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Sydney Metro Chatswood to Sydenham – TSE Works - Victoria Cross Station - Shed demolition - CNVIS Addendum

1 Introduction

1.1 Overview of works

This technical memorandum is an addendum to the report *Construction Noise and Vibration Impact Statement: Victoria Cross Constructions sites*¹ (Victoria Cross CNVIS) and has been prepared on behalf of John Holland CPB Ghella Joint Venture (JHCPBG) in accordance with the Construction Noise and Vibration Management Plan (CNVMP) [SMCSWTSE-JCG-TPW-EM-PLN-002012]² for the Design and Construction of the Tunnel and Station Excavation (TSE) Works of the Sydney Metro City & Southwest Project (the Project).

JHCPBG is proposing to deconstruct the acoustic shed at the Victoria Cross south (VCS) construction site. These works are not specifically covered in the existing Victoria Cross CNVIS, and so this addendum has been prepared to cover these works. The deconstruction of the acoustic shed will typically take place during standard construction hours, with the exception of the erection of construction hoarding and the erection and dismantling of scaffolding to facilitate the dismantling of the acoustic shed. These activities will take place on the boundaries of the site on Miller Street, Denison Street and Berry Street. The works are proposed to extend into the evening (i.e. 6pm to 10pm) and night (i.e. 10pm to 7am) out of hours works (OOHW) periods.

This memorandum has been prepared to address the potential construction noise and vibration impacts from shed deconstruction activities. These works have been assessed in combination with other works occurring at the site, such as tunnel lining activities, which have previously been identified in the Victoria

¹ TH511-02 01.04.03 F01 VC CNVIS (r7), dated 21 September 2018

² Sydney Metro City & Southwest – TSE Works Construction Noise and Vibration Management Plan (SMCSTSE-JCG-TPW-EN-PLN-002012)

Cross CNVIS, however, the modelling has been undertaken assuming that the shed has now been removed and the location of the tunnel lining plant and equipment are correct for the current stage of the project. The construction works are detailed in Section 2.1 below.

1.2 Justification for out of hours construction works

As identified above, some works will need to be undertaken outside of standard working hours as they involve the erection of hoarding and the erection and disassembly of scaffolding on pedestrian walkways in the North Sydney area. As this area is a busy commercial district foot traffic is frequent throughout the day. To ensure public safety and minimise disruption to pedestrians these works will be undertaken during the evening and night period. During these works occupancy of a road lane may be required to undertake the works, to minimise impacts on traffic this work is required to be undertaken outside of normal working hours.

2 Construction noise assessment

2.1 Construction activities

Key details regarding the location and layout of the noise generating plant and equipment that will operate during the shed deconstruction works were informed by the Design and Construction Teams. The location of the Victoria Cross site, and the boundary are shown in Figure 1 and Figure C1 in the Victoria Cross CNVIS.

Table 2.1 presents the list of plant that are proposed to be used during the acoustic shed deconstruction works along with the associated sound power levels and the locations where the equipment will be within and along the site boundary during the works.

Deconstruction of shed panels and steel frame disassembly (Standard construction hours)

The acoustic shed will be deconstructed using elevated work platforms and hand tools to cut large sections from shed panelling, and then panel sections will be lowered to the shed floor using mobile cranes. The panels will be further deconstructed and broken down once they are at ground level before being loaded onto trucks to be moved offsite.

Erection of hoarding and erection and disassembly of scaffolding (Outside of standard construction hours)

The erection of hoarding and the erection and disassembly of scaffolding around the site as part of the shed deconstruction works and the setup of site hoarding will be required around the boundary of the entire site. Hand tools along with a hiab truck will be used as part of these works. As this will be required to take place around the boundary of the site, which are heavily pedestrianised areas during the daytime, these works would take place outside of standard construction hours, as per Section 1.2.

Table 2.1: Construction activities and applicable sound power levels - Acoustic shed deconstruction works

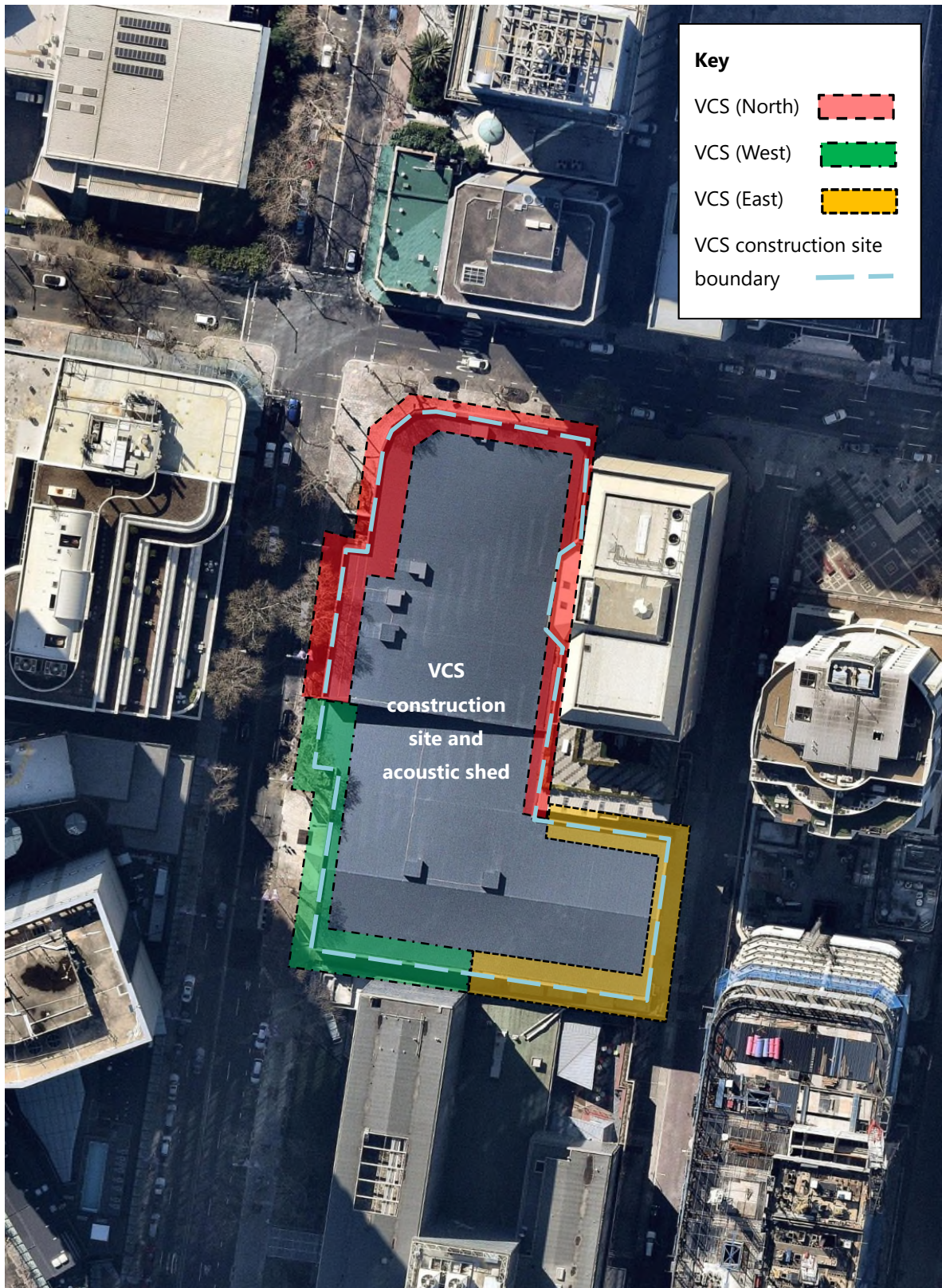
Construction activity (Works time period)	Key plant and equipment	Qty	Sound power level, dB(A)		Comments
			L _{Aeq 15min}	L _{Amax}	
Panel removal & steel frame disassembly (Standard construction hours)	Power tools - 5" grinder	2	108	-	Located at high point on the shed. Note 5.
	Power tools - Rattle Gun	2	99	-	Located at high point on the shed. Note 5.
	Oxy Acetylene	2	101	-	Located at high point on the shed. Note 5.
	Elevated work platforms	4	95	-	Located on shed floor
	Excavator (20t)	2	103	-	Located on shed floor
	Excavator (40t)	1	107	-	Located on shed floor
	Franna 25t	1	98	-	Located on shed floor
	Crane 200t	1	107	-	Located on shed floor
	Telehandler	1	98	-	Located on shed floor
	Trucks - material removal	2 p.h.	108	-	Moving through existing site truck route
Erection of hoarding and erection/disassembly of scaffolding (Outside standard construction hours)	Delivery Trucks - Hiab	4 per shift	95	117	Located adjacent to works area, engine idling during lifting movements
	Forklift	1	100	105	Adjacent to works area. Assumed operating 50% of the 15-minute period
	Power Tools - Cordless Drill	2	97	105	Located at elevated point on the shed
	Power Tools - Rattle Gun	2	99	107	Located at elevated point on the shed
	Dropped scaffolding	2	87	120	Ground level
	Hand Tools	2	97	105	Located at elevated point on the shed
The following works will take place concurrently with the above activities					
Tunnel lining (concreting) (Standard construction hours and Outside standard construction hours)	Concrete pump	U.G.	104	-	Underground (U.G), no contribution
	Compressor	U.G.	78	-	Underground, no contribution
	Ventilation fan with silencer	U.G.	Note 3	-	Underground, no contribution
	Concrete truck	5 p.h.	108	111	Truck moves into the site and into the tunnel. Trucks do not use air brakes when nearing the site.

- Notes
1. Not listed as standard hours works
 2. Noise sources are located underground so that there is no contribution to construction noise levels
 3. See Victoria Cross CNVIS
 4. No shielding has been assumed from the acoustic shed, which may be the case during the works.

Each of the shed deconstruction activities could take place the same time as the tunnel lining activities, and so these have been modelled occurring concurrently. However, the shed is assumed to be removed for the modelling, which is not the case for the Victoria Cross CNVIS.

The erection of hoarding and erection/disassembly of scaffolding works has been assessed for three different works area locations across the site, as shown in Figure 1, with the works located at the reasonable worst case location compared with the nearby sensitive receivers.

Figure 1: Construction assessment reference works areas - Acoustic shed deconstruction works OOH works areas (Image source: Nearmap)



2.2 Predicted noise levels

2.2.1 Construction

Noise emissions were determined by modelling noise sources, receiver locations, and operating activities, based on the information presented in Table 2.1. Predicted L_{Aeq} noise levels from construction works (within 10 dB(A) of the external equivalent NML) are shown in APPENDIX B. The predictions represent external noise levels during the works and are assessed against equivalent external NMLs.

The predictions presented in this CNVIS represent a realistic worst-case scenario when construction occurs at locations close to sensitive receivers.

At each receiver, noise levels will vary during the construction period based on the position of equipment within the worksite, the distance to the receiver, the construction activities being undertaken and the noise levels of particular plant items and equipment. Actual noise levels will often be less than presented in this CNVIS.

Predicted noise levels associated with the acoustic shed deconstruction works at the nearest noise sensitive receivers to the work site are presented in Table 2.2. The impacts presented are as follows:

For Day and evening Period 1 (from 7am to 8pm)

- ◆ Noise levels predicted to be below internal NMLs in PPA Conditions E37 and E38
- □ Noise levels predicted to be above internal NMLs in PPA Conditions E37 and E38

For Evening Period 2 and night (from 8pm to 7am)

- ◆ Noise levels predicted to be below internal NMLs in PPA Condition E41/E42 (residential receivers)
- □ Noise levels predicted to be above internal NMLs in PPA Condition E41/E42

Table 2.2: Summary of predicted noise levels at noise sensitive receivers - Acoustic shed deconstruction works

Works	Acoustic shed deconstruction works			
	Day / Evening 1 (7am to 8pm)	Evening 2 / Night (8pm to 7am)		
NCA / Work area	All areas	VCS (North)	VCS (West)	VCS (East)
OSR ¹	◆	◆	◆	◆
VC_01	◆	◆	◆	◆
VC_02	◆	◆	◆	◆
VC_07	◆	◆	◆	◆

Notes: 1. OSR includes all commercial, industrial and other non-residential sensitive receivers. Residential receivers are included in VC_01 to VC_07.

2. Evening 1 = evening period Monday to Sunday from 6 pm to 8 pm.

3. Evening 2 = evening period Monday to Sunday from 8 pm to 10 pm.

4. The location of the assessed work areas is presented in Figure 1.

The summary results presented in Table 2.2, show that the following

- During the day and evening period 1 (6pm to 8pm), the predicted construction noise levels achieve the PPA Condition E37/E38 NML at all residential and non-residential noise sensitive receiver buildings.
- During the evening period 2 (8pm to 10pm) and night period, the predicted construction noise levels are predicted comply with the PPA Condition E41/E42 NML at all nearby receivers. As the predicted noise levels are within 2 dB(A) of the external equivalent NML for 77 Berry Street for VCS (East) works, verification noise monitoring as outlined in Section 2.3.2 is recommended.

Measures for managing potential noise impacts are provided in Section 2.3. For more detailed predictions, see APPENDIX B.

2.2.2 Sleep disturbance

The maximum noise levels associated with delivery vehicle movements along with the construction activities with the potential for high noise level metal-on-metal impacts (eg. handling of scaffolding) may potentially cause sleep disturbance at nearby residential receivers.

The L_{Amax} noise levels associated with typical construction activities are expected to generally comply with screening levels except for the following activities:

- Metal-on-metal impacts (eg. mishandling/dropping of scaffolding) when works are taking place on the eastern side of the VCS site (eg. along Denison Street).
- Following the removal of the acoustic shed, if concrete agitator truck movements within the southern section of the of the VCS site are required to use airbrake, or during concrete agitator truck movements exiting the VCS site onto Denison Street.

Maximum noise levels from metal-on-metal impacts (eg. mishandling/dropping of scaffolding) are predicted during works in VCS (East) to be up to 79 dB(A) external, which is likely to result in an internal noise level of up to 59 dB(A) internal (with windows closed) at 77 Berry Street. As such, these noise levels could be above both the sleep disturbance screening level of 45 dB(A) L_{Amax} (internal), and the sleep disturbance 'awakening reaction' level of 55 dB(A) L_{Amax} (internal). Similarly, during works in VCS (N) marginal exceedances of the external sleep disturbance screening level (up to 67 dB(A) external) are possible at two residential receivers at 211-223 Pacific Highway, North Sydney and 80 Berry Street, North Sydney.

Maximum noise levels from trucks are predicted to be 71-75 dB(A) external and 51-55 dB(A) internal (with windows closed) at 77 Berry Street. Noise levels could therefore be above the sleep disturbance screening level of 45 dB(A) L_{Amax} (internal), but below the sleep disturbance 'awakening reaction' level of 55 dB(A) L_{Amax} (internal). However, as per the Victoria Cross CNVIS, at night there will typically only be 3 concrete trucks movements between 8pm and 7am.

As noted in the Victoria Cross CNVIS, the existing ambient noise levels (dominated by road traffic noise) are already high at this locality during night-time periods. The noise monitoring results presented in the

EIS indicate that the existing L_{Amax} noise levels range from 75-85 dB(A). The maximum noise levels from trucks exiting the VCS shed are therefore lower than the typical L_{Amax} noise levels from other ambient sources (dominated by existing road traffic noise) during night-time periods.

Notwithstanding this, potential sleep disturbance impacts will be minimised managed as outlined in Section 2.3.1.

2.2.3 Other sensitive receivers (Condition E34)

Presented in Table 2.3 are other noise-sensitive receivers that have been identified as potentially noise affected during the assessed activities. These are based upon the potential to exceed the equivalent external NML of each receiver.

Condition E34 receivers that are predicted to be impacted by airborne noise levels above the NMLs (see Victoria Cross CNVIS APPENDIX B Table B1) for each receiver type. In accordance with Condition E34, these receivers are to be consulted as part of the management of the works so that activities are not undertaken within sensitive periods for each receiver, or other suitable arrangements are agreed to.

Furthermore, high airborne noise generating activities will be managed to reduce noise levels where feasible and reasonable. Other reasonable arrangements should be considered by TfNSW to reduce internal noise levels during construction works at Victoria Cross worksites.

Table 2.3: E34 affected receiver locations – Victoria Cross (Acoustic shed deconstruction works)

Other sensitive receivers (Condition E34)	Description	Noise management levels as per ICNG	Consultation needed for airborne noise
Recording Studio			
(UNDER CONSTRUCTION) 1 Denison Street (77 Berry Street) North Sydney (if in operation)	Channel 9 Studio	25 (internal)	✓ (if in operation)

2.3 Noise mitigation and management

Based upon the assessment, as the predicted noise levels are expected to be above the PPA Condition E41 external equivalent NMLs, there are additional noise mitigation or management measures applicable for the assessed works.

2.3.1 Specific mitigation measures

The following specific mitigation measures are to be incorporated where feasible and reasonable during the construction works –

Panel removal & steel frame disassembly (Standard construction hours)

1. Where feasible and reasonable, schedule the deconstruction methodology so that use of louder equipment (eg. grinders) are located such that the existing shed elements act as a barrier between the construction noise source the nearest sensitive receivers.

Erection of hoarding and erection/disassembly of scaffolding (Outside Standard construction hours)

1. VCS (East) works area (Denison Street) – Predicted noise levels show there is potential for sleep disturbance from metal-on-metal impacts such as dropping or mishandling scaffolding or other metal elements. When works take place in the VCS (East) and VCS (North) area there is the potential for noise levels above the sleep disturbance screening level and awakening reaction levels. Management measures should be put in place to prevent metal-on-metal bangs for works in this location. These would include where feasible and reasonable:
 1. Use of straps for crane operations moving scaffolding.
 2. Scaffolding to be either directly erected or stored in an area which would prevent significant movements or falling elements.
2. Following the removal of the acoustic shed, management measures are to be put in place to minimise the requirement for concrete agitator trucks to use air-brakes or operate so that metal components can't bang together (eg. sharp accelerations or bumps) within the southern section of the of the VCS site or moving onto Denison Street.

2.3.2 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 memorandum or the relevant NMLs. 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. A minimum of one representative receiver in each NCA is to be monitored. The nominated monitoring locations are identified in Table 2.4, and have been selected as they present the best opportunity to validate the predicted noise levels.

As some of the key receiver properties are multi-storey and the residential apartments are at levels higher than ground. As such, the measurements cannot be undertaken at the most affect receiver floor, and so the corresponding ground floor measurement level is provided in order to verify against the predicted noise level. Independent of whether or not the ground floor construction noise level achieves the required NML, if the measured construction noise level is greater than the predicted noise level, further investigation is required to determine if the noise levels at higher floors achieve the predicted noise levels.

Table 2.4: Nominated verification monitoring locations

Works area	NCA	Nominated receiver address	Monitoring location at 1 m from	Predicted noise level, dB(A)	Predicted noise level, dB(A)
				L _{Aeq} 15 minute	L _{Amax}
Panel removal & steel frame disassembly (Standard construction hours)					
All	VC_01	100 MILLER STREET NORTH SYDNEY	Opposite VCS Miller Street truck entrance (West side of Miller St)	72	-
All	VC_02	15 ANGELO STREET NORTH SYDNEY	Cnr Berry St/Miller St (NW cnr of intersection)	68	-
All	VC_07	77 BERRY STREET NORTH SYDNEY	West facade	69 (73) ²	-
Erection of hoarding and erection/disassembly of scaffolding (Outside Standard construction hours)					
VCS(N)	VC_01	100 MILLER STREET NORTH SYDNEY	Opposite VCS Miller Street truck entrance (West side of Miller St)	72	85
VCS(W)	VC_02	15 ANGELO STREET NORTH SYDNEY	Cnr Berry St/Miller St (NW cnr of intersection)	65	78
VCS(E)	VC_07	77 BERRY STREET NORTH SYDNEY	West facade	64 (68) ²	79 (84) ²
Notes:	<ol style="list-style-type: none"> Monitoring on private property is subject to owner consent and where relevant, occupier consent The noise levels presented is at the nearest noise-sensitive receiver, which is the residential apartment located on level 5. The noise level in brackets (XX) is the noise level that is predicted at ground level adjacent to the building, to assist with verifying the predicted noise levels. 				

If verification monitoring shows that the external noise levels are consistently above the predicted levels, investigation should be undertaken to understand the cause of the exceedance.

Additional, if following this, the cause of the exceedance cannot then be mitigated or managed and the verification monitoring shows that the external noise levels are also consistently above the equivalent external NML or sleep disturbance screening level at night, more detailed analysis should be conducted to quantify the building façade loss and the potential of being above the internal NML of 45 dB(A) L_{Aeq,15min} specified in PPA Conditions E41/E42 or internal sleep disturbance screening level. If internal noise levels are found to be above 45 dB(A) L_{Aeq,15min}, or above the 55 dB(A) L_{Amax} construction noise level, consideration will be given to the provision of additional mitigation or management measures, such as alternative accommodation.

2.3.3 Consultation with affected receivers (PPA Condition E33 and E34)

As outlined in Section 5.4.1 of the Victoria Cross CNVIS, consistent with requirements in PPA Conditions E33 and E34, JHCPBG has commenced and will continue to consult with potentially affected stakeholders including business and residential receivers regarding specific mitigation measures applicable to the construction works at the Victoria Cross site.

As predicted noise levels in this assessment are identified to potentially exceed the NML of nearby OSRs. Where these are identified in Section 2.2.3 further notification or consultation for these works should be considered if appropriate (ie. if OSR will be in use during the works).

3 Construction related road traffic assessment

The proposed acoustic shed deconstruction works require 2 heavy vehicles per hour for materials removal during standard construction hours, while outside of standard construction hours there would be up to 4 hiab truck delivery movements per overall shift.

The existing traffic noise levels at the nearest representative residential receiver at 77 Berry Street are presented in the Victoria Cross CNVIS. Based upon these numbers of truck movements, the traffic noise level at this worst-affected residential receiver would increase by less than 1 dB(A) during both works taking place during standard hours and outside of standard hours.

4 Other assessments

The proposed works are not vibration intensive and so construction vibration or ground-borne noise impacts have not been considered further in this addendum assessment.

No other works other than those discussed in this addendum are proposed to be occurring concurrently so that there may be cumulative airborne noise impacts on nearby sensitive receivers. The cumulative impacts with other construction works are considered in this assessment, as the tunnel lining activities have been modelled occurring concurrently.

5 Conclusion

This technical memorandum is an addendum to the report Victoria Cross CNVIS to review the potential noise and vibration impacts for the proposed acoustic shed deconstruction works.

These works are programmed to be undertaken during standard construction hours, however, for the erection of hoarding and the erection and disassembly of scaffolding partition of the works, this is required to both occupy areas of the pedestrian walkways in the North Sydney area along with a lane occupancy during the works. As such, these specific works will be required to take place during the evening and night period

These works have been assessed concurrently with the tunnel lining activities that are occurring at this project stage.

Noise levels are predicted to achieve the PPA Condition PPA Condition E37/E38 and E41/E42 NMLs at nearby noise sensitive receivers but could exceed sleep disturbance noise levels without further mitigation and management. Noise mitigation and management measures that are recommended to be incorporated for these works are presented in Section 2.3.

Noise monitoring will be undertaken on a regular basis to verify compliance with the predicted noise levels and NMLs.

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Authorised
19/09/2019	Initial issue	0	1	A. Leslie	A. Leslie	T. Gowen
23/09/2019	Updated with client comments	-	2	A. Leslie	A. Leslie	T. Gowen

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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]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
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 _{Max}	The maximum sound pressure level measured over a given period.
L _{Min}	The minimum sound pressure level measured over a given period.
L ₁	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L ₁₀	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L ₉₀	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 _{eq}	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 _{eq} 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 Detailed predicted noise levels

The impacts presented in the following table are identified by colour coding of the text.

Only properties predicted to within 10 dB(A) of the external NML are included in the detailed prediction list.

For Day and E1 (from 7am to 8pm)

- XX Noise levels predicted to be below internal NMLs in PPA Condition E37/E38 (residential receivers)
- **XX** Noise levels predicted to be above internal NMLs in PPA Condition E37/E38 (residential receivers)

For E2 and Night (from 8pm to 7am):

- XX Noise levels predicted to be below internal NMLs in PPA Condition E41/E42 (residential receivers)
- **XX** Noise levels predicted to be above internal NMLs in PPA Condition E41/E42 (residential receivers)

Table B1: Predicted construction noise levels

Victoria Cross South (Acoustic shed deconstruction)

Receiver				Predicted noise levels, dB(A)									
				Day / E1 (7am to 8pm)			E2 / Night (8pm to 7am) - residential only			Sleep disturbance (L _{Amax})			
NCA	NCA ID	Receiver type	Assumed façade loss	NML	All areas	NML	VCS (North)	VCS (West)	VCS (East)	NML	VCS (North)	VCS (West)	VCS (East)
OSR	OSR -5507	Educational	20	80	69	n/a	66	59	51	n/a	79	72	72
OSR	OSR -5536	Commercial	20	80	74	n/a	73	61	56	n/a	86	76	76
OSR	OSR -5538	Commercial	20	80	70	n/a	66	62	55	n/a	80	75	75
OSR	OSR -5539	Commercial	20	80	70	n/a	68	58	57	n/a	78	76	76
OSR	OSR -5540	Commercial	20	80	77	n/a	73	68	65	n/a	85	85	85
OSR	OSR -5683	Commercial	20	80	71	n/a	61	69	60	n/a	84	84	84
OSR	OSR -5685	Commercial	20	80	77	n/a	64	68	70	n/a	88	88	88
OSR	OSR -5686	Commercial	20	80	73	n/a	64	70	61	n/a	80	80	80
OSR	OSR -5690	Hotel/Motel/Hostel	20	80	73	n/a	72	60	52	n/a	86	72	72
OSR	OSR -9699	Commercial	20	80	71	n/a	61	70	61	n/a	84	84	84
OSR	OSR -9955	Commercial	20	80	70	n/a	60	66	58	n/a	81	81	81
OSR	OSR -9959	Commercial	20	80	77	n/a	65	70	67	n/a	88	88	88
OSR	OSR -9961	Commercial	20	80	71	n/a	59	59	67	n/a	80	80	81
OSR	OSR -9970	Childcare	30	90	81	n/a	66	69	73	n/a	90	90	90
VC_01	VC_01-5532	Residential	10	70	43	55	44	32	34	65	60	51	51
VC_01	VC_01-5533	Residential	10	70	44	55	43	36	36	65	56	50	50
VC_01	VC_01-5534	Residential	10	70	52	55	50	31	37	65	63	52	52
VC_01	VC_01-5940	Residential	10	70	51	55	45	45	32	65	58	58	58
VC_02	VC_02-5508	Residential	10	70	54	55	47	45	42	65	58	58	58
VC_02	VC_02-5531	Residential	10	70	43	55	45	27	24	65	48	42	42
VC_02	VC_02-5791	Residential	10	70	58	55	53	46	47	65	66	62	62
VC_04	VC_04-5665	Residential	10	70	45	55	39	36	29	65	56	52	52
VC_04	VC_04-5667	Residential	10	70	47	55	37	35	33	65	55	55	55
VC_05	VC_05-5696	Residential	10	70	53	55	45	47	34	65	59	59	59
VC_05	VC_05-5698	Residential	10	70	50	55	41	46	33	65	58	58	58
VC_05	VC_05-5700	Residential	10	70	48	55	39	45	32	65	58	58	58
VC_05	VC_05-5869	Residential	10	70	53	55	46	40	49	65	61	61	65
VC_05	VC_05-9698	Residential	10	70	43	55	31	28	41	65	50	50	58
VC_07	VC_07-9932	Residential	10	70	56	55	55	36	33	65	67	60	60
VC_07	VC_07-9969	Residential	20	80	69	65	55	61	64	75	76	76	79

**ENDORSEMENT
CITY & SOUTHWEST ACOUSTIC ADVISOR**

Review of	Construction Noise and Vibration Impact Statement: Shed Demolition	Document reference:	SYDNEY METRO CITY & SOUTHWEST-TSE WORKS
Prepared by:	Sav Shimada, Alternate Acoustic Advisor		Construction Noise and Vibration Impact Statement Addendum: Victoria Cross Station Shed demolition CNVIS Addendum
Date of issue:	3 October 2019		<i>TH511-02 01.04.03 F02 VC South Shed Demolition (r2).docx</i> <i>Dated 23 September 2019</i>

As approved Alternate Acoustic Advisor for the Sydney Metro City & Southwest project, I have reviewed the Construction Noise and Vibration Impact Statement (CNVIS) for Victoria Cross Construction Sites, Addendum for Shed Demolition, as required under A27 (d) of the project approval conditions.

The CNVIS Addendum covers the demolition of the acoustic shed located at Victoria Cross south and supports the CNVIS: Victoria Cross Construction sites, revision 7. The focus of the Addendum is deconstruction of the acoustic shed at the Victoria Cross south construction site.

We have reviewed the Addendum and endorse it.

We have been advised by TSE that the following non-residential receivers have been consulted in the planning of agreed respite periods, monitoring and provision of information for owners and tenants:

- Investa - 105 Berry Street
- Charter Hall - 65 Berry Street
- North Sydney Council
- Monte Saint Angelo's

TSE has made efforts to contact Only About Children (65 Berry St) and we note that Sydney Metro provided a full balcony enclosure at this receiver to mitigate construction noise impacts.

I am satisfied that the CNVIS Addendum is technically valid and that it includes appropriate noise and vibration mitigation and management. On this basis I endorse the impact statement Addendum in relation to the documented deconstruction of the acoustic shed at the Victoria Cross south construction site.



Sav Shimada, City & Southwest Alternate Acoustic Advisor