS POINT	60	59	50	59	55	59
BN_02	33-33A DALGETY ROAD MILLERS POINT	60	58	50	58	55	58
BN_02	31-31A DALGETY ROAD MILLERS POINT	60	57	50	57	55	57
BN_02	29-29A DALGETY ROAD MILLERS POINT	60	56	50	56	55	56
BN_02	27-27A DALGETY ROAD MILLERS POINT	60	55	50	55	55	55
BN_02	25-25A DALGETY ROAD MILLERS POINT	60	53	50	53	55	53
BN_02	23-23A DALGETY ROAD MILLERS POINT	60	52	50	52	55	52
BN_02	21-21A DALGETY ROAD MILLERS POINT	60	51	50	51	55	51

NCA	Address	Day (Standard)		Evening (OOHW)		E41 (OOHW)	
		NML	Predicted levels	NML	Predicted levels	NML	Predicted levels
BN_02	19-19A DALGETY ROAD MILLERS POINT	60	51	50	51	55	51
BN_02	17-17A DALGETY ROAD MILLERS POINT	60	51	50	51	55	51
BN_02	9 DALGETY ROAD MILLERS POINT	60	48	50	48	55	48
BN_02	34 MERRIMAN STREET MILLERS POINT	60	53	50	53	55	53
BN_02	18-20 MUNN STREET MILLERS POINT	60	50	50	50	55	50
BN_02	15 WINDMILL STREET MILLERS POINT	60	40	50	40	55	40
BN_02	17 WINDMILL STREET MILLERS POINT	60	40	50	40	55	40
BN_02	19 WINDMILL STREET MILLERS POINT	60	40	50	40	55	40
BN_02	21 WINDMILL STREET MILLERS POINT	60	39	50	39	55	39
BN_02	23 WINDMILL STREET MILLERS POINT	60	39	50	39	55	39
BN_02	25 WINDMILL STREET MILLERS POINT	60	39	50	39	55	39
BN_02	27 WINDMILL STREET MILLERS POINT	60	38	50	38	55	38
BN_02	29 WINDMILL STREET MILLERS POINT	60	38	50	38	55	38
BN_02	31 WINDMILL STREET MILLERS POINT	60	38	50	38	55	38
BN_02	33 WINDMILL STREET MILLERS POINT	60	38	50	38	55	38
BN_02	35 WINDMILL STREET MILLERS POINT	60	37	50	37	55	37
BN_02	37 WINDMILL STREET MILLERS POINT	60	37	50	37	55	37
BN_02	39 WINDMILL STREET MILLERS POINT	60	37	50	37	55	37
BN_02	41 WINDMILL STREET MILLERS POINT	60	36	50	36	55	36
BN_02	43 WINDMILL STREET MILLERS POINT	60	36	50	36	55	36
BN_02	45 WINDMILL STREET MILLERS POINT	60	36	50	36	55	36
BN_02	47 WINDMILL STREET MILLERS POINT	60	36	50	36	55	36
BN_02	49 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	51 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	53 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	55 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	57 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	59 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	61 WINDMILL STREET MILLERS POINT	60	35	50	35	55	35
BN_02	63 WINDMILL STREET MILLERS POINT	60	34	50	34	55	34
BN_02	65 WINDMILL STREET MILLERS POINT	60	34	50	34	55	34
BN_02	67 WINDMILL STREET MILLERS POINT	60	34	50	34	55	34
BN_02	19 HICKSON ROAD DAWES POINT	60	-	50	-	55	-
BN_02	21-21A HICKSON ROAD MILLERS POINT	60	46	50	46	55	46
BN_02	6 TOWNS PLACE MILLERS POINT	60	39	50	39	55	39
BN_02	20 HICKSON ROAD MILLERS POINT	60	-	50	-	55	-
BN_02	1 POTTINGER STREET MILLERS POINT	60	-	50	-	55	-
BN_02	1B POTTINGER STREET MILLERS POINT	60	36	50	36	55	36

NCA	Address	Day (Standard)		Evening (OOHW)		E41 (OOHW)	
		NML	Predicted levels	NML	Predicted levels	NML	Predicted levels
BN_02	81-83 LOWER FORT STREET MILLERS POINT	60	-	50	-	55	-
BN_02	64 Argyle Pl, Millers Point NSW 2000, A	60	-	50	-	55	-
BN_02	28 ARGYLE PLACE MILLERS POINT	60	38	50	38	55	38
BN_02	30 ARGYLE PLACE MILLERS POINT	60	37	50	37	55	37
BN_02	32 ARGYLE PLACE MILLERS POINT	60	37	50	37	55	37
BN_02	34 ARGYLE PLACE MILLERS POINT	60	37	50	37	55	37
BN_02	36 ARGYLE PLACE MILLERS POINT	60	35	50	35	55	35
BN_02	38 ARGYLE PLACE MILLERS POINT	60	34	50	34	55	34
BN_02	40 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	42 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	44 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	50 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	60 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	62 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	64 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	67 WINDMILL STREET MILLERS POINT	60	34	50	34	55	34
BN_02	48 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	46 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	52 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	54 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	56 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	58 ARGYLE PLACE MILLERS POINT	60	-	50	-	55	-
BN_02	80-82 Windmill St, Millers Point NSW 20	60	34	50	34	55	34
BN_02	81-83 LOWER FORT STREET MILLERS POINT	60	-	50	-	55	-
BN_02	8 Argyle Place, Millers Point	60	58	50	58	55	58
BN_02	1-5 Towns Place, Millers Point NSW 2000	60	63	50	63	77	63
BN_03	38 HICKSON ROAD MILLERS POINT	60	45	50	45	55	45
BN_03	127-153 KENT STREET MILLERS POINT	60	46	50	46	55	46
BN_03	187 KENT STREET MILLERS POINT	60	43	50	43	55	43
BN_03	161 KENT STREET MILLERS POINT	60	43	50	43	55	43
BN_03	155-157 KENT STREET MILLERS POINT	60	44	50	44	55	44
BN_03	7-7A HIGH STREET MILLERS POINT	60	45	50	45	55	45
BN_03	115 KENT STREET MILLERS POINT	60	39	50	39	55	39
BN_03	117 KENT STREET MILLERS POINT	60	39	50	39	55	39
BN_03	119 KENT STREET MILLERS POINT	60	36	50	36	55	36
BN_03	121 KENT STREET MILLERS POINT	60	43	50	43	55	43
BN_03	123 KENT STREET MILLERS POINT	60	39	50	39	55	39
BN_03	80-80A HIGH STREET MILLERS POINT	60	46	50	46	55	46

NCA	Address	Day (Standard)		Evening (OOHW)		E41 (OOHW)	
		NML	Predicted levels	NML	Predicted levels	NML	Predicted levels
BN_03	2-2A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	2 HIGH STREET MILLERS POINT	60	56	50	56	55	56
BN_03	10-12 KENT STREET MILLERS POINT	60	43	50	43	55	43
BN_03	18 KENT STREET MILLERS POINT	60	38	50	38	55	38
BN_03	20 KENT STREET MILLERS POINT	60	38	50	38	55	38
BN_03	22 KENT STREET MILLERS POINT	60	38	50	38	55	38
BN_03	24-26 KENT STREET MILLERS POINT	60	38	50	38	55	38
BN_03	28 KENT STREET MILLERS POINT	60	37	50	37	55	37
BN_03	30A-30B KENT STREET MILLERS POINT	60	37	50	37	55	37
BN_03	32 KENT STREET MILLERS POINT	60	37	50	37	55	37
BN_03	34 KENT STREET MILLERS POINT	60	36	50	36	55	36
BN_03	36 KENT STREET MILLERS POINT	60	36	50	36	55	36
BN_03	38 KENT STREET MILLERS POINT	60	36	50	36	55	36
BN_03	40 KENT STREET MILLERS POINT	60	35	50	35	55	35
BN_03	42 KENT STREET MILLERS POINT	60	36	50	36	55	36
BN_03	44 KENT STREET MILLERS POINT	60	35	50	35	55	35
BN_03	46 KENT STREET MILLERS POINT	60	36	50	36	55	36
BN_03	48 KENT STREET MILLERS POINT	60	35	50	35	55	35
BN_03	50 KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	52 KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	54 KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	54A-54B KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	56 KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	58 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	60 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	62 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	80 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	82 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	84 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	86 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	88 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	90 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	92 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	94 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	85-87 KENT STREET MILLERS POINT	60	49	50	49	55	49
BN_03	81 KENT STREET MILLERS POINT	60	51	50	51	55	51
BN_03	79 KENT STREET MILLERS POINT	60	51	50	51	55	51
BN_03	77 KENT STREET MILLERS POINT	60	52	50	52	55	52

NCA	Address	Day (Standard)		Evening (OOHW)		E41 (OOHW)	
		NML	Predicted levels	NML	Predicted levels	NML	Predicted levels
BN_03	75 KENT STREET MILLERS POINT	60	51	50	51	55	51
BN_03	73 KENT STREET MILLERS POINT	60	49	50	49	55	49
BN_03	71 KENT STREET MILLERS POINT	60	48	50	48	55	48
BN_03	59 KENT STREET MILLERS POINT	60	47	50	47	55	47
BN_03	61 KENT STREET MILLERS POINT	60	47	50	47	55	47
BN_03	63 KENT STREET MILLERS POINT	60	51	50	51	55	51
BN_03	37 KENT STREET MILLERS POINT	60	40	50	40	55	40
BN_03	39 KENT STREET MILLERS POINT	60	40	50	40	55	40
BN_03	41 KENT STREET MILLERS POINT	60	40	50	40	55	40
BN_03	43 KENT STREET MILLERS POINT	60	40	50	40	55	40
BN_03	45 KENT STREET MILLERS POINT	60	41	50	41	55	41
BN_03	47 KENT STREET MILLERS POINT	60	39	50	39	55	39
BN_03	49 KENT STREET MILLERS POINT	60	42	50	42	55	42
BN_03	51 KENT STREET MILLERS POINT	60	42	50	42	55	42
BN_03	53 KENT STREET MILLERS POINT	60	44	50	44	55	44
BN_03	55 KENT STREET MILLERS POINT	60	46	50	46	55	46
BN_03	38-38A HIGH STREET MILLERS POINT	60	47	50	47	55	47
BN_03	40-40A HIGH STREET MILLERS POINT	60	48	50	48	55	48
BN_03	42-42A HIGH STREET MILLERS POINT	60	47	50	47	55	47
BN_03	44-44A HIGH STREET MILLERS POINT	60	49	50	49	55	49
BN_03	46-46A HIGH STREET MILLERS POINT	60	49	50	49	55	49
BN_03	48-48A HIGH STREET MILLERS POINT	60	48	50	48	55	48
BN_03	50-50A HIGH STREET MILLERS POINT	60	49	50	49	55	49
BN_03	52-52A HIGH STREET MILLERS POINT	60	47	50	47	55	47
BN_03	54-54A HIGH STREET MILLERS POINT	60	48	50	48	55	48
BN_03	56-56A HIGH STREET MILLERS POINT	60	48	50	48	55	48
BN_03	58-58A HIGH STREET MILLERS POINT	60	46	50	46	55	46
BN_03	60-60A HIGH STREET MILLERS POINT	60	49	50	49	55	49
BN_03	62-62A HIGH STREET MILLERS POINT	60	47	50	47	55	47
BN_03	64-64A HIGH STREET MILLERS POINT	60	46	50	46	55	46
BN_03	66-66A HIGH STREET MILLERS POINT	60	47	50	47	55	47
BN_03	68-68A HIGH STREET MILLERS POINT	60	46	50	46	55	46
BN_03	70-70A HIGH STREET MILLERS POINT	60	46	50	46	55	46
BN_03	72-72A HIGH STREET MILLERS POINT	60	46	50	46	55	46
BN_03	78-78A HIGH STREET MILLERS POINT	60	42	50	42	55	42
BN_03	76-76A HIGH STREET MILLERS POINT	60	42	50	42	55	42
BN_03	74-74A HIGH STREET MILLERS POINT	60	41	50	41	55	41
BN_03	4-4A HIGH STREET MILLERS POINT	60	53	50	53	55	53

NCA	Address	Day (Standard)		Evening (OOHW)		E41 (OOHW)	
		NML	Predicted levels	NML	Predicted levels	NML	Predicted levels
BN_03	6-6A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	8-8A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	10-10A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	12-12A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	14-14A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	16-16A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	18-18A HIGH STREET MILLERS POINT	60	55	50	55	55	55
BN_03	20-20A HIGH STREET MILLERS POINT	60	54	50	54	55	54
BN_03	22-22A HIGH STREET MILLERS POINT	60	54	50	54	55	54
BN_03	24-24A HIGH STREET MILLERS POINT	60	53	50	53	55	53
BN_03	26-26A HIGH STREET MILLERS POINT	60	53	50	53	55	53
BN_03	28-28A HIGH STREET MILLERS POINT	60	52	50	52	55	52
BN_03	30-30A HIGH STREET MILLERS POINT	60	52	50	52	55	52
BN_03	32-32A HIGH STREET MILLERS POINT	60	51	50	51	55	51
BN_03	34-34A HIGH STREET MILLERS POINT	60	51	50	51	55	51
BN_03	36-36A HIGH STREET MILLERS POINT	60	50	50	50	55	50
BN_03	83 KENT STREET MILLERS POINT	60	37	50	37	55	37
BN_03	3-3A HIGH STREET MILLERS POINT	60	51	50	51	55	51
BN_03	5-5A HIGH STREET MILLERS POINT	60	47	50	47	55	47
BN_03	9-9A HIGH STREET MILLERS POINT	60	43	50	43	55	43
BN_03	64 KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	68 KENT STREET MILLERS POINT	60	34	50	34	55	34
BN_03	72 KENT STREET MILLERS POINT	60	-	50	-	55	-
BN_03	76 KENT STREET MILLERS POINT	60	-	50	-	55	-

## APPENDIX C Additional noise mitigation measures

NCA	Address	Additional mitigation measures	Exceed CoA E41?
BN_02	40-48 MERRIMAN STREET MILLERS POINT	LB	Yes
BN_02	68 BETTINGTON STREET MILLERS POINT	LB	Yes
BN_02	66 BETTINGTON STREET MILLERS POINT	LB	Yes
BN_02	35-35A DALGETY ROAD MILLERS POINT	LB	Yes
BN_02	33-33A DALGETY ROAD MILLERS POINT	LB	Yes
BN_02	31-31A DALGETY ROAD MILLERS POINT	LB	Yes
BN_02	29-29A DALGETY ROAD MILLERS POINT	LB	Yes
BN_02	8 Argyle Place, Millers Point	LB	Yes
BN_02	1-5 Towns Place, Millers Point NSW 2000	LB	
BN_03	2 HIGH STREET MILLERS POINT	LB	Yes