

Table 2 Construction Scenarios and Equipment

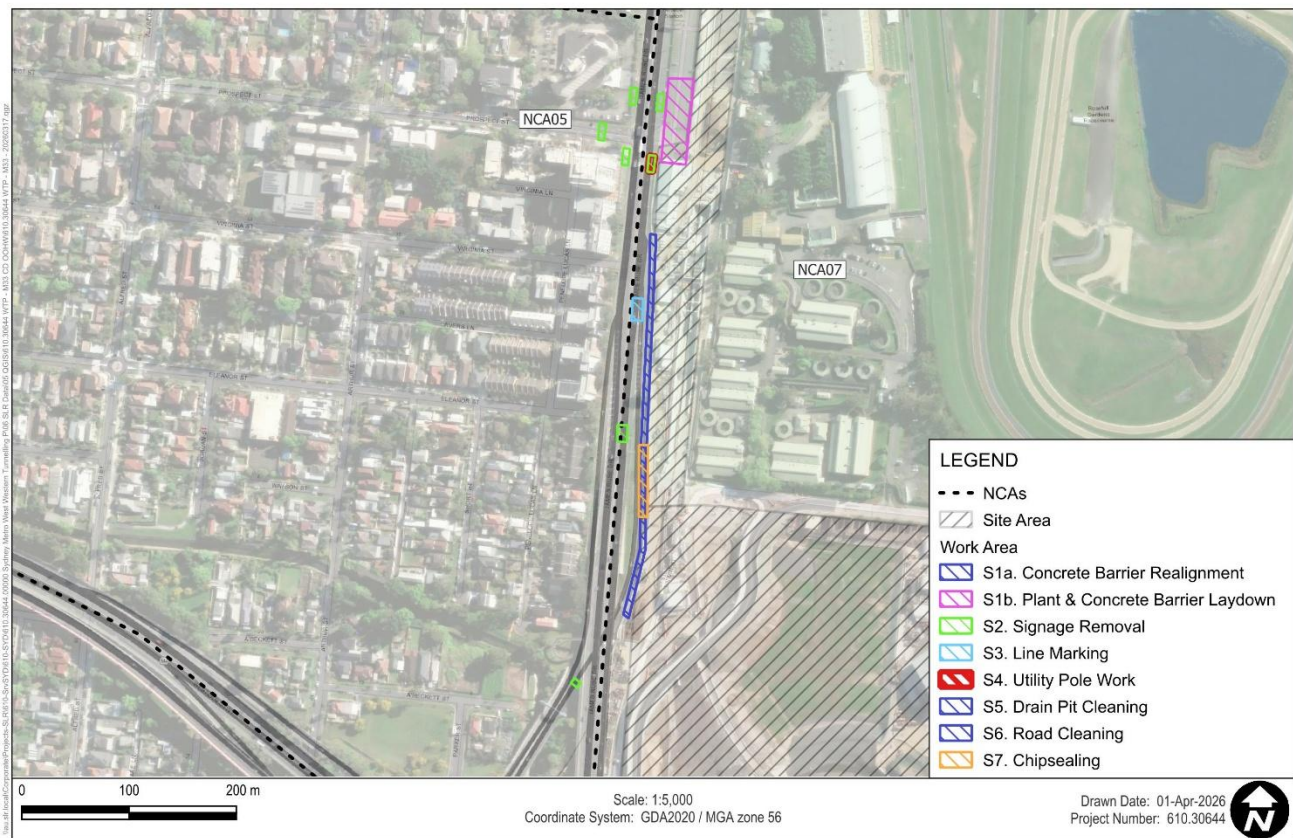
Equipment ¹			Total Lw (dBA)	Asphalt - Truck and Sprayer	Crane Franna (20 tonne)	Elevated Work Platform	Excavator - (20 tonne)	Grinder ³	Hand tools	Line Marking Machine	Road Sweeper	Truck – Medium Rigid	Truck - Vacuum	Truck (flatbed)
Sound Power Level (Lw), dBA				106	98	89	104	105	94	94	104	103	109	95
Estimated utilisation in assessment duration (%)²				75	30	30	40	30	50	60	100	25	100	25
ID	Construction Scenario	Assessment Period												
S1a	Concrete barrier realignment	OOHW1 (Evening) / OOHW2 (Night)	104		1		2		2					
S1b	Plant and Concrete Barrier Laydown	OOHW1 (Evening) / OOHW2 (Night)	104		1	1	2							2
S2	Signage Removal	OOHW1 (Evening) / OOHW2 (Night)	108					2						
S3	Line Marking	OOHW1 (Evening) / OOHW2 (Night)	92							1				
S4	Utility pole Work	OOHW1 (Evening) / OOHW2 (Night)	92			1			1					
S5	Drain Pit Cleaning	OOHW1 (Evening) / OOHW2 (Night)	109										1	
S6	Road Cleaning	OOHW1 (Evening) / OOHW2 (Night)	104								1			
S7	Chip Sealing	OOHW1 (Evening) / OOHW2 (Night)	105	1								1		
SC1	Cumulative (S1a,S2,S3,S4,S5,S7)	OOHW1 (Evening) / OOHW2 (Night)	114	1	1	1	2	2	3	1		1	1	
SC2	Cumulative (S1b,S2,S3,S4,S5,S7)	OOHW1 (Evening) / OOHW2 (Night)	113	1	1	2	2	2	1	1		1	1	2
SC3	Cumulative (S1a,S3,S6)	OOHW1 (Evening) / OOHW2 (Night)	107		1		2		2	1	1			
SC4	Cumulative (S1b,S4,S5,S7)	OOHW1 (Evening) / OOHW2 (Night)	111	1	1	2	2		1			1	1	2

Note 1: Individual Sound power level (Lw) data is taken from the DEFRA Noise Database, AS2436, TfNSW Construction Noise and Vibration Strategy and Sydney Metro Construction Noise and Vibration Standard.

Note 2: Estimated utilisation in assessment duration represents the percentage of time the equipment is assumed to operate over the 15-minute assessment duration.

Note 3: Equipment classed as ‘annoying’ in the ICNG and requires a 5 dB correction.

Figure 1 Location of Works



3 Assessment Criteria

3.1 Noise Management Levels

The noise management levels (NMLs) for residential (**Table 3**) and other sensitive receivers (**Table 4**) have been adopted from the Construction Noise and Vibration Management Plan (CNVMP). Project-specific NMLs for residential receivers were determined for each Noise Catchment Area (NCA). During out-of-hours work (OOHW) the residential NML is determined as 5 dB above the Rating Background Noise level (RBL) (ie RBL + 5dB).

NMLs for other sensitive receivers have been adopted from the Interim Construction Noise Guideline (ICNG), Sydney Metro - Construction Noise and Vibration Standard (CNVS), *AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors*, and previous assessments undertaken for the Sydney Metro West Project (eg EIS and modification reports).

Table 3 Project Residential NMLs

NCA	Receiver Type	Representative Logger Location	Noise Management Level (L _{Aeq} (15minute) – dBA)				Sleep Disturbance Screening Level (52 dBA or RBL +15 dB whichever is higher) (L _{Amax} dBA)
			Approved Construction Hours (RBL+10dB)	Out of Hours (RBL+5dB)			
			Day	Day ¹	Evening	Night	Night
NCA04	Residential	B.04	61	56	53	46	56
NCA05	Residential	B.05	60	55	54	50	60
NCA06	Residential	B.06	62	57	56	49	59
NCA07	Residential	B.07	56	51	49	46	56

Note 1: Daytime out of hours is 7 am to 8 am on Saturday, and 8 am to 6 pm on Sunday and public holidays

Table 4 NMLs for ‘Other Sensitive’ Receivers

Land Use	Assessment Period	Noise Management Level L _{Aeq} (15minute) (dBA)	
		Internal	External
ICNG ‘Other Sensitive’ Receivers			
Classrooms at schools and other educational institutions	When in use	45	55 ¹
Hospital wards and operating theatres	When in use	45	65 ²
Places of worship	When in use	45	55 ¹
Active recreation areas (characterised by sporting activities and activities which generate noise)	When in use	-	65
Passive recreation areas (characterised by contemplative activities that generate little noise)	When in use	-	60
Commercial	When in use	-	70
Industrial	When in use	-	75
Non-ICNG ‘Other Sensitive’ Receivers			
Hotel ³	Day / Evening	50	70 ²
	Night-time	40	60 ²
Café / Bar / Restaurant ³	When in use	50	70 ²
Child Care Centres – Sleeping areas ⁴	When in use	40	50 ¹
Public Building	When in use	50	60 ¹
Recording Studio	When in use	25	45 ²
Theatre/Auditorium	When in use	30	50 ²
Rosehill Gardens Racecourse Stables ⁵	When in use	-	60

Note 1: It is assumed that these receivers have windows partially open for ventilation which results in internal noise levels being around 10 dB lower than the external noise level.

Note 2: It is assumed that these receivers have fixed windows which conservatively results in internal noise levels being around 20 dB lower than the external noise level.

Note 3: Adopted from AS2107.

Note 4: Adopted from *Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment*.

Note 5: Adopted from the ICNG – passive recreation.

4 Assessment Findings

4.1 Airborne Noise Impact Assessment

Noise modelling was conducted in accordance with the method outlined in the overarching DNVIS. A summary of the number of buildings where NML exceedances were predicted for the various work scenarios is shown in **Table 6**. Maps of the proposed work area with the worst-case noise exceedances are presented in **Appendix A**.

The assessment shows the predicted impacts based on the exceedance of the management levels, as per the categories in **Table 5**.

Table 5 Exceedance Bands and Impact Colouring

Exceedance of Management Level	Impact Colouring
No exceedance	
1 to 10 dB	
11 dB to 20 dB	
21 dB to 30 dB	
>30 dB	

The assessment is generally considered conservative as the calculations assume several items of construction equipment are in use at the same time within individual scenarios.

The assessment uses 'realistic worst-case' scenarios to determine the impacts from the noisiest 15-minute period that is likely to occur for each work scenario. The exceedances shown in **Table 6** are therefore representative of a 'realistic worst-case' 15-minute period and are unlikely to occur for extended periods of time throughout the construction period at any given receiver. Recommendations are provided in **Section 5**.

Table 6 Construction Noise Assessment

Receiver Category	NCA	Total	Number of Receivers																									
			Exceedance Category	With NML Exceedance																								
				S1a	S1b	S2	S3	S4	S5	S6	S7	SC1	SC2	SC3	SC4	S1a	S1b	S2	S3	S4	S5	S6	S7	SC1	SC2	SC3	SC4	
				OOHW1										OOHW2														
Residential	NCA04	25	1-10 dB	-	-	2	-	-	-	-	-	2	2	-	-	-	2	3	-	-	-	-	-	3	3	-	2	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	2	-	-
			21-30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9	HNA ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			SD ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	3	3	-	-
	NCA05	475	1-10 dB	6	-	33	-	-	16	6	9	31	32	16	16	16	2	40	2	-	17	16	15	41	40	16	10	
			11-20 dB	-	-	4	-	-	-	-	-	8	7	-	-	-	-	15	-	-	4	-	-	22	22	-	13	
			21-30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			>30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		134	HNA ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			SD ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	-	-	15	-	2	34	34	-	15
	NCA06	-	1-10 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			21-30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	HNA ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			SD ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NCA07	2	1-10 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-30 dB			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
>30 dB			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-		HNA ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		SD ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other Sensitive	All NCA	40	1-10 dB	-	-	6	-	-	-	-	7	7	-	-	-	-	4	-	-	-	-	-	5	5	-	-		
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	2	-	-	
			21-30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>30 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: Highly Noise Affected, as defined in the ICNG. Relates to construction noise levels of >75 dBA and is the point above which there may be strong community reaction to construction noise levels.

Note 2: Sleep disturbance (see Table 3)

5 Conclusion and Recommendations

Noise emissions from the project have been predicted at the surrounding receivers. Noise levels are expected to exceed the noise management levels (NMLs) at the closest residential receivers during the evening period (OOHW1) and the night-time period (OOHW2).

A number of mitigation and management measures have been recommended below. Where feasible and reasonable these should be applied to the project to control and minimise the impacts during construction as far as practicable. Specific mitigation measures will be implemented and developed in consultation with the community at each affected location, consistent with Project SSI 10038 MOD 6 – Consolidated Approval including Condition D38, D39, D50 & D51 such as respite offers and alternative accommodation.

To determine the predicted noise levels and exceedances at each floor and facade at the residential towers and hotel in proximity to the works, additional analysis of the modelling results has been conducted. The purpose of this analysis is to provide GLC with the ability to undertake more targeted mitigation measures. This analysis is available in a separate XLS spreadsheet file (610.30644-M33-High Rise Analysis.xlsx).

GLC will consider the following recommendations (where feasible and reasonable) during commencement of work:

- Implement mitigation measures identified within the CNVMP and overarching DNVIS.
- Implement additional mitigation measures identified within the CNVMP and overarching DNVIS.
- Ensure the minimum sized equipment necessary to complete the work are used.
- Implement portable noise barriers around small, contained work areas.
- Wheeled Excavators (Duck) will be used in place of tracked excavators and franna cranes to undertake the barrier realignment using either forks or grabber attachments.
- Where feasible the use of grinders will be prioritised to occur in less sensitive periods (ie OOHW1, before 10pm) to minimise impacts on residents (eg sleep disturbance).
- Shut down plant and machinery, including vehicles when not in operation.

Checked/
Authorised by: SL

APPENDIX A – NOISE IMPACT MAPS

Figure A1 S1a – OOHW1



Figure A2 S1b – OOHW1



Figure A3 S2 – OOHW1

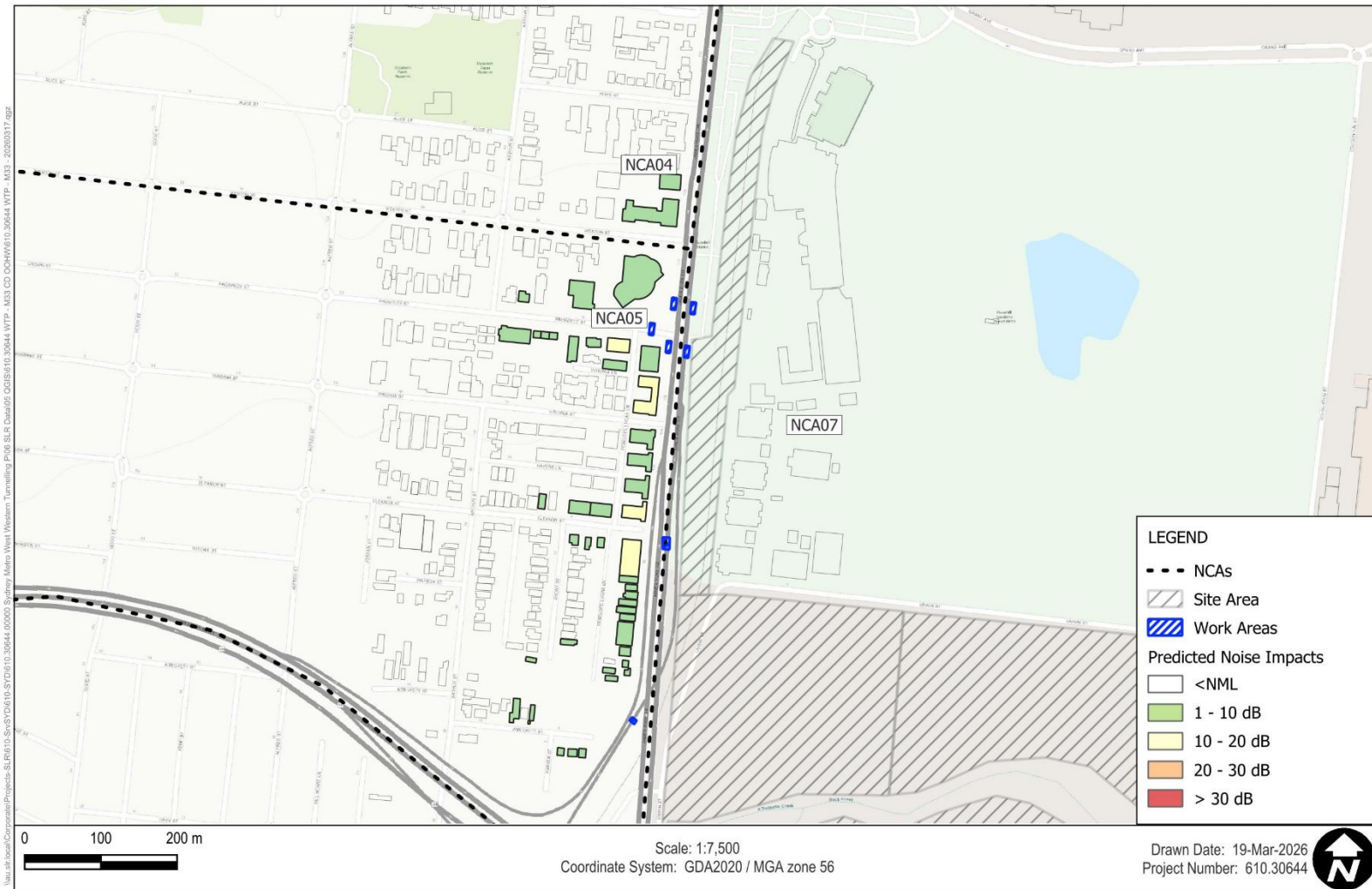


Figure A4 S3 – OOHW1



Figure A5 S4 – OOHW1



Figure A6 S5 – OOHW1



Figure A7 S6 – OOHW1



Figure A8 S7 – OOHW1



Figure A9 SC1 – OOHW1



Figure A10 SC2 – OOHW1

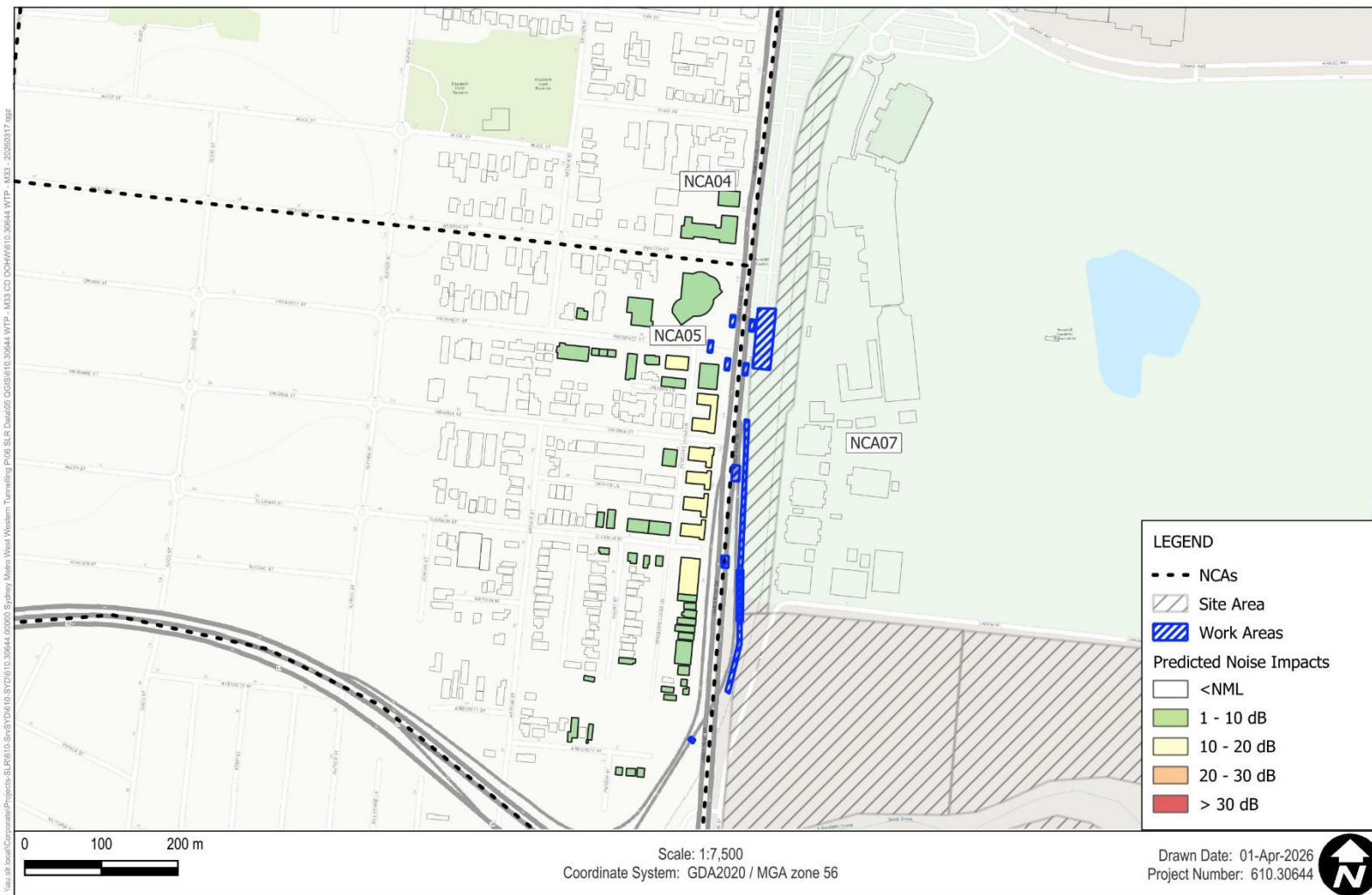


Figure A11 SC3 – OOHW1



Figure A12 SC4 – OOHW1

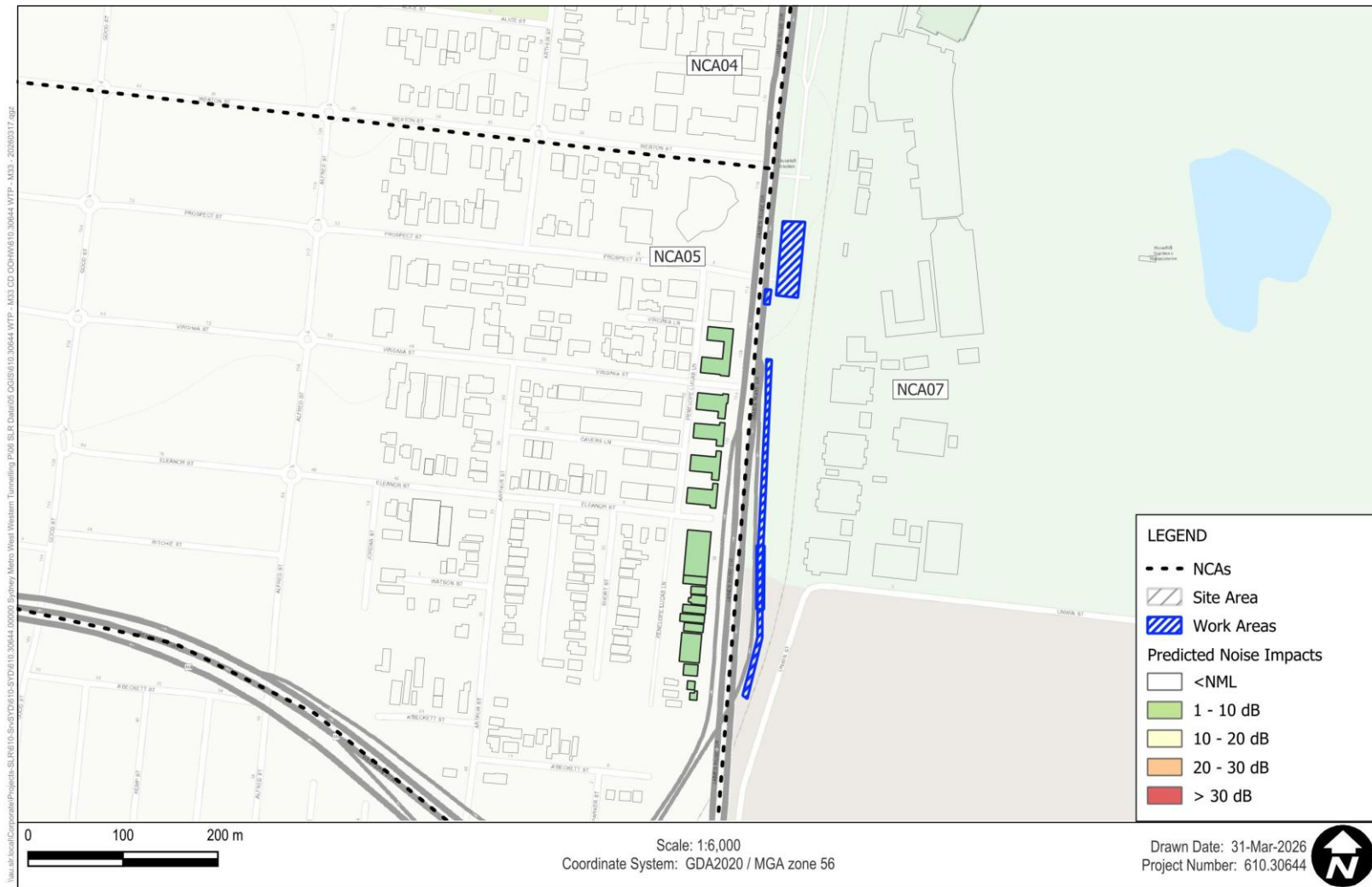


Figure A13 S1a – OOHW2



Figure A14 S1b – OOHW2



Figure A15 S2 – OOHW2

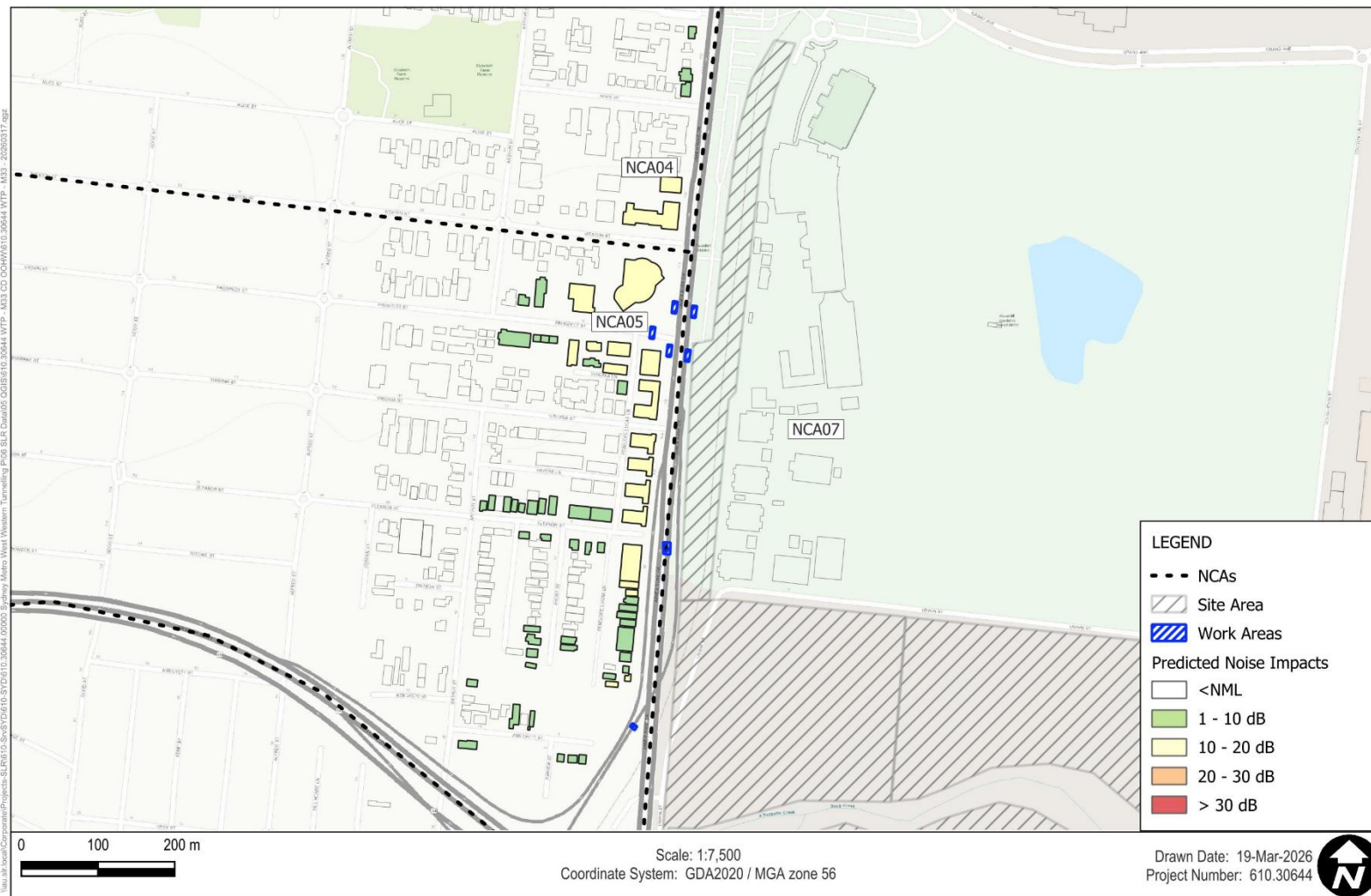


Figure A16 S3 – OOHW2



Figure A17 S4 – OOHW2



Figure A18 S5 – OOHW2



Figure A19 S6 – OOHW2



Figure A20 S7 – OOHW2



Figure A21 SC1 – OOHW2

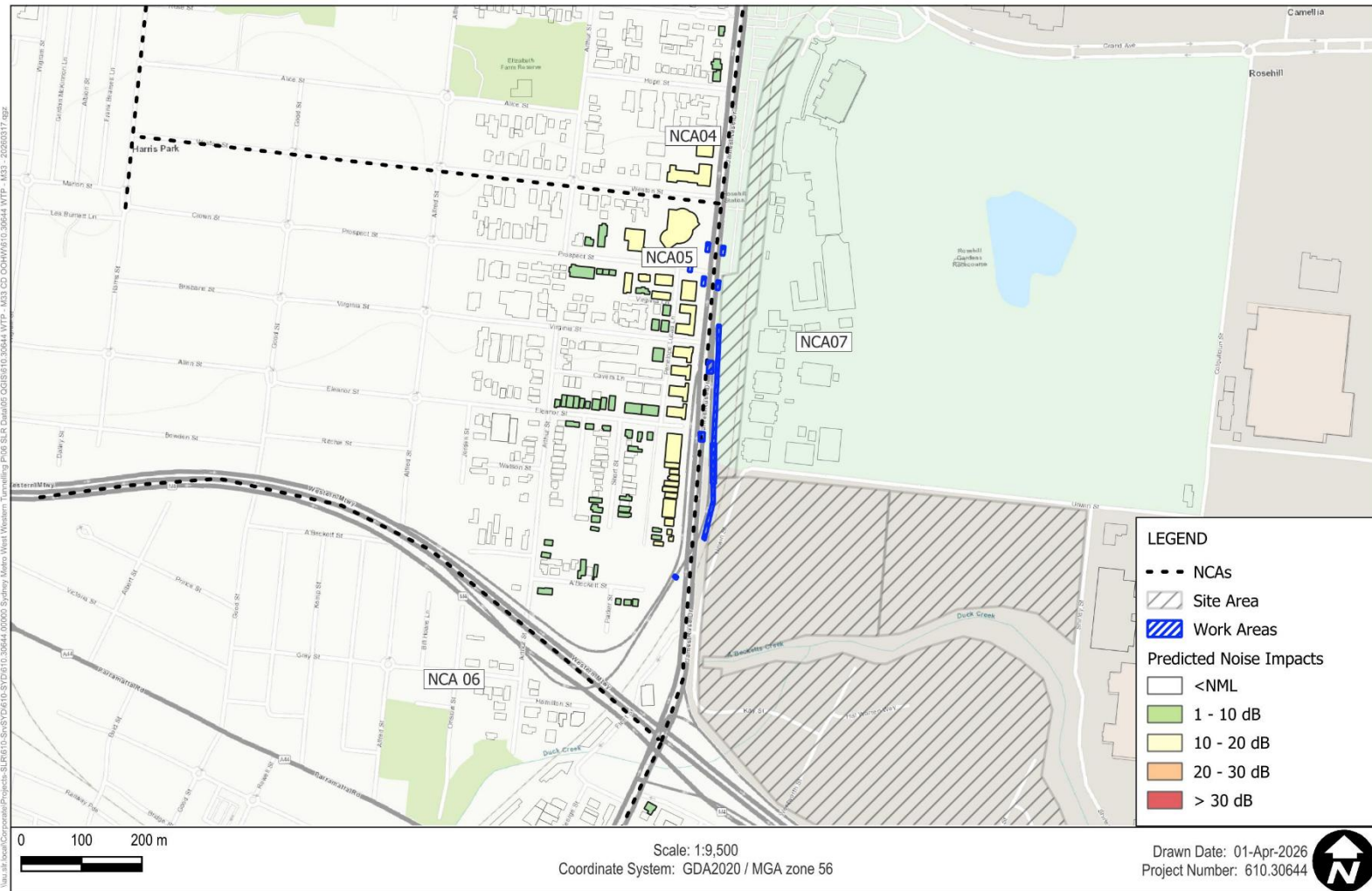


Figure A22 SC2 – OOHW2

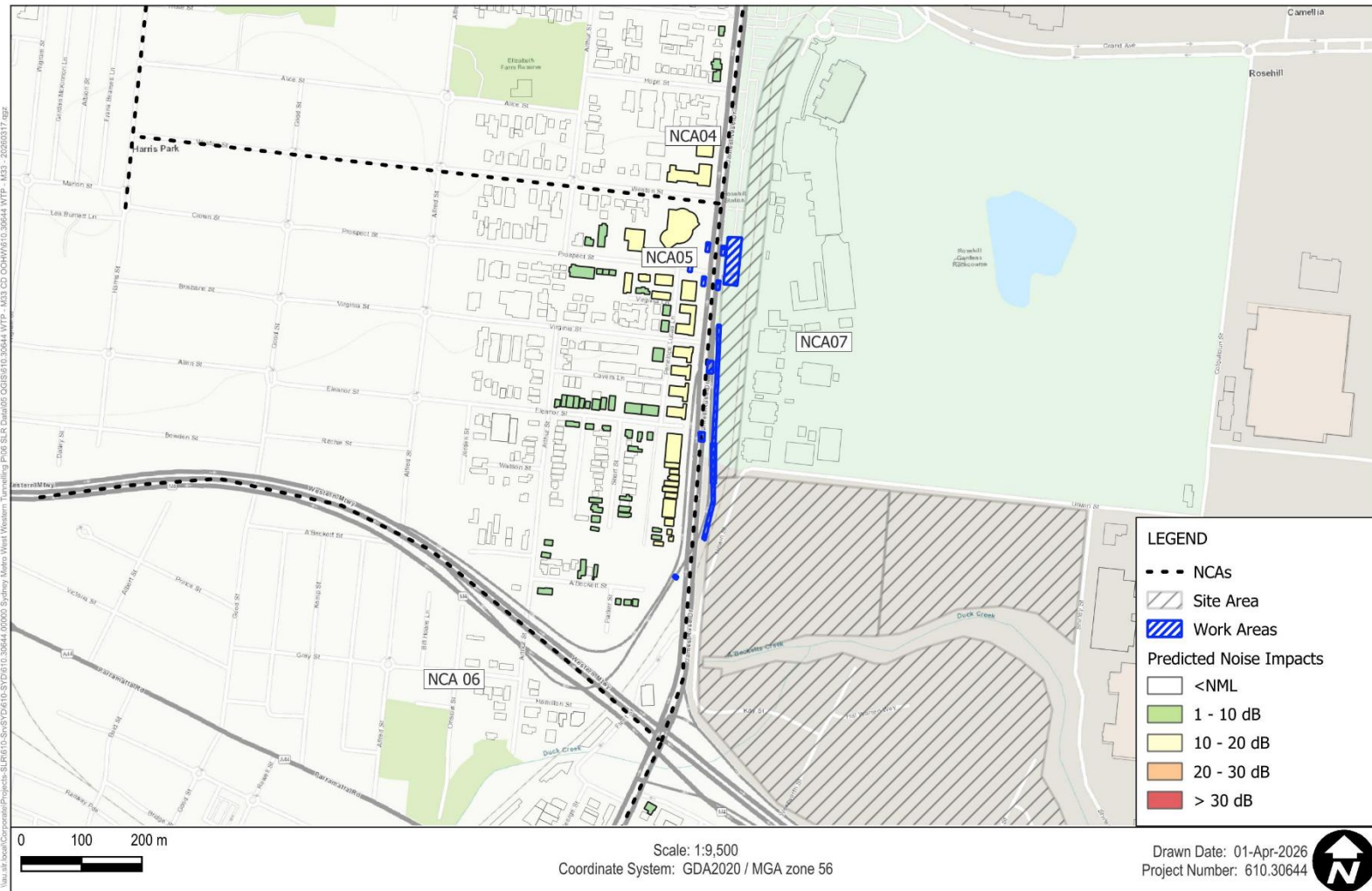


Figure A23 SC3 – OOHW2



Figure A24 SC4 – OOHW2

