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CPB Ghella
[redacted]

SYDNEY METRO - WESTERN SYDNEY AIRPORT - STATION BOXES AND TUNNELLING WORKS - DNVIS Addendum Report - Aerotropolis (AEO) TBM Retrieval Works

1 Introduction

This technical memorandum is an addendum to the report *Detailed Noise and Vibration Impact Statement: Aerotropolis Core Station*[1] (Aerotropolis DNVIS). This addendum has been prepared on behalf of CPB Ghella Joint Venture (CPBG) in accordance with the Sydney Metro Construction Noise and Vibration Standard (CNVS)[2] for the construction of the Sydney Metro: Western Sydney Airport Project – Station Boxes and Tunnelling (SBT) Works (the Project). The DNVIS and this addendum have been prepared to satisfy SSI 10051 Infrastructure Condition of Approval (CoA) E47.

This Addendum has been prepared consistent with the Aerotropolis DNVIS to assess short duration works outside the scope of works assessed in the Aerotropolis DNVIS. . This includes additional plant and equipment, and the extension of works outside standard construction hours to include the night period, The works addressed in this Addendum DNVIS are described Section 2. Due to works being undertaken during and outside standard construction hours, the estimated timing for the TBM retrieval and disassembly is up to 3 months, which is less than the 4-month estimated for the completion of the works assessed in the DNVIS,

[1] *Sydney Metro – Western Sydney Airport – Station Boxes and Tunnelling Works, Detailed Noise and Vibration Impact Statement: Aerotropolis Core Station, reference: TM008-05-01F01 SMWSA-SBT_DNVIS-AEC, revision 7, dated 5 September 2023*
[2] *Sydney Metro Construction Noise and Vibration Standard Version 4.3 (SM-20-00098866) – 4 November 2020*

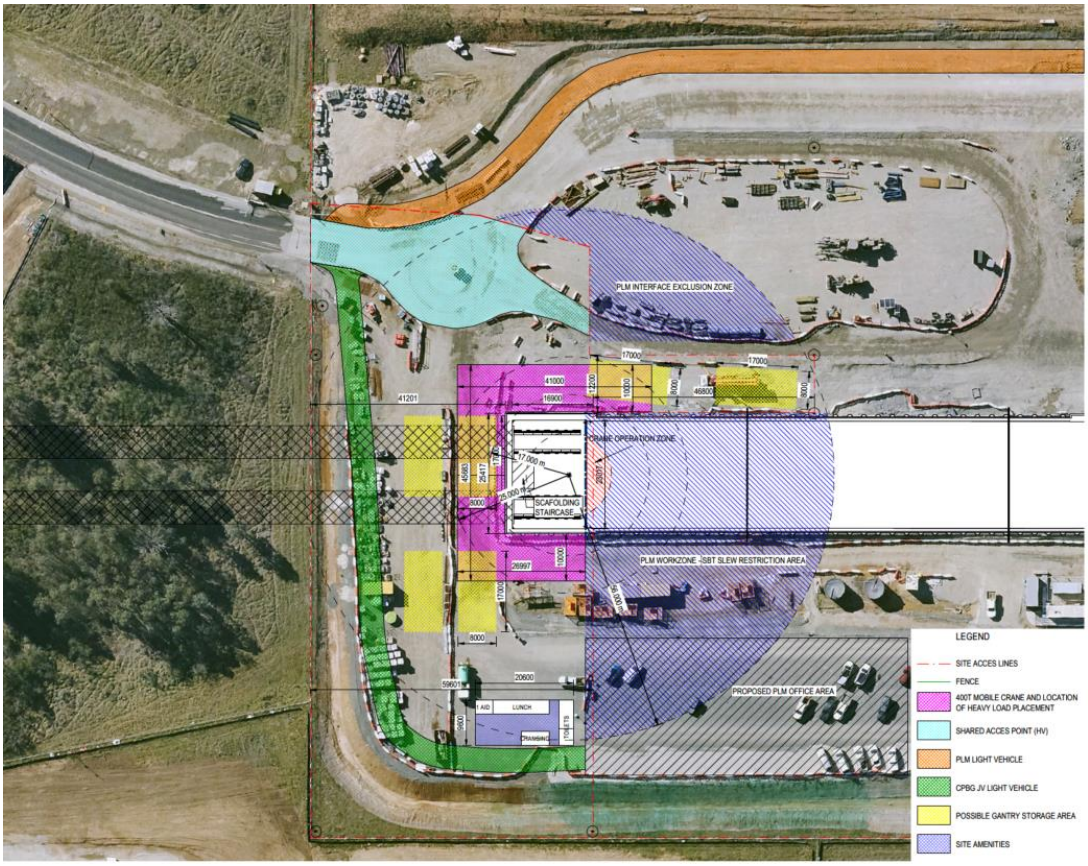
2 Construction works and hours

2.1 Construction works addressed in this Addendum DNVIS

CPBG has proposed undertaking TBM retrieval works at the Aerotropolis worksite. The TBM retrieval works will involve installing a tower crane and demobilising the TBM on site. The proposed TBM retrieval works are scheduled to be undertaken during standard construction hours and outside standard construction hours. The proposed works are anticipated to be completed in 11 weeks. The TBM retrieval work areas are shown in Figure 2.1 and in APPENDIX C.

This addendum to the DNVIS has been prepared to address the potential construction noise and vibration impacts from the proposed TBM retrieval works.

Figure 2.1: Aerotropolis TBM retrieval works



Key details regarding the location and layout of the noise generating plant that will operate during these works were informed by the Construction and Environmental Teams. Table 2-1 presents the list of plant proposed to be used for these works and their assumed sound power levels. The location of the works relative to nearby sensitive receivers is shown in APPENDIX C.

2.1.1 Construction traffic noise

Based on the proposed activities presented in Table 2-1, the construction traffic is consistent with construction generated traffic noise impacts assessed in the DNVIS. No further assessment is required.

2.1.2 Ground-borne noise and vibration

Sensitive receivers are more than 250m away from the proposed vibration intensive works (drilling tower crane anchors) during Aerotropolis TBM retrieval works. Ground-borne noise and vibration impact will be negligible. No further assessment is required.

Table 2-1: Construction timetable/activities/equipment

Aerotropolis - 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}			
Phase 1 - Site access to TBM retrieval area	400t crane	1	-	-	Mar-24	2 days	106	-	110	-	-	On surface: mobilisation of GMK4600 - 2 days
	Delivery trucks	4 per hour	4 per hour	4 per hour			106	-	111	-	-	On surface: counterweight just to deliver and will park up on site or leave as required. 2 trucks.
	Delivery trucks						106	-	111	-	-	On surface: to deliver and store steel modules
	Delivery trucks						106	-	111	-	-	On surface: strand delivery and grout delivery
	Drill rig	1	-	-			106	-	116	-	X	Within station box: to drill tower crane anchors
	7t telehandler	1	-	-			98	-	102	-	-	On surface: surface movements to crane
	5t forklift	1	-	-			99	-	103	-	-	On surface: surface movements to crane
	100t crane	1	-	-			104	-	108	-	-	On surface: mobile crane on surface for rescue cage setup
Phase 2 - Tower crane establishment and breakthrough preparation	400t crane	1	-	-	Mar-24	5-8 days	106	-	110	-	-	On surface: mobilisation of GMK4600 - 5-8 days.
	Delivery trucks	4 per hour	4 per hour	4 per hour			106	-	111	-	-	On surface: counterweight just to deliver and will park up on site or leave as required. 2 trucks.
	Delivery trucks						106	-	111	-	-	On surface: to deliver towers/car body/slew ring/jib sections/counter weights and other items. Up to 10 trucks per day.
	Delivery trucks						106	-	111	-	-	On surface: to deliver precast concrete blocks. Up to 10 trucks per day.
	7t telehandler	1	-	-			98	-	102	-	-	On surface: surface movements to crane
	7t telehandler	1	1	1			98	-	102	-	-	Within station box: placing modules and stillages
	Power hand tools	5	2	2			108	-	118	-	-	On surface and within station box: to build the tower crane, Power hand tools and compressor will not be used on the surface outside standard construction hours.
	Compressor	1	1	1			102	-	103	-	-	
	5t forklift	1	1	1			99	-	103	-	-	On surface: surface movements to crane
	Light vehicle	4 per hour	4 per hour	4 per hour			89	-	100	-	-	On surface: access for work force and supervision. Up to 10 light vehicles per day.
Phase 3 - Breakthrough and demobilisation of TBM 1340 and 1341	Tower crane 2480D	1	1	1	Mar-24	7-8 weeks	114 (104)	-	119 (109)	-	-	Tower crane in use. Tower crane will be mitigated to achieve a sound power level of 104 dB(A) re: 1 pW. *Best practice material handling as described in Table 4-3 would reduce the likelihood of L_{Amax} event occurring. Number in brackets represents mitigated L_{Aeq} and estimated L_{Amax} (managed).*
	OSOM trucks	4 per hour	4 per hour	4 per hour			106	-	111	-	-	On surface: this will be driven by permit process and may affect durations. 7 OSOM trucks are required.
	Delivery trucks						106	-	111	-	-	On surface: to move TBM gantries for 1338. Up to 10 trucks per day.
	Delivery trucks						106	-	111	-	-	On surface: to move TBM gantries for 1339. Up to 10 trucks per day.
	7t telehandler	1	-	-			98	-	102	-	-	On surface: surface movements to crane
	400t crane	1	- 1#	- 1#			106	-	108	-	-	On surface: removal of gantry pieces for transport #Required OOH to assist with loading TBM components onto OSD truck
	7t telehandler	1	-	-			98	-	102	-	-	On surface: surface to move materials for loading
	7t telehandler	1	1	1			98	-	102	-	-	Within station box: miscellaneous demobilisation movements
	34ft EWP	2	1	1			95	-	98	-	-	On surface: to unhook loads
	34ft EWP	1	1	1			95	-	98	-	-	Within station box
	Power hand tools	5	1	1			108	-	118	-	-	On surface and within station box: to dismantle components on site. Power hand tools and compressor will not be used on the surface outside standard construction hours.
	Compressor	1	1	1			102	-	103	-	-	
	Oxy torch	5	1	1			96	-	107	-	-	
	5t forklift	1	-	-			99	-	103	-	-	On surface: to move materials for loading
	Light vehicle	4 per hour	4 per hour	4 per hour			89	-	100	-	-	On surface: access for work force and supervision. Up to 10 light vehicles per day.
Phase 4 - Tower crane demobilisation and handover	400t crane	1	-	-	May-24	5 days	106	-	110	-	-	On surface: mobilisation of GMK4600 - use of crane 5 days
	Delivery trucks	2	2	2			106	-	111	-	-	On surface: counterweight just to deliver and will park up on site or leave as required. 2 trucks.
	7t telehandler	1	-	-			98	-	102	-	-	On surface: movements to crane
	bobcat	1	1	1			102	-	107	-	-	Within station box
	7t telehandler	1	-	-			98	-	102	-	-	On surface: to move materials for loading
	5t forklift	1	-	-			99	-	103	-	-	On surface: to move materials for loading
	Power hand tools	5	1	1			108	-	118	-	-	Within station box: to dismantle components on site. Power hand tools and compressor will not be used on the surface outside standard construction hours
	Compressor	1	1	1			102	-	103	-	-	
	Light vehicle	4 per hour	4 per hour	4 per hour			89	-	100	-	-	On surface: access for work force and supervision. Up to 10 light vehicles per day.

Notes: * also applies for Day (OOH) , i.e. Saturdays 1:00 pm to 6:00 pm and Sundays/ public holidays 8:00 am to 6:00 pm

2.2 Construction Hours

Construction hours are as reported in the DNVIS Section 2.2. The works assessed in this Addendum will be undertaken within and outside standard construction hours under the Environment Protection License (EPL) number 21672, in accordance with Planning Approval Condition E41(d).

2.2.1 Justification for OOHW

As detailed in Condition of Approval E41(d) and EPL 21672 Condition L5.10, the following prescribed activities are permitted to be undertaken 24 hours a day, 7 days a week:

- Tunnelling and ancillary support activities
- Delivery of material that is required to be delivered outside of standard construction hours

Works that require a Road Occupancy Licence (ROL), may be undertaken outside of standard construction hours should the Relevant Road Network Operator advise that carrying out the works and activities during standard construction hours would result in a high risk to road network operational performance.

The delivery of oversized plant structures or materials determined by the police or other authorised authorities to require special arrangements to transport along public roads may also occur outside of standard construction hours.

All reasonable and feasible mitigation measures will be implemented to reduce noise emissions to be below the NMLs.

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 Aerotropolis worksite is provided in Table 4.1 of the DNVIS. Construction noise objectives specific to these works are presented in Table B1 in APPENDIX B.

4 Construction airborne noise assessment

The airborne noise prediction methodology is consistent with the DNVIS (Section 5.1).

4.1 Predicted noise levels

Predicted construction noise levels at the closest noise sensitive receivers are summarised in Table 4.1 and Table 4.2 and compared to the ICNG NMLs (see APPENDIX B). Detailed noise predictions are compared to ICNG NMLs and presented in APPENDIX D. Note that predictions are based on the worst-case scenario and actual noise levels are likely to be lower than the predicted noise levels.

4.1.1 Standard construction hours

The results presented in Table 4.1 show that the residential receivers are predicted to experience noise levels above the corresponding NMLs during standard construction hours. Predicted noise levels are below the 'highly noise affected' threshold of 75 dB(A) at all residential receivers.

The noise predictions in Table 4.2 show that other sensitive receivers are predicted to experience noise levels below the corresponding NMLs when in use.

4.1.2 Out of hours work

The noise predictions in Table 4.1 show that the residential receivers are predicted to experience noise levels above the corresponding NMLs outside standard construction hours. All reasonable and feasible mitigation and management measures presented in Section 4.2 shall be implemented to reduce the potential noise impacts during OOHW.

Actual noise levels can often be less than the predicted levels presented in this addendum when measured over the assessment period, depending on the location of the works relative to the receivers.

4.1.3 Sleep disturbance

The noise predictions in Table 4.1 show the residential receivers are predicted to experience noise levels above the corresponding sleep disturbance screening levels. Further review (see APPENDIX D) finds that predicted instantaneous noise levels are below the (external) awakening events noise level L_{Amax} 65 dB(A).

All reasonable and feasible mitigation and management measures presented in Section 4.2 shall be implemented to reduce the potential sleep disturbance during the night period.

Table 4.1: Number of receiver buildings over the noise management level (all NCAs) – residential receivers

Worksite	Construction activity	Assessment reference	Highly noise affected[2]	Day (standard hours)				Day (outside standard hours)				Evening				Night				Sleep disturbance	
			L_{Aeq}	L_{Aeq}				L_{Aeq}				L_{Aeq}				L_{Aeq}				L_{Amax}	L_{Amax}
			> 75 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)	> 52 or RBL+15 dB(A)	> 65 dB(A)
Aerotropolis TBM Retrieval works	Phase 1 - Site access to TBM retrieval area	P1M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phase 2 - Tower crane establishment and breakthrough preparation	P2M	0	5	0	0	0	7	0	0	0	19	0	0	0	23	1[3]	0	0	13	0
	Phase 3 – Breakthrough and demobilisation of TBM 1340 and 1341	P3M	0	4	0	0	0	6	0	0	0	17	0	0	0	25	0	0	0	7	0
	Phase 4 – Tower crane demobilisation and handover	P4M	0	5	0	0	0	4	0	0	0	10	0	0	0	17	0	0	0	10	0

Note:
1. Construction noise level cells are shaded based upon the predicted worst case NML exceedance in accordance with the key presented in Section 5.2 of the DNVIS.
2. Highly noise affected applies to residential receivers, as per the ICNG.
3. Predicted noise level 10.5 dB(A) above NML

Table 4.2: Number of other sensitive receivers over the noise management levels (all NCAs)

Worksite	Construction activity	Assessment reference	Commercial				Childcare				Educational				Recreational				Places of worship				Hotel/Motel/ Hostel				Industrial			
			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)
Aerotropolis TBM Retrieval works	Phase 1 - Site access to TBM retrieval area	P1M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phase 2 - Tower crane establishment and breakthrough preparation	P2M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phase 3 - Breakthrough and demobilisation of TBM 1340 and 1341	P3M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phase 4 - Tower crane demobilisation and handover	P4M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:
1. Commercial, industrial, recreational and other sensitive receivers have been assessed against the respective NMLs, and exceedances have been presented in the count table.
2. Impacts only applicable when facility is in use.
3. Highly noise affected does not apply to OSRs, as per the ICNG.

4.2 Noise mitigation and management

In accordance with SSI 10051 CoA 43, the CNVS, and the Aerotropolis DNVIS all feasible and reasonable work practices and mitigation measures will be applied to reduce the potential noise impacts from the TBM retrieval works. In addition to the measures adopted in the DNVIS, the following mitigation and management measures specific to the TBM retrieval works are provided.

4.2.1 Consultation with affected receivers

As outlined in the Aerotropolis DNVIS, CPBG has consulted with potentially affected stakeholders including business and residential receivers regarding specific mitigation and management measures applicable to the bulk excavation and tunnelling works at Aerotropolis. This consultation has continued for the TBM retrieval works, notably for the proposed out of hours works associated with TBM retrieval and a summary of the consultation is provided in APPENDIX E.

Community will be regularly updated on the progress of the project as described in the CPBG SBT Community Communication Strategy (SMWSASBT-CPG-1NL-NL000-CY-PLN-000002).

4.2.2 Site noise control measures

In addition to the noise mitigation measures identified in the Aerotropolis DNVIS (see Section 5.3), Table 4-3 presents additional noise control measures recommended to reduce and manage potential noise impacts from the TBM retrieval works. All personnel working on site will be informed of critical noise mitigation and management measures to be implemented to reduce noise, especially during OOHW.

Table 4-3: Site noise mitigation and management measures

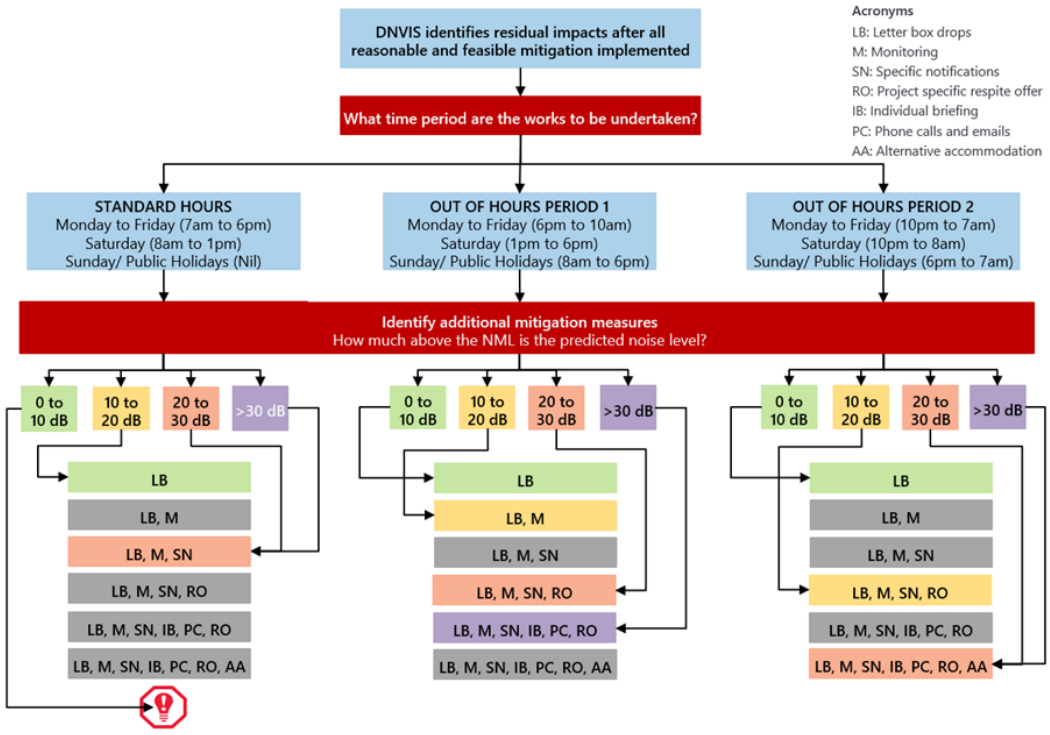
Control measure	Description of the control measure	Feasible mitigation test	Deemed feasible?	Reasonable mitigation test	Deemed reasonable?	Adopted?	Justification and commentary
At source control measures							
Limit work area location and plant location within work area	The OOHW area location should be limited to the work areas in shown in Figure 2.1. Plant and equipment locations should be limited to as described in Table 2-1.	This measure could be feasibly implemented.	Yes	This measure could be reasonably implemented.	Yes	Yes	The OOHW area should be limited to the work areas in shown in Figure 2.1. Plant and equipment locations should be limited to as described in Table 2-1.
Mitigating tower crane noise source	An attenuated diesel tower cranes to be used on site, mitigated to achieve the nominated sound power level presented in Table 2-1 (i.e. L_{Aeq} 104 dB(A) re: 1 pW), considering all crane operating conditions and all operating crane noise sources, and achieve any other specific performance requirements. The crane supplier should provide documentation confirming the tower crane can achieve the nominated noise level.	Crane supplier has advised that this measure could be feasibly implemented.	Yes	Up to 10 dB(A) noise reduction (compared with unattenuated diesel tower crane) could be achieved by mitigating the tower crane.	Yes	Yes	This measure will be implemented for the duration of the TBM retrieval works. Verification noise monitoring will be undertaken to confirm the sound power level of the tower crane. The crane supplier should provide documentation confirming the tower crane can achieve the nominated sound power level L_{Aeq} 104 dB(A) re: 1 pW.
Limit OOH plant and equipment	Plant and equipment operating outside standard construction hours will be limited as much as practicable to allow the retrieval to progress.	This measure could be feasibly implemented.	Yes	5-10 dB(A) noise reduction could be achieved depending on the plant in use/ switched off.	Yes	Yes	Plant items in use OOHW should be limited to the plant items indicated in Table 2-1, or better where practicable.
Noise barriers or temporary noise screens	Any removal of construction hoardings will be replaced by temporary fencing/gate. Furthermore, the temporary fencing/gate shall be fitted with noise blankets.	Potential benefit of 5-10 dB(A). Could be feasibly implemented.	Yes	5-10 dB(A) noise reduction could be achieved if line of sight is broken.	Yes	Yes	This measure will be implemented for the duration of the TBM retrieval works.
Switching off any equipment not in use	Switching off any equipment not in use for extended periods e.g. crane/ heavy vehicles engines will be switched off while not loading/ being loaded. No idling of delivery trucks.	This measure could be feasibly implemented.	Yes	This measure could be reasonably implemented. Routine measure for Project team.	Yes	Yes	Any equipment not in use for extended periods shall be switched off to reduce the potential noise impacts.
Noise management measures							
Respite coordination	Consult with other construction works in the vicinity of the worksite and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration.	This measure could be feasibly implemented.	Yes	This measure could be reasonably implemented. Routine measure for Project team.	Yes	Yes	Respite coordination shall be conducted with other construction works in the vicinity of the worksite.

Control measure	Description of the control measure	Feasible mitigation test	Deemed feasible?	Reasonable mitigation test	Deemed reasonable?	Adopted?	Justification and commentary
Material handling	During OOHW, avoid unnecessary maximum instantaneous emissions when carrying out manual operations and when operating plant such as (but not limited to): • Avoid dropping material at height • Ensuring material is placed and not dropped into awaiting trucks or other plant/vehicles • Careful use of chains/equipment to avoid metal-on-metal bangs	This measure could be feasibly implemented.	Yes	5-15 dB(A) noise reduction could be achieved with good materials handling practice. This measure could be reasonably implemented.	Yes	Yes	Training workers and contractors (such as the site induction and toolbox talks) on the importance of minimising emissions and how to use equipment in ways to minimise noise. Great care shall be undertaken when handling material during the night period to minimise the potential sleep disturbance impact.
Traffic flow	Planning traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.	This measure could be feasibly implemented.	Yes	This measure could be reasonably implemented.	Yes	Yes	Traffic flow, parking and loading/unloading areas shall be designated to minimise reversing movements within the site.
Truck drivers training	Ensuring truck drivers are informed of designated vehicle routes, parking locations and acceptable delivery hours for the site.	This measure could be feasibly implemented.	Yes	Sufficient noise reduction could be This measure could be reasonably implemented.	Yes	Yes	Training truck drivers on the importance of designated vehicle routes, parking locations and acceptable delivery hours for the site to minimise noise emissions.

4.2.3 Additional mitigation measures

As specified in section 5.3.3 of the Aerotropolis DNVIS, Figure 4.1 will be used to advise the appropriate additional mitigation during the proposed works.

Figure 4.1: Additional airborne noise mitigation measures



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

4.2.4 Noise monitoring

Attended noise monitoring will be undertaken to verify that the proposed TBM retrieval works is consistent with the assessed noise modelling scenarios and that noise levels resulting from construction works are not higher than the levels predicted in this addendum.

Attended noise monitoring will be undertaken in the NCAs most impacted by the works. The nominated monitoring locations are identified in Table 4-4, and have been selected as they present the best opportunity to validate the predicted noise levels.

The real time monitoring installed for the bulk earthworks at Aerotropolis was removed prior to handover of the station box. A new fixed, real time monitoring location is proposed to be installed on site at the nominated location in Table 4-4, subject to confirmation the location is suitable and safe for the monitor. Once the monitoring location is confirmed, Table D1 will be updated with predicted noise levels to the real-time monitor, for the purpose of verification monitoring.

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.

Table 4-4: Nominated verification monitoring locations

Type of monitoring	NCA	Nominated receiver address	Monitoring location at 1 m from
Fixed real time	NCA12	On-site monitor (E: 290602, N: 6244194, to be confirmed subject to suitability of location on site)	N/A
Attended	NCA12	145 Badgerys Creek Road, Bringelly	Eastern facade
Attended	NCA12	175 Badgerys Creek Road, Bringelly	Eastern facade
Attended	NCA12	195 Badgerys Creek Road, Bringelly	Eastern facade
	Note:	Monitoring on private property is subject to owner consent and where relevant, occupier consent. If property access is denied, monitoring will still be carried out outside property boundaries.	

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

5 Impact classification

The impact classification from the in Section 10 of the DNVIS has been reviewed taking into consideration the outcomes of this Addendum assessment report. The impact classification for the Aerotropolis TBM retrieval works are considered **moderate**, consistent with the classification in the DNVIS.

All reasonable and feasible mitigation and management measures addressed in the Aerotropolis DNVIS shall be implemented to minimise the potential noise impacts during the proposed TBM retrieval works. It is noted that whilst the works exceed the NMLs outside standard construction hours, the duration of the works is up to 11 weeks.

6 Conclusion

This technical memorandum is an addendum to the report Aerotropolis DNVIS to review the potential noise and vibration impacts for the proposed TBM retrieval works at the Aerotropolis worksite.

Construction airborne noise

During standard construction hours, the noise predictions in this addendum show that the residential receivers are predicted to experience noise levels above the corresponding NMLs during standard construction hours. However, predicted noise levels are below the 'highly noise affected' threshold of 75 dB(A) at all residential receivers.

Outside standard construction hours, the noise predictions in this addendum show that the residential receivers are predicted to experience noise levels above the corresponding NMLs outside standard construction hours. During the night period, the noise predictions show the residential receivers are predicted to experience noise levels above the corresponding sleep disturbance noise goals during the night period. Mitigation and management measures are described in Table 4-3 to reduce noise levels towards the NML, where reasonable and feasible.

It is noted that the noise predictions in this addendum represent a worst-case scenario when the works occur at worst-case intensity and the worst-case location throughout the assessment period. Actual noise levels can often be less than the predicted levels presented in this addendum when measured over the assessment period, depending on the location of the works relative to the receivers. Additional mitigation measures will be implemented in accordance with the SSI 10051 CoA 43 and the CNVS. Noise monitoring will be undertaken to verify compliance with the predicted noise levels.

Construction ground-borne noise and vibration

There are no vibration significant plant or equipment proposed to be used during the OOH works. Sensitive receivers are more than 250m away from the proposed vibration intensive works (drilling tower crane anchors) during Aerotropolis TBM retrieval works. Ground-borne noise and vibration impacts are unchanged from the impacts presented in the DNVIS.

Construction traffic noise

The findings within the Aerotropolis DNVIS for construction related traffic is unchanged (i.e. no adverse impacts).

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
14.03.2023	Initial issue	0	1	[redacted]	[redacted]	[redacted]
03.05.2024	Respond to ER comments	2	3	[redacted]	[redacted]	[redacted]
09.05.2024	Minor edits	-	4	[redacted]	[redacted]	[redacted]

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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 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 Noise management levels

APPENDIX C Construction work areas and landuses

APPENDIX D Detailed predicted construction noise levels

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

APPENDIX E Additional noise mitigation

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