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TM372-02-1-02F20 SMW-ETP_ADD-DNVIS-PYR_TBM Support(r7)

John Holland CPB Contractors Ghella Joint Venture
Level 4, 60 Union Street
Pyrmont NSW 2009

Sydney Metro West Eastern Tunnelling Project - Addendum DNVIS - Pyrmont Station - TBM Support from Pyrmont East

1 Introduction

A Detailed Noise and Vibration Impact Statements (DNVISs) have been prepared for the Sydney Metro West – Eastern Tunnelling Package (ETP) **Pyrmont Station** surface worksites (Pyrmont DNVIS) [1] and for Tunnelling (Tunnelling DNVIS) [2]. The DNVIS was prepared on behalf of John Holland CPB Contractors Ghella Joint Venture (JCG) to meet the requirements of Planning Approval (SSI 19238057) Condition D29 and the Sydney Metro Construction Noise and Vibration Standard (CNVS) Sydney Metro Construction Noise and Vibration Standard Version 4.3 (SM-20-00098866) – 4 November 2020 for the construction of the ETP Works.

This Sydney Metro West Eastern Tunnelling Package – Addendum Detailed Noise and Vibration Impact Statement – Pyrmont Station – TBM Support from Pyrmont East (Addendum) has been prepared consistent with the DNVISs to assess changes in the delivery of the scope of works assessed in the Pyrmont DNVIS [1] and the Tunnelling DNVIS.

1.1 Changes to DNVIS assessed in this Addendum

This Addendum assesses changes in noise and vibration impact associated with the following two activities:

- Commencement of the TBM segment deliveries (on a 24 hour basis) and consumables (7am-10pm) to Pyrmont East, referred to as TBM support activities. The segments will be unloaded within the acoustic shed; lifted into the shaft and transported by Multi Service Vehicle (MSV) to enable the tunnel lining to be constructed as the TBM progresses towards Hunter Street. Consumables (pipe work, grease, oil etc) are required to connect critical services (water, slurry, grout) between The Bays and the operating TBMs. The deliveries would be to the Pyrmont East site upper deck where the consumables would be lifted into the shaft via an electric (davit) crane.

- Concrete pours for the crossover and station cavern inverts are required to occur outside the acoustic shed on Union Street. This is required as there is insufficient space within the Pyrmont East site/acoustic shed to set up two concrete pumping facilities and associated testing and washout areas. The concrete pours will generally occur between 7am and 10pm over a 9 week period. On four occasions (subject to EPL approval), this would also require concrete pours past 10pm, when the pours take around 24 hours each. Extended hours of concrete deliveries for the concrete pours are required to ensure concrete quality requirements and design specifications can be achieved.

Table 1-1 summarises the proposed changes to works, and where the changes result in a change in the works assessed in the Pyrmont DNVIS and/ or the Tunnelling DNVIS requiring reassessment.

Table 1-1: Changes to construction works addressed in this DNVIS Addendum

Site	Change to construction works	Change to DNVIS?		Comment
		Pyrmont	Tunnelling	
Pyrmont West	No change to activities at Pyrmont West.	No	No	Pyrmont DNVIS Table C1 assumptions remain unchanged. No change to Tunnelling DNVIS.
Pyrmont East	Construction methodology revised so that TBM is partly support from Pyrmont East, including: - Segments delivered to Pyrmont East acoustic shed - Deliveries of other tunnelling materials to Pyrmont East Upper deck - Opening in Upper Deck to allow other tunnelling materials to be lifted into shaft (7am to 10pm only)	Yes	No	Ventilation as per Pyrmont DNVIS Pyrmont DNVIS Table C1 assumption updates for Pyrmont East in blue text (see Table C1). Changes to construction works do not affect the ground-borne noise and vibration impacts from TBM tunnelling assessed in the Tunnelling DNVIS. No change to Tunnelling DNVIS.
	Revised Invert concrete pours from PYR-E Tunnel Lining (concreting) without shed, i.e. delivery of concrete to Union Street	Yes	No	Pyrmont DNVIS Table C1 assumption updates for Pyrmont East in blue text (see Table C1). No change to Tunnelling DNVIS.

2 Construction works and hours

2.1 Construction works addressed in this Addendum DNVIS

The additional works assessed in this addendum to the Pyrmont DNVIS will be undertaken during and outside standard the construction hours defined in Section 2.2 of the DNVIS. The works are summarised in Table 2-1.

Table 2-1: Summary of construction works under this Addendum DNVIS

Activity/ work area	Aspect	Construction hours	Applicable CoA/ EPL Condition	Timing of activity	Duration
Post-TBM: TBM Support from Pyrmont East (Assessment ref: SW-MTS-TBM)	Tunnel Lining (segments) and other tunnelling materials/ consumables	Standard hours + OOHW (D/E/N)*	CoA D23(d)(ii) EPL L5.10(b) and L5.19	Jul-25	4 months
Post-TBM: Revised Invert concrete pours from Union Street due to TBM support (Assessment ref: SW-MTL-TBM)	Invert concrete pours - Tunnel Lining (concreting) without shed, including delivery of concrete	Standard hours + OOHW (D/E/N)*	CoA D23(c)(i);	Oct 25 (setup in standard hours from Sep-25)	9 weeks

Notes: 'OOHW' means Out of Hours works, or work outside the standard construction hours (see Section 2.2 of the DNVIS)

'OOHW(D)' is the OOH 'Day' period; 8am to 6pm Sunday

'OOHW(E)' is the 'Evening' period, 6pm to 10pm Monday to Sunday

'OOHW(N) is the 'Night' period, 10pm to 7am Sunday/Monday to Thursday/ Friday; 10pm to 8am Friday/Saturday and Saturday/ Sunday

*Justification of OOHW presented in Section 2.2.1 of this report

Table C.1 in APPENDIX C presents the list of plant proposed to be used for these works and their assumed sound power levels. There are no vibration intensive plant identified in Table C.1. The proposed site layout for each set of works is presented in Figure C-1 and Figure C-2 in APPENDIX C.

2.1.1 Construction traffic noise

The construction haulage route (including all deliveries) for Pyrmont East is as per Figure 2.3 in the DNVIS. Based on the proposed activities summarised in Table 1-1 and detailed in Table C.1 in APPENDIX C, the construction traffic is consistent with construction traffic generated in the Pyrmont DNVIS, with the exception of night time concrete deliveries during the invert concrete pours. In Table C1 in APPENDIX C of the Pyrmont DNVIS during scenario "SW-MTS Mined tunnelling and associated activities" the number of heavy vehicle movements per day are assumed to be 10-19 per hour during the day/ evening (7am to 10pm) and 6 per hour at night (10pm to 7am) under the EPL trial.

From Table C1 of this report, during scenario "SW-MTS-TBM Post-TBM TBM Support from PYR-E - Tunnel Lining (segments)" and "SW-MTL-TBM Post-TBM Revised Invert concrete pours from PYR-E" the number of heavy vehicle movements per day are assumed to be a total of 9 heavy vehicles per hour during the day, 7 heavy vehicles per hour during the evening (7am to 10pm) and 5 per hour at night.

The traffic generated by construction assessed in the Addendum report is consistent with the traffic generated by construction assessed in the Pyrmont DNVIS, except on the four long pour nights.

The truck access route to and from the Pyrmont East site will not change from the DNVIS (i.e. site access via Pyrmont Bridge Road, left onto Edward Street, right onto Union Street; site egress left off Union Street onto Pyrmont Bridge Road). The additional vehicles on Pyrmont Bridge Road over the 4 long pour nights are unlikely to have a significant impact to residential receivers on Pyrmont Bridge Road due to the existing traffic volumes on this major arterial road.

There are likely to be traffic noise impacts to residential receivers on Edward Street and Union Street on the four nights where there are long pours. However, these receivers will also be noise affected by the concrete lining works on Union Street. Noise mitigation and management measures are described in Section 4.2 to mitigate both construction noise and construction traffic noise.

No further assessment is required.

2.1.2 Ground-borne noise and vibration

There are no vibration intensive activities required for these works. Ground-borne noise and vibration impacts from TBM tunnelling are assessed in the Tunnelling DNVIS (ref: TM372-02-1-04F01 SMW-ETP_DNVIS-TUN (rev06)). No further assessment is required.

2.2 Construction Hours

Construction hours are as reported in the DNVIS Section 2.2.

TBM Support activities from Pyrmont East are the delivery of materials to directly support tunnelling activities and are a prescribed activity permitted 24 hours a day under condition D23(d)(ii) and EPL Conditions L5.10(b) and L5.19.

Invert concrete pours from Pyrmont East (Union Street) will be undertaken under an EPL variation in accordance with condition D23(c)(i).

2.2.1 Justification for OOHW

TBM Support activities at the Pyrmont eastern shaft involve the delivery of materials to directly support tunnelling activities and are a prescribed activity permitted 24 hours a day under condition D23(d)(ii).

An EPL variation has been approved to permit out of hours deliveries to Pyrmont East (EPL L5.16) and concrete segment deliveries to Pyrmont East (EPL L5.19) past 10pm.

JCG require extended hours of concrete deliveries at the Pyrmont East site to ensure concrete quality requirements and design specifications can be achieved. Concrete pumping for the crossover and station cavern inverts has been relocated from the Pyrmont East shed to Union Street adjacent to the Pyrmont East site due to space requirements associated with the concrete pumping equipment required to achieve the pumping rate. The pours will be completed over 9 weeks, instead of 19 weeks as outlined in the Pyrmont DNVIS.

The pours associated with the crossover and station cavern inverts are planned to be completed within 10 to 15 hours, between 7 am and 10 pm. On four occasions (compared to 3 occasions identified in the Pyrmont DNVIS) there will be a need for concrete pours to occur during the night period.

Updated details of the concrete pours associated with the crossover and station cavern inverts and likely OOHW requirements are summarised in Table 2-2.

Table 2-2: Large concrete pour out-of-hours work requirements

Concrete pour location	Approx Start Date (duration)	Frequency	Working hours*	Construction hours
Crossover & Station Cavern Inverts	October 2025 (9 weeks)	24 pours in 9 weeks = 2-5 pours/week	12no. x 14 hours pour	Standard hours + OOHW (D/E)
			8no. x 15 hours pour	Standard hours + OOHW (D/E)
			2no. x 23 hours pour	Standard hours + OOHW (D/E/N)
			2no. x 25 hour pour	Standard hours + OOHW (D/E/N)

Note: * Standard construction hours = 11 hours (7am to 6pm, weekdays); Evening (E) = 4 hours (6pm to 10pm); Night (N) = 9 hours (10pm to 7am, weekdays)

Text in blue represents revised details from Pyrmont DNVIS

EPL L5.16 has been approved by the EPA (6/6/2025) for delivery of materials to support tunnelling between 10:00 pm and 7:00 am provided deliveries are unloaded inside the acoustic shed. This will include the delivery of concrete for large concrete pours as described above, subject to variation to allow the delivery to occur outside the shed on Union Street.

3 Construction noise objectives

The DNVIS Section 3 describes the Land Use Survey and Noise Catchment Areas used to identify sensitive receivers potentially impacted by the Project and establish receiver groups for the purpose of assessment and management of impact.

Construction airborne noise objectives are detailed in the CNVS Section 2. A summary of the objectives as applicable to the Pyrmont Station works is provided in Table 4.1 of the DNVIS. Construction noise objectives specific to these works and sensitive receivers and noise management levels (NMLs) are presented in Table B1. All reasonable and feasible mitigation measures will be implemented to reduce noise impacts from the works towards (or below) the NMLs.

4 Construction airborne noise impacts

The airborne noise prediction methodology is consistent with the DNVIS (Section 5.1). The assessed construction scenarios are presented in Table 4-1. Assumptions regarding construction activities, plant and equipment and hours of operation for works assessed in this Addendum are presented in APPENDIX C, including limitations on plant operating beyond 10:00 PM.

Table 4-1: Assessed construction scenarios

Construction activity	Scenario ID	High impact item	Vibration significant item
Western worksite			
Post TBM: TBM Support PYR-E (activities as per Pyrmont DNVIS	SW-MTS-TBM	-	-

Construction activity	Scenario ID	High impact item	Vibration significant item
Eastern worksite			
Post TBM: TBM Support PYR-E	SW-MTS-TBM	-	-
Post-TBM: Revised Invert concrete pours from Union St (no mitigation)*	SW-MTL-TBM	-	-
Post-TBM: Revised Invert concrete pours from Union St (mitigated)*	SW-MTL-TBM-M	-	-

NOTE: * Tunnelling support at Pyrmont West and East (assessment ref: SW-MTS-TBM) occurs concurrently with invert concrete pours.

4.1 Predicted noise levels

Airborne noise impacts during construction works have been predicted and compared to the noise management levels (NMLs). A receiver is considered construction noise affected when the predicted construction noise level is above the NML.

Table 4-2: Key to the predicted construction airborne noise results tables

Assessment	Time of day	Key			
$L_{Aeq(15min)}$	Standard hours[1] or Outside standard hours	0-10 dB(A) above NML (green)	11-20 dB(A) above NML (yellow)	21-30 dB(A) above NML (orange)	>30 dB(A) above NML (purple)
Sleep disturbance	Night only	$L_{Aeq,15min}$ above 40 dB(A) or RBL plus 5 dB, whichever is the greater (yellow)		L_{Amax} above 52 dB(A) or RBL plus 15 dB, whichever is the greater (purple)	

Notes: 1. Highly noise affected (HNA) which is greater than 75dB(A) during standard construction hours is shown with Bold text and applies to residential receiver buildings only.

Table 4-3 and Table 4-4 presents a summary of the number of residential receivers and 'other sensitive receivers' (in use) likely to be noise affected by the additional activity associated with the revised works. The tables are colour coded to indicate how much the predicted noise level is above the NML and the corresponding perceived noise impact, based on the CNVS, as noted in Table 4-2. Predicted noise levels are presented in APPENDIX D.

Table 4-3: Number of receiver buildings over the airborne noise management level (all NCAs) – residential receivers

Worksite	Construction activity	Assessment reference[1]	Highly noise affected[2, 3]	Day (standard hours)[2]				Day (outside standard hours)[2]				Evening[2]				Night[2]				Sleep disturbance[3]	
			L_{Aeq}	L_{Aeq}				L_{Aeq}				L_{Aeq}				L_{Aeq}				L_{Aeq}	L_{Amax}
			> 75 dB(A)	1-2 dB(A)	3-10 dB(A)	11-20 dB(A)	> 20 dB(A)	1-2 dB(A)	3- 10 dB(A)	10-20 dB(A)	> 20 dB(A)	1- 2 dB(A)	2- 5 dB(A)	5-10 dB(A)	> 10 dB(A)	1-2 dB(A)	2-5 dB(A)	5-10 dB(A)	> 10 dB(A)	> 40 or RBL+5 dB(A)	> 52 or RBL+15 dB(A)
Site wide (Pyrmont West and Pyrmont East, with shed)	Mined tunnelling and associated activities	SW-MTS	0	1	0	0	0	7	2	0	0	4	8	2	0	6	7	1	0	14	5 (18)[3]
	Mined tunnel lining, inc. concrete delivery	SW-MTL	0	0	0	0	0	0	0	0	0	3	1	0	0	8	4	0	0	12	5 (18)[3]
	Post TBM: TBM Support PYR-E	SW-MTS-TBM	0	1	0	0	0	5	4	0	0	4	8	4	0	5	9	1	0	15	5 (18)[3]
	Post-TBM: Revised Invert concrete pours from Union St (no mitigation)	SW-MTL-TBM	6	8	1	0	0	10	22	4	5	12	15	17	14	7	19	23	14	63	9 (22)[3]
	Post-TBM: Revised Invert concrete pours from Union St (mitigated)	SW-MTL-TBM-M	0	9	1	0	0	6	9	5	0	4	8	6	8	8	8	3	9	27	9 (22)[3]

Note: Construction noise level cells are shaded based upon the predicted worst case NML exceedance in accordance with the key presented in Table 5.2. Grey text indicates predicted impacts from DNVIS.

1. For detail, refer to Table C1 in APPENDIX C
2. Highly noise affected applies to residential receivers, as per the ICNG.
3. Number in brackets (X) for sleep disturbance total properties (from PYR-E and PYR-W activity at night) potentially exposed to L_{max} noise levels above sleep disturbance screening level. Number outside brackets is from PYR-E only.

Table 4-4: Number of other sensitive receivers over the airborne noise management levels (all NCAs)

Stage	Construction activity	Assessment reference	Commercial[1,2]				Childcare[1]				Educational[1]				Recreational[1]				Places of worship[1]				Hotel/Motel/ Hostel[1]				Recording Studio[1]			
			1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)
Site wide (Pyrmont West and Pyrmont East, with shed)	Mined tunnelling and associated activities	SW-MTS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
	Mined tunnel lining, inc. concrete delivery	SW-MTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Post TBM: TBM Support PYR-E	SW-MTS-TBM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
	Post-TBM: Revised Invert concrete pours from Union St (no mitigation)	SW-MTL-TBM	4	3	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0
	Post-TBM: Revised Invert concrete pours from Union St (mitigated)	SW-MTL-TBM-M	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0

Note: Highly noise affected does not apply to OSRs, as per the ICNG. Grey text indicates predicted impacts from DNVIS

1. Recording studios assume facade attenuation 30 dB. For more detail on specific impacts to receivers refer to Appendix D (Table D.1)
2. Impacts only applicable when facility is in use.

4.1.1 Standard hours

The predicted noise levels for the TBM Support from Pyrmont East during standard hours indicate there will be a marginal (up to 1 dB) increase in noise from the Pyrmont East site. There are no additional noise affected receivers.

The invert concrete pours in Union Street will result in up to 15 construction noise affected residential receiver buildings if no mitigation measures are implemented. All reasonable and feasible mitigation measures have been considered (refer to Section 4.2). By implementing all reasonable and feasible mitigation measures, predicted noise levels are significantly reduced, by up to 15 dB. Up to 10 residential receiver buildings would be construction noise affected during standard construction hours, with 9 of those residential receivers predicted to be within 2 dB of the NML.

Up to four commercial receivers, one hotel (The Sebel) and one recording studio are predicted to be construction noise affected should they be occupied during the Invert concrete pours.

Reasonable and feasible physical noise mitigation measures in addition to the measures identified in the Pyrmont DNVIS (refer to Section 4.2) are being implemented to reduce noise towards the NML. The identified noise affected receivers above are expected to be within 5 dB or below NML, with physical mitigation measures in place.

4.1.2 Out of hours work

The predicted noise levels for the TBM Support from Pyrmont East outside standard hours indicate there will be a marginal (up to 1 dB) increase in noise from the Pyrmont East site during the evening, mostly from tunnel material deliveries to the upper deck. This activity ceases at 10 pm, so there is minimal change to the predicted impacts after 10 pm. From Table C1 in APPENDIX C, after 10 pm there will be fewer heavy vehicle deliveries to the shed, compared with deliveries and spoil handling considered for mined tunnelling support (i.e. 2 per hour, compared to 2 to 6 per hour under the EPL trial). Predicted impacts are similar to the predicted impacts in the Pyrmont DNVIS, however the likely number of events that potentially exceed the sleep disturbance screening level after 10 pm is significantly less.

There are no additional noise affected receivers.

The cavern invert pour in Union Street will result in up to 63 construction noise affected residential receiver buildings if no mitigation measures are implemented. All reasonable and feasible mitigation measures have been considered (refer to Section 4.2). By implementing all reasonable and feasible mitigation measures, predicted noise levels are significantly reduced, by up to 15 dB. Up to 28 residential receiver buildings would be construction noise affected outside standard construction hours, with 8 of those residential receivers predicted to be within 2 dB of the NML.

Physical noise mitigation measures in addition to the measures identified in the Pyrmont DNVIS (refer to Section 4.2) are being implemented to reduce noise towards the NML. The identified noise affected

receivers above are expected to be within 10 dB or below NML, with physical mitigation measures in place.

4.1.3 Sleep disturbance

There is no change in the predicted L_{Amax} noise levels from the TBM Support activities from Pyrmont East. As per the Pyrmont DNVIS, up to eighteen (18) residential receivers may be exposed to noise levels above the sleep disturbance screening level, five (5) associated with truck movements at Pyrmont East, the remainder from truck movements at Pyrmont West. There will be no sleep disturbance associated with TBM consumables deliveries, as the works will stop between 10pm and 7am.

The cavern invert pour in Union Street will result in an additional four residential receiver buildings (compared to TBM Support activities) potentially exposed to noise levels above the sleep disturbance screening level. These receivers are also exposed to noise from the activity on site. It is noted that over the 9 week concrete pour work period, concrete pours occur on a total of four nights.

4.2 Mitigation and management measures

4.2.1 Specific mitigation measures

In addition to the mitigation and management measures outlined in Section 9 of the DNVIS, the following specific mitigation measures will be implemented as applicable during the proposed OOH works, taking into consideration industry best practice methods in accordance with Condition D28 of the Planning Approval.

Table 4-5: Specific mitigation measures

Control measure	Description of the control measure	Feasible/ reasonable test	Adopted?
Post TBM: TBM Support PYR-E (SW-MTS-TBM)			
Limit OOHW activities identified in Table 2.1	OOH works would be limited to manage noise emission from site to the plant and activities nominated in Table C.1A: PYRMONT STATION (Post TBM – TBM support from PYR-E shed)	This measure could be feasibly and reasonably implemented.	Yes
Works will be contained within the acoustic shed and shaft.	TBM support works will mostly be contained within the acoustic shed (see Pyrmont DNVIS Table C4) and shaft during OOHW, as noted in Table C1A.	This measure could be feasibly and reasonably be implemented.	Yes
Acoustic shed rapid roller door openings.	During works, the rapid roller door openings of the acoustic shed (see Pyrmont DNVIS Table C4) will be closed, during OOHW period, except to allow vehicle entry/egress.	This measure could be feasibly and reasonably be implemented.	Yes
Smooth access driveways	Access driveways to the worksites will be maintained smooth, to minimise the occurrence of clangs or bangs as trucks enter the worksite	This measure could be feasibly and reasonably be implemented.	Yes
Opening in upper deck closed at night	Opening in upper deck for tunnelling deliveries is to be closed between 10pm and 7am by covering with an acoustic cover (see Table C4A in APPENDIX C) to limit noise emission from works within the acoustic shed and at the bottom of the shaft.	This measure could be feasibly and reasonably be implemented.	Yes

Control measure	Description of the control measure	Feasible/ reasonable test	Adopted?
Deliveries to upper deck limited at night	No tunnel materials deliveries to upper deck between 10pm and 7am (see Table C1A in APPENDIX C).	This measure could be feasibly and reasonably be implemented.	Yes
Post-TBM: Revised Invert concrete pours from Union St (mitigated) (SW-MTL-TBM-M)			
Limit OOHW activities identified in Table 2.1	OOH works would be limited to manage noise emission from site to the plant and activities nominated in Table C.1B: PYRMONT STATION (Post TBM - Invert concrete pours outside PYR-E shed).	This measure could be feasibly and reasonably implemented.	Yes
Replace diesel concrete line pumps with electric	Noise from the line pump is mostly generated by the swing tube pushing the concrete through the pump, not the diesel engine, so no noise benefit from electric pump. In addition, the electric pump would require a large diesel generator with a similar engine size as the pump.	This measure is not reasonable as there is not sufficient noise benefit from the alternative pump.	No
Acoustic shed for Union Street worksite	Acoustic shed to cover entire Union Street worksite, enclosing all plant items with sound insulation/absorption specifications designed by Renzo Tonin & Associates.	Not feasible to construct an acoustic shed on the site large enough to house all plant items.	No
Acoustic enclosure for concrete line pumps	Temporary acoustic enclosure to completely enclose concrete line pumps (see Figure C1B and Table C4A in APPENDIX C).	This measure could be feasibly and reasonably be implemented.	Yes
Acoustic enclosure for concrete truck discharge point and washout stations	Expand temporary acoustic enclosure for concrete line pumps to completely enclose pump and concrete agitator truck during discharge to pump. Similar enclosure for wash out station and concrete agitator truck.	This measure is not feasible as there is insufficient space on site to accommodate the larger enclosures, whilst maintaining access to site	No
Temporary noise barrier (4m) at western end of Union Street worksite	Temporary noise barrier 4 metres high located at western end of Union Street worksite to shield noise to sensitive receivers to the west on Unions Street and Edward Street (see Figure C1B and Table C3A in APPENDIX C).	This measure could be feasibly and reasonably be implemented.	Yes
Relocate concrete testing to Pyrmont West acoustic shed	Concrete testing must be completed immediately prior to the concrete being poured on site for quality control. This creates an additional concrete discharge point within the Union Street worksite. Relocation of the test facility to inside the Pyrmont West acoustic shed would reduce this noise.	This measure is not feasible as there is insufficient space within the Pyrmont West acoustic shed during the day/ evening period. For the night pours, this measure would increase the number of residential receivers potentially exposed to sleep disturbance impacts.	No
Location of concrete test facility	The concrete test facility and discharge point should be located as close as practicable to the temporary noise barrier (4m) at western end of Union Street worksite to maximise to noise shielding benefit of the noise barrier.	This measure could be feasibly and reasonably be implemented.	Yes
During night pours spin to agitator bowls on slow rotation during concrete wash out	Limit noise emission from concrete washout during four long pours that extend to the night period. After 10:00 PM concrete wash out will be undertaken with the agitator bowls on slow rotation only (i.e. no high speed rotation) with a hose. Drivers will complete a thorough wash out back at the concrete supply yard (if necessary).	This measure could be feasibly and reasonably be implemented.	Yes

Control measure	Description of the control measure	Feasible/ reasonable test	Adopted?
Low pressure hose for concrete washout	All concrete washouts will be undertaken using a low pressure hose only.	This measure could be feasibly and reasonably be implemented.	Yes
Provide respite from concrete pours at night	Provide a minimum of 2 nights respite following each 24 hour pour.	This measure could be feasibly and reasonably be implemented.	Yes
Limit segment deliveries at night during long pour	There are four planned long invert concrete pours, where works will extend into the night period (i.e. after 10:00 PM). On these four nights, segment deliveries will be to the Pyrmont East shed will be stopped prior to 10:00 PM to reduce the total number of heavy vehicle movements on Edward Street during the night period	This measure is not feasible. Ceasing segment deliveries at 10pm would result in the TBM operation ceasing operation dure to the limited storage space for TBM segments in the Pyrmont shaft.	No
Sitewide			
Switch off plant not in use.	Any plant not in use for an extended period (e.g. delivery trucks) would be switched off and not left idling on site.	This measure could be feasibly and reasonably be implemented.	Yes
Traffic control to manage traffic on Edward Street and Pyrmont Bridge Road	Use traffic control to manage traffic on Edward Street so that delivery trucks can directly access - the Pyrmont East shed - Union Street worksite (concrete deliveries). from Edward Street and egress onto Pyrmont Bridge Road without coming to a stop.	This measure could be feasibly and reasonably be implemented.	Yes
Alternative audible alarms, such as 'quackers'	All plant would be fitted with non-tonal audible alarms as a minimum.	This measure could be feasibly and reasonably be implemented.	Yes
Toolbox talks	Toolbox Talks will be provided to all personnel involved in the OOH works (as per the DNVIS), specifically targeted to manage the noise impacts from tunnelling support deliveries. Toolbox talks should encourage employees to limit the occurrence of high instantaneous noise sources that may trigger sleep disturbance by following good behavioural practices, including: - No unnecessary shouting or loud stereos/radios on site. - No dropping of materials from height, throwing of metal items and slamming of doors. - No unnecessary revving of plant and vehicle engines. - No unnecessary use of compression engine braking unless required for safety	This measure could be feasibly and reasonably be implemented.	Yes

4.2.2 Additional noise mitigation measures

The steps to be carried out to determine the additional airborne noise management measures to be implemented are identified in Section 9.4.1 of the DNVIS. Prior to the commencement of works, receivers identified in APPENDIX D will be notified to advise that noise from the works may at times be audible. Additional airborne noise management measures will be implemented as per Table D.3.

4.2.3 Consultation with noise affected receivers

The following proposed actions will be completed by the Communications Team prior to the TBM support activities from Pyrmont East and the revised invert concrete pours in Union Street. JCG JV will start proactively engaging with stakeholders prior to the activities occurring and in accordance with the CNVS. Further details regarding consultation completed to date are provided in APPENDIX E.

Table 4-6: Proposed consultation plan prior to commencement of and during OOHW

Date	Item	Status
April 25	Monthly update	Ongoing
April 25	Install flyers in building foyers	Completed
One week prior	Work notification	Ongoing
One week prior	Weekly email update	Ongoing
One week prior	Direct email to residents and businesses	Ongoing
One day prior (and as required)	Text message	Ongoing
Ongoing	Weekly email updates – work updates	Commenced, ongoing

4.2.4 Attended airborne noise monitoring

Consistent with Section 9.6.1 of the DNVIS, attended noise monitoring is to be undertaken to verify that noise levels resulting from the TBM support activities from Pyrmont East are in accordance with (or below) the levels predicted in this report and confirm that all reasonable and reasonable mitigation measures detailed in Section 4.2.1 and Section 9.3 of the DNVIS have been implemented.

Attended noise monitoring will be completed at the nominated receiver locations, subject to gaining access to properties. Where access to properties is denied, monitoring will be undertaken in publicly accessible areas on or near the nominated receivers. The nominated monitoring locations are:

Table 4-7: Nominated verification monitoring locations

Type of monitoring	NCA/ Receiver type	Nominated receiver address
Unattended	PYR-E1 FIXED RTM	69 EDWARD STREET PYRMONT, NSW (balcony)
Unattended	PYR-E2 FIXED RTM	1-5 HARWOOD STREET, PYRMONT, NSW (rooftop balcony)
Attended	NCA04	63 EDWARD STREET PYRMONT, NSW
Attended	NCA04	33 UNION STREET PYRMONT, NSW
Attended	NCA05	1-5 HARWOOD STREET, PYRMONT, NSW
Attended	NCA05	1-9 PYRMONT BRIDGE ROAD, PYRMONT, NSW

Verification monitoring will be consistent with the DNVIS and the CNVMP (Appendix A), supplemented with the following verification process:

1. Site noise level checks

Noise monitoring would be undertaken on site to confirm plant sound power levels are consistent with (or below) the assumptions in Table C1A and C1B in APPENDIX C. Noise monitoring would be conducted during the daytime to confirm noise levels from plant items are at or below the levels prescribed in Table C1A and C1B before commencing use during the OOHW period. If measured noise levels are above the levels reported in Table C1, additional mitigation measures will be considered (where reasonable and feasible) to reduce noise levels from the identified source prior to its operation during the OOHW period or manage impacts as described in Section 4.2.2.

2. Initial and ongoing noise checks at receiver monitoring locations
Noise monitoring would be undertaken and compared to the predicted noise levels and the noise management levels for the evening and night period. Site inspection should be undertaken to confirm that all reasonable and feasible mitigation measures detailed in Section 4.2.1 above and Section 9.3 of the DNVIS have been implemented.

5 Impact classification

The impact classification from Section 10 of the DNVIS has been reviewed taking into consideration the outcomes of this Addendum assessment report. The predicted noise levels summarised in Section 4.1 indicate there is minimal change in noise impact. There is no change in ground-borne noise, vibration or traffic noise impact as a result of the works. Impacted receivers are consistent with those identified as construction noise impacted in the DNVIS. The duration of the TBM support works, 4 months from July 2025 (as noted in Table C1 in APPENDIX C of this Addendum) is within the duration of Mined tunnelling and associated activities (Caverns) – Cavern excavation and support (SW-MTS) assessed in the DNVIS, 19 months from July 2024 (as noted in Table C1-2 in APPENDIX C of the DNVIS).

Impact classification should also consider potential construction fatigue in relation to receivers impacted by the works assessed in this Addendum, compared with the DNVIS. As there is no significant change to the overall duration and extent of impact from mined tunnelling support activities assessed in the DNVIS, the new TBM support activities are unlikely to increase construction fatigue.

The impact classification for the TBM support works from Pyrmont East is **low** to **moderate** for the consistent with the classification in the DNVIS. The impact classification for the Revised Invert concrete pours from Union St (mitigated) is **low** to **moderate** during the standard hours and evening period consistent with the classification in the DNVIS. During the four long concrete pours the impact classification is considered **moderate** as the number of nights have been limited to four in total, and there will be 2 nights of respite (or more) between each long pour that extends into the night period.

Whilst predicted noise levels from the OOHW were found to exceed the NMLs, the impacts will be managed through the mitigation and management measures outlined in Section 9 of the DNVIS and Section 4.2 of this Addendum report, including suitable community notification and additional mitigation measures (as noted in table D3 in APPENDIX D) regarding the works and noise monitoring to verify noise levels.

6 Conclusion

In conclusion, works associated with the following construction activities have been described in this Addendum DNVIS to identify potential environmental risks associated with construction noise and vibration:

- commencement of the TBM support activities, including segment deliveries and consumables to Pyrmont East; and
- Invert concrete pours to be facilitated from the Union Street worksite (including delivery of concrete to Union Street).

Construction noise and vibration objectives have been established in the DNVIS, consistent with the conditions of approval for the Project and the EIS.

Construction airborne noise

The predicted airborne noise levels during **TBM support activities** were found to be consistent with the predicted noise levels in the DNVIS, with 1 dB increase at some receivers during the day (standard hours) and evening, mostly from tunnel material deliveries to the upper deck. This change in impact is unlikely to be noticeable. Deliveries to Pyrmont East after 10 pm are anticipated to be less than what was assessed in the Pyrmont DNVIS (i.e. 2 per hour, compared to 2 to 6 per hour under the EPL trial assessed in the Pyrmont DNVIS). Predicted impacts are similar to the predicted impacts in the Pyrmont DNVIS, however the likely number of events that potentially exceed the sleep disturbance screening level after 10 pm is significantly less. There are no other additional noise affected receivers.

Airborne noise impacts will be managed through the mitigation and management measures outlined in Section 9 of the DNVIS and Section 4.2 of this Addendum report, including implementing community notification regarding potential impacts from the works.

The predicted airborne noise levels during **invert concrete pours in Union Street** were found to be higher than the predicted noise levels in the DNVIS, as the works will be undertaken outside the acoustic shed. Reasonable and feasible physical noise mitigation measures in addition to the measures identified in the Pyrmont DNVIS (refer to Section 4.2) will be implemented to reduce noise towards the NML. The identified noise affected receivers above are mostly within 10 dB or below NML, with physical mitigation measures in place. There are nine residential receiver buildings and 1 hotel where predicted noise levels (with mitigation) are more than 10 dB above the NML. There is 1 receiver where predicted noise levels (with mitigation) are more than 20 dB above the NML. Additional mitigation measures are identified in Table D.3 (APPENDIX D).

Construction ground-borne noise and vibration

There are no vibration significant plant or equipment proposed to be used during the OOH works. Ground-borne noise and vibration impacts are unchanged from the impacts presented in the DNVIS.

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
11.04.2025	Initial issue	0,1	2	T. Gowen	-	M. Tabacchi
19.05.2025	Updated following SM/AA/ER review	3 (redacted)	4	T. Gowen	-	M. Tabacchi
30.05.2025	Updated to address SM/AA comments	-	5	T. Gowen	-	M. Tabacchi
10.06.2025	Minor edits to address AA comments	-	6	T. Gowen	-	M. Tabacchi
27.06.2025	Update to include revised invert concrete pours on Union Street	6.1	7	T. Gowen	-	M. Tabacchi
25.07.2025	Respond to SM/ER/AA comments	7.1	8	T. Gowen	-	M. Tabacchi

File Path: R:\AssocSydProjects\TM351-TM400\TM372 mt SMW - Eastern Tunnelling Pkge\1 Docs\02 PYRMONT\TM372-02-1-02F20 SMW-ETP_ADD-DNVIS-PYR_TBM Support(r7).docx

Important Disclaimers:

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

This document is issued subject to review and authorisation by the suitably qualified and experienced person named in the last column above. If no name appears, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

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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.

External cladding: No claims are made and no liability is accepted in respect of any external wall and/or roof systems (eg facade / cladding materials, insulation etc) that are: (a) not compliant with or do not conform to any relevant non-acoustic legislation, regulation, standard, instructions or Building Codes; or (b) installed, applied, specified or utilised in such a manner that is not compliant with or does not conform to any relevant non-acoustic legislation, regulation, standard, instructions or Building Codes.

References

[1] Renzo Tonin & Associates 2025 Sydney Metro West Eastern Tunnelling Package - Detailed Noise and Vibration Impact Statement – Pyrmont Station – 5 March 2024 (TM372-02-1-02F01 SMW-ETP_DNVIS-PYR (rev06))

[2] Renzo Tonin & Associates 2025 Sydney Metro West Eastern Tunnelling Package - Detailed Noise and Vibration Impact Statement – Tunnelling – 19 October 2023 (TM372-02-1-04F01 SMW-ETP_DNVIS-TUN (rev05))

[3] Sydney Metro Construction Noise and Vibration Standard Version 4.3 (SM-20-00098866) – 4 November 2020

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[8] Department of Environment and Climate Change 2009 NSW Interim Construction Noise Guideline (ICNG)

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[11] Department of Environment Conservation NSW 2006 Assessing Vibration; a technical guideline

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[14] Australian Standard AS 2187.2-2006 Explosives - Storage and Use - Use of Explosives

[15] British Standard BS 7385 Part2-1993, Evaluation and measurements for vibration in buildings Part 2

[16] German Standard DIN 4150-3: 2016-12, Structural vibration - Effects of vibration on structures, December 2016

[17] ASHRAE Applications Handbook (SI) 2003, Chapter 47 Sound and Vibration Control, pp47.39-47.40

[18] Australian Standard 2834-1995 Computer Accommodation, Chapter 2.9 Vibration, p16

[19] Australian Standard AS/NZS 2107:2000 Acoustics - Recommended design sound levels and reverberation times for building interiors

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 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 Leq 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 Sensitive receivers and noise management levels

B.1 NCAs and sensitive receiver identification

Plot Date: 25/01/24 - 13:49 Layout: TM372 LU Template
Atlas feature: TM372 Large Overall LU atlas
GIS File: R:\AssocSyd\Projects\TM351-TNM400\TM372 mt SMW - Eastern Tunnelling Page 5 Calcs t00 General\00 GIS\TM372-SS.qgz

LEGEND

Noise Sensitive Receiver

- Residential
- Mixed use
- Commercial
- Industrial
- Hotel/Motel/Hostel
- Medical facility
- Place of Worship
- Community centre
- Recording studio
- Library/Museum
- Childcare
- Educational
- Theatre/Auditorium
- Cinema
- Laboratory
- Flight simulator
- Animal Enclosure
- Recreational - Passive
- Recreational - Active
- Other
- Heritage

- Tunnel Alignment
- Project Worksites
- Project NCAs

NCA	NML DS	NML DO	NML E	NML N
NCA04	60	55	52	50
NCA05	62	57	54	51
NCA06	71	66	61	57

NCA: Noise Catchment Area
NML: Noise Management Level
D(S): standard construction hours from 7 am to 6 pm Monday to Friday and from 8 am to 6 pm Saturday
D(O): out-of-hours day period from 8 am to 6 pm Sunday and Public holidays - OOHW P1
E: evening period from 6 pm to 10 pm Monday to Sunday - OOHW P1
N: night-time period from 10 pm to 7 am Monday to Friday, from 10 pm am to 8 am Saturday, Sunday and Public holidays - OOHW P2

REV	BY	DATE	DESCRIPTION	APPROVED
r2	SS	25/01/24	Landuse Update	TG
r1	SS	18/10/23	Heritage update	TG
r0	DA	03/04/23	Prepare figures	TG

A3 Original | Co-ordinate System: MGA Zone 56

0 50 100 150 m
1:3,000 At A3
FULL SIZE A3, REDUCED TO A4
NOTE: Do not scale from this drawing.

CLIENT
SYDNEY METRO WEST
JOHN HOLLAND CPB Ghella

ACOUSTIC CONSULTANT
RENZO TONIN & ASSOCIATES
inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

SYDNEY METRO WEST – EASTERN TUNNELLING PACKAGE
Hunter Street Station Site

Landuse, Worksites and NCAs

B.2 NCAs and noise management levels

PYRMONT STATION

Table B1: Noise Sensitive Receivers and Construction Noise Management Levels (airborne noise)

NCA	Receiver Type	Reference	Existing Noise Levels, dB(A)						Airborne NMLs based on ICNG (external)					Sleep Dist. L_{Amax}		Comments
		RBL	RBL Day	RBL Evening	RBL Night	LAeq_D	LAeq_E	LAeq_N	NMLD(S)	NMLD(O)	NMLE	NMLN	NMLMS	$L_{Aeq(15min)}$	L_{AFmax}	
Residential receivers																
NCA04	Predominantly Residential	B.04	50	47	45	56	50	47	60	55	52	50	53	50	60	Nearest worksite Pyrmont
NCA05	Predominantly Residential	B.05	52	49	46	61	59	56	62	57	54	51	54	51	61	Pyrmont
ICNG 'Other sensitive' receivers (NML applicable when in use)																
Classrooms at schools and other educational institutions									55	55	55	55	55	-	-	Source: ICNG, assuming a conservative façade loss of 10 dB(A)
Hospital wards and operating theatres									65	65	65	65	65	-	-	Source: ICNG, assuming a conservative façade loss of 20 dB(A)
Places of worship									55	55	55	55	55	-	-	Source: ICNG, assuming a conservative façade loss of 10 dB(A)
Passive recreation areas (e.g. area used for reading, meditation)									60	60	60	60	60	-	-	Source: ICNG
Active recreation areas (e.g. sports fields)									65	65	65	65	65	-	-	Source: ICNG
Commercial premises (including offices and retail outlets)									70	70	70	70	70	-	-	Source: ICNG
Industrial premises									75	75	75	75	75	-	-	Source: ICNG
Non-ICNG 'Other sensitive' receivers (GBNML applicable when in use)																
Hotel - daytime and evening									70	70	70	70	70	-	-	Source: CNVS Section 2.2.1 & AS2107 'maximum', assuming 20 dB(A) facade loss
Hotel - night-time									60	60	60	60	60	-	-	Source: CNVS Section 2.2.1 & AS2107 'maximum', assuming 20 dB(A) facade loss
Café/ Bar/ Restaurant									60	60	60	60	60	-	-	Source: CNVS Section 2.2.1 & AS2107 'maximum', assuming 10 dB(A) facade loss
Childcare centre (indoor sleeping areas)									55	55	55	55	55	-	-	Source: CNVS Section 2.2.1, assuming a conservative façade loss of 10 dB(A)
Childcare centre (play areas)									65	65	65	65	65	-	-	Source: CNVS Section 2.2.1
Public Building									60	60	60	60	60	-	-	Source: CNVS Section 2.2.1 & AS2107 'maximum', assuming 10 dB(A) facade loss
Studio building (music recording studio)									45	45	45	45	45	-	-	Source: CNVS Section 2.2.1 & AS2107 'maximum', assuming 20 dB(A) facade loss
Studio building (film or television studio)									50	50	50	50	50	-	-	Source: AS2107 'maximum', assuming 20 dB(A) facade loss
Theatre/ Auditorium									50	50	50	50	50	-	-	Source: CNVS Section 2.2.1 & AS2107 'maximum', assuming 20 dB(A) facade loss

Notes: D(S) - standard construction hours from 7 am to 6 pm Monday to Friday and from 8 am to 6 pm Saturday
D(O): out-of-hours day period from 8 am to 6 pm Sunday and Public holidays - OOHW P1
E: evening period from 6 pm to 10 pm Monday to Sunday - OOHW P1
N: night-time period from 10 pm to 7 am Monday to Friday, from 10 pm am to 8 am Saturday, Sunday and Public holidays - OOHW P2
MS: Morning shoulder: from 05:00 to 07:00 Monday to Friday, and from 06:00 to 08:00 Saturday, Sunday and Public holidays - OOHW P2

APPENDIX C Construction timetable/ activities/ management

C.1 Construction timetable/activities/equipment

Table C1A: Construction timetable/ activities/ equipment

PYRMONT STATION (Post TBM - TBM support from PYR-E shed)

Activity/ Work Area	Aspect	Plant/ Equipment (as provided by client)	Day	Evening	Night	Timing of Activity		Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant	Vibration intensive plant	Notes
			7am - 6pm	6pm - 10pm	10pm - 7am	Start Date	Duration	L_{Aeq}	Penalty	L_{Amax}			
Post-TBM	Tunnel Lining (segments)	Delivery truck	≤ 4 p.h.	≤ 4 p.h.	≤ 2 p.h.	Jul-25	4 months	100	-	109	-	-	Semi-trailers delivering segments to PYR-E Shed (No additional trucks to DNVIS)
TBM Support from PYR-E	INSIDE SHED/ SHAFT	Gantry Crane	2	2	2			106	-	110	-	-	Located in PYR-E shed (no change to DNVIS)
	Assessment ref: **SW-MTS-TBM**	Forklift (Diesel) 16t	1	1	1			99	-	103	-	-	Located at bottom of PYR-E shaft for east shaft logistics
	[Site wide (East & West sites, with shed)	EWP (Diesel)	2	2	2			96	-	99	-	-	Underground in tunnels (tunnel maintenance on day shift and night shift)
	tunnelling and associated activities of	Tunnel buggy	2	2	2			100	-	105	-	-	Running in the PYR-E Shaft and TBM tunnels 24/7
	rockbolting, shotcreting and mucking out;	Crane 40t Franna	1	1	1			100	-	104	-	-	Located within Cavern and PYR-E Shaft
	spoil haulage; delivery of material to directly	Crane 40t (electric, slewing)	1	1	1			104	-	111	-	-	Located within PYR-E Shaft during TBM launch
		Truck Movement (MSVs)	2 p.h.	2 p.h.	2 p.h.			102	-	109	-	-	Located within PYR-E Shaft and TBM tunnels
		MSV/Truck Horn		minimise	minimise			-	-	120	-	-	Broadband horn - e.g. BBS-tek. Within PYR-E shaft
	Other tunnelling materials/ consumables	Delivery truck (medium, rigid)	≤ 2 p.h.	≤ 2 p.h.	-			100	-	109	-	-	Deliver to upper deck. No deliveries between 10pm and 7am.
	[Outside shed. Deliveries via opening in	Crane 2.5t (Electric, Davit Arm)	1	1	-			90	-	111	-	-	Located adjacent to opening in upper deck. Used to unload trucks/ load material into
	upper deck to be covered 10 PM - 7AM.]	Forklift 2t	1	1	-			90	-	96	-	-	Located on upper deck to unload trucks

NOTE: Black text indicates works included in Pyrmont DNVIS. Blue text indicates update from DNVIS, assessed in this Addendum.

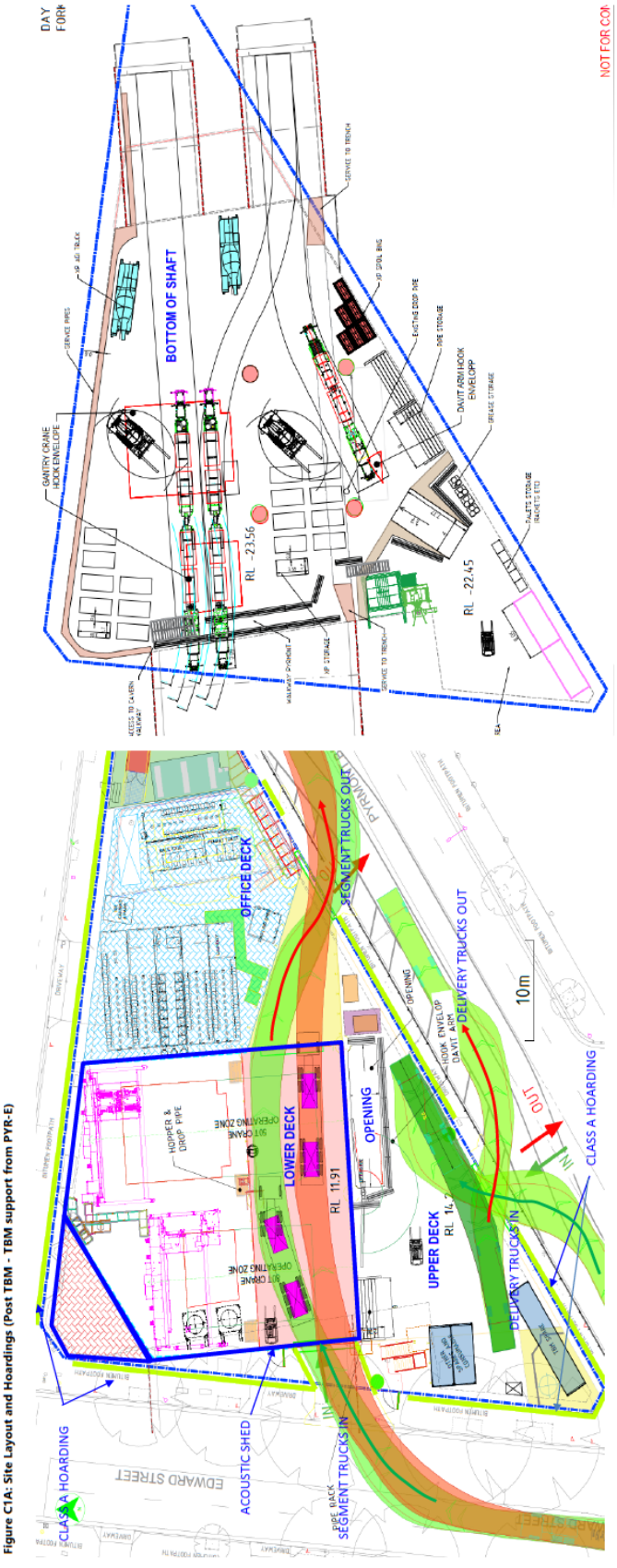

Figure C1A: Site Layout and Hoardings (Post TBM - TBM support from PYR-E)

Table C1B: Construction timetable/ activities/ equipment — **PYRMONT STATION (Post TBM - Invert lining outside PYR-E shed)**

Activity/ Work Area	Aspect	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Timing of Activity		Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant	Vibration intensive plant	Notes
				7am - 6pm	6pm - 10pm	10pm - 7am	Start Date	Duration	L_{Aeq}	Penalty	L_{Amax}			
Post-TBM	Cavern invert concrete pours	Stationary concrete pump 200 kW | 162 bar |	Stationary concrete pump 200 kW | 1	2	2	2**	Oct-26	9 weeks	123	-	125	-	-	Located on Union Street.
Revised invert concrete pours from Union Street	Assessment ref: **SW-MTL-TBM** (Site wide (East & West sites, with shed); Tunnel Lining (concreting) without shed, including delivery of concrete	Concrete vibrator	pneumatic vibrator	40	40	0			97	-	100	-	-	Underground, in cavern
		Concrete Agitator	Concrete road agitator	≤ 9 p.h.	≤ 7 p.h.	≤ 5 p.h.**			105	-	111	-	-	Enter via Union Street, discharge to line pump on Union Street.
		Forklift	Forklift	1	1	1**			99	-	103	-	-	Located on Union Street
		Concrete Agitator	Concrete wash out - high speed	2	2	-			105	-	111	-	-	Washout out with hose (not high pressure) on Union Street
		Concrete Agitator - low speed	Concrete wash out -slow rotation	-	-	2**			102	-	111	-	-	Washout out with hose (not high pressure) on Union Street. Full wash out completed back at batch plant during night period.

NOTE: Black text indicates works included in Pyrmont DNVIS. Blue text indicates update from DNVIS, assessed in this Addendum.
**** 10pm to 7am is for 4no. pours only.**

Figure C1B: Site Layout and Hoardings (Post TBM - Invert lining outside PYR-E shed)

PYRMONT STATION (Post TBM - Invert lining outside PYR-E shed)

Table C3A: Noise Wall / Hoarding Design Specifications

Noise wall reference	Location	Noise wall/ hoarding height	Proposed Construction	Acoustic Rating of Construction*	Building element key
TNB01	PYRMONT EAST Temporary noise barrier as shown in Addendum Figure C1	4 m	17 mm plywood hoarding OR RVT's Soundex Curtain - Lite Barrier	Rw24 Rw28	

Notes:

Noise barrier performance: Low - Rw 10-15; Medium - Rw 15-20; Medium-High - Rw 20-25; High - Rw 25; Very High - Rw 30

* estimated by calculations and/or reference to other similar barrier type data

GENERAL

- The specified 'required rating' must be achieved by the product selected.
- By way of explanation, the Sound Insulation Rating Rw is a measure of the noise reduction property of the assembly, a higher rating implying a higher sound reduction performance.
- Note that the Rw rating of systems measured as built on site (Rw Field Test) may be up to 5 points lower than the laboratory result.
- The sealing of all gaps is critical in a sound rated construction. Use only sealer approved by the acoustic consultant.
- Check design of all junction details with acoustic consultant prior to construction.
- Check the necessity for HOLD POINTS with the acoustic consultant to ensure that all building details have been correctly interpreted and constructed.
- The information provided in this table is subject to modification and review without notice.
- The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

Table C4A: Noise Shed / Enclosure Design Specifications

PYRMONT STATION (Post TBM - TBM support from PYR-E shed & Invert lining outside PYR-E shed)

Area to be Mitigated	Construction component	Reference ID	Indicative element construction	Building element key
TBM Support: Opening in Upper Deck - Cover	Cover (OPTIONS)	F019 F026	Lining - 2x17mm Plywood with acoustic foam on inside Acoustic curtains such as sonic curtain 5kg/m2 - Flexshield or equivalent	
Invert lining: Concrete pump acoustic enclosure	Walls	F063	SOUNDEX® Maxi Enclosure or equivalent	
	Roof	F063	SOUNDEX® Maxi Enclosure or equivalent	
	Openings (enclosure access opening)	-	Openings should face away from neighbours or have direct line of sight to receivers broken by a noise barrier .	

Notes:

1. The final level of noise reduction required from an acoustic shed / enclosure is dependent on a number of factors, however one important factor is whether or not there are noisy plant on site which cannot be acoustically treated and operate outside the acoustic shed / enclosure. Depending on the number and noise emissions of such plant, it may be necessary to apply greater acoustic treatment to the acoustic shed / enclosure in order to keep its noise contributions down so that the total noise emissions from site meet the set environmental noise limits at neighbouring receptors.

LEGEND * estimated by calculations and/or reference to other similar wall type data. The client is advised not to commit to materials which have not been tested in an approved laboratory or for which an opinion only is available. Testing materials is a component of the quality control of the design process and should be viewed as a priority because there is no guarantee the forecast results will be achieved thereby necessitating the use of an alternative which may affect the cost and timing of the project. No responsibility is taken for use of or reliance upon untested materials, estimates or opinions.

GENERAL

- The underside of the roof and (where possible) internal walls should be lined with acoustic insulation to reduce the build-up of sound inside the shed
- The specified performances must be achieved by the product selected.
- The sealing of all gaps is critical in a sound rated construction. Use only sealer approved by the acoustic consultant.
- Check design of all junction details with acoustic consultant prior to construction.
- Check the necessity for HOLD POINTS with the acoustic consultant to ensure that all building details have been correctly interpreted and constructed.
- The information provided in this table is subject to modification and review without notice.
- The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.
- Only the buildings elements noted in Table C4 and Table C4a have been assessed. It is assumed that all other items will not impact the acoustic properties, or can be sufficiently acoustically treated.

APPENDIX D Construction airborne noise impacts

D.1 Predicted noise levels

The detailed predicted levels have been provided to JCG in a spreadsheet table to more adequately mitigate and manage potential noise impacts.

D.2 Number of receivers above NMLs

The number of exceedances has been provided to JCG in a spreadsheet table.

D.3 Additional management measures

The additional management measures have been provided to JCG in a spreadsheet table to more adequately mitigate and manage potential noise impacts.

APPENDIX E Consultation Outcomes

Consultation details have been provided in a spreadsheet table.

ACOUSTICS ADVISOR ENDORSEMENT

SYDNEY METRO WEST (SSI 19238057)

Review of	**Eastern Tunnelling Package:** Detailed Noise and Vibration Impact Statement (DNVIS) addendum – Pyrmont Station – TBM Support from Pyrmont East	**Reviewed document reference:**	TM372-02-1-02F20 SMW-ETP ADD DNVIS PYR_TBM Support (r7) Rev 8 Dated 25 July 2025
Prepared by:	Larry Clark, Alternate Acoustics Advisor		
Date of issue:	31 July 2025		

As approved Alternate Acoustics Advisor for the Sydney Metro West project, I reviewed and commented on previous revisions of this DNVIS Addendum.

JCG has prepared this addendum to assess changes in the delivery of the scope of works assessed in the Pyrmont DNVIS and the Tunnelling DNVIS:

- Pyrmont West: No change to activities at Pyrmont West.
- Pyrmont East:
    - Construction methodology revised so that TBM is partly support from Pyrmont East, including:
        - Segments delivered to Pyrmont East acoustic shed
        - Deliveries of other tunnelling materials to Pyrmont East Upper deck
        - Opening in Upper Deck to allow other tunnelling materials to be lifted into shaft (7am to 10pm only)
    - Revised Invert concrete pours from Pyrmont East, which JCG has indicated are part of tunnelling
    - Tunnel Lining (concreting) without shed, i.e. delivery of concrete to Union Street

Approval for the works will require the Environment Protection Authority (EPA) to vary JCG's Environment Protection Licence.

I am satisfied that my comments, and those of Sydney Metro and the Environmental Representative (ER) have been adequately addressed in Revision 8, and I endorse this Addendum, subject of course to EPA's variation of JCG's EPL.

Larry Clark

Larry Clark, Metro West Alternate Acoustics Advisor