

SYDNEY METRO CITY AND SOUTH WEST - LINE-WIDE WORKS

Construction Noise and Vibration Impact Statement - P4 South West Corridor Works

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Systems Connect

TK685-03-15F01 CNVIS S2B_P4 SW Corridor (r2)





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1 Introduction

This Construction Noise and Vibration Impact Statement (CNVIS) has been prepared on behalf of Systems Connect in accordance with the Construction Noise and Vibration Management Plan (CNVMP) [SMCSWLWC-SYC-1NL-PM-PLN-000032] [1], for the Design and Construction of the Line-Wide Works (LWW) of the Sydney Metro City & Southwest Project (the Project).

1.1 Relevant requirements and purpose of this CNVIS

As defined in the CNVMP, the works covered by this CNVIS are part of the Portion 4 - Power Supply Works delivered under Critical State Significant Infrastructure Approval SSI 8256. Condition E27 of CSSI-8256 requires that:

Construction Noise and Vibration Impact Statements must be prepared for Construction sites before Construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receivers. The Statements must augment the Construction Noise and Vibration Management Sub-plan and must be implemented for the duration of Work. The Statements must be informed by a suite of potential management/mitigation options provided in the Construction Noise and Vibration Sub-plan.

This CNVIS applies to the South West (SW) Corridor Power Supply works, more specifically to the High Voltage (HV) Cabling and Padmounts and the Traction Substation works.

South West Corridor works will be completed during standard construction hours as well as works outside of standard construction hours where rail possession or rail shutdown is required for the works to be completed safely. The construction hours of work are defined by the Project Planning Approval conditions as outlined in the CNVMP.

In addition to the above, the SW Corridor Power Supply works will be completed under the Sydney Trains Environment Protection Licence (EPL) number 12208. Licence Condition O5 sets the objectives for minimising noise impacts from rail maintenance and construction activities.

This CNVIS forms part of the CNVMP for the Project.

1.2 Structure of this CNVIS

This CNVIS is structured as follows:

- Section 2 Description of construction works and hours
- Section 3 Nearest sensitive receivers
- Section 4 Construction Noise and Vibration objectives
- Section 5 Construction Noise Assessment

- Section 6 Construction vibration impacts
- Section 7 Ground-borne noise assessment
- Section 8 Traffic noise assessment
- Section 9 Cumulative impacts.

1.3 Quality assurance

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Description of construction works and hours

2.1 Summary of works addressed in this CNVIS

2.1.1 Construction activities

This CNVIS provides an assessment of noise and vibration impacts from activities associated with the SW Corridor Power Supply works. The worksite locations are depicted in APPENDIX B. The works include:

- HV Cabling and Padmounts along the corridor
 - HV Cabling (Marrickville Dive to Campsie Traction Substation)
 - HV Cabling (Campsie Traction Substation to Bankstown Station)
- 11kV Padmount Substation Installation (Sydenham to Bankstown)
- Traction Substations at Dulwich Hill, Canterbury, Campsie, Lakemba, Punchbowl
 - Traction Substation civil works
 - Traction Substation installation works.

The proposed works, likely plant and equipment and indicative Project timing are summarised in APPENDIX C. Works are planned to occur during standard construction hours, however due to the proximity of the works area to the existing rail corridor, some works will need to occur under Rail Possession or during rail shutdown, as outlined in Section 2.2.3 and APPENDIX C.

2.1.2 Construction traffic

The SW Corridor Power Supply works will generate additional traffic movements in the form of:

- Light vehicle movements generated by construction personnel travelling to and from work
- Heavy vehicle movements generated by delivery vehicles bringing materials, plant and equipment to the worksite

Construction traffic on-site (i.e. within the Project footprint) is included as part of the construction noise assessment of the works activities identified in Sections 5 and APPENDIX C. When construction related traffic moves onto the public road network, a different noise assessment methodology is appropriate as vehicle movements would be regarded as 'additional road traffic' rather than as part of the construction site's activities. Construction traffic noise is addressed in Section 7.

2.1.3 Cumulative construction impacts

All concurrent Sydney Metro construction site works have been considered and addressed in Section 9 of this CNVIS. CSSI-8256 Condition of Approval E26 requires work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations) to be coordinated to ensure respite periods are provided. Potentially concurrent construction activities within the vicinity of the Traction Substation worksites have also been considered, as discussed in Section 9.

2.2 Construction hours

The construction hours for the Project are defined in the CSSI-8256 Conditions E19 to E24 and EPL Condition O5.1.

2.2.1 Standard construction hours

The standard construction hours of work are defined by the CSSI-8256 Condition E19. The standard construction hours for the Project are summarised in the Table 2.1 below. The EPL standard construction hours (Condition O5.1) are consistent with CSSI-8256 Conditions E19.

In addition to this, highly noise intensive work that results in an exceedance of the applicable Noise Management Level at the same receiver is limited by CSSI-8256 Condition E24, except where permitted by the EPL as noted in Table 2.1.

Table 2.1: Standard construction hours

Construction Activity	Monday to Friday	Saturday	Sunday/ Public holiday		
Standard construction hours	7:00 am to 6:00 pm	8:00 am to 6:00 pm	No work		
Highly noise intensive Work	8:00 am to 6:00 pm ¹	8:00 am to 1:00 pm ¹	No work		

Notes: 1. Works may only be undertaken in continuous blocks not exceeding three (3) hours each with a minimum respite from those activities and Works of not less than one (1) hour between each block. 'Continuous' includes any period during which there is less than a one (1) hour respite between ceasing and recommencing any of the highly noise intensive work.

2.2.2 Out of hours work periods

CSSI-8256 Condition E20 and E23 and EPL 12208 Condition 05.1 allow standard construction hours to be varied under specific conditions (where justified), including work permitted under an EPL or under an Out of Hours Work Protocol as required by CSSI-8256 Condition E25. This includes work under a Rail Possession or Road Occupancy Licence.

The Transport for NSW (TfNSW) Construction Noise and Vibration Strategy (CNVS) [10] provides a hierarchy of Out of Hours (OOH) work periods. The impact of OOH works may be reduced by scheduling work and activities with greater impact during the preferred periods when receivers are likely to be less sensitive to noise and vibration, such as in the day out of hours (OOHD) and evening out of hours (OOHE) periods. Table 2.2 presents the construction work periods as Standard Hours, Out of Hours Work (OOHW) Period 1 and OOHW Period 2.

-5am
-6am
-7am
-8am
-10am
-11am
-12pm
-2pm
-3pm
-3pm
-5pm Day Monday Tuesday Wednesday OOHW Standard Hours OOHW Period 2 Period 1 Thursday Friday Saturday Sunday or OOHW Period 2 OOHW Period 1 Public Holiday

Table 2.2: Construction hours

- Standard construction hours are defined in CSSI-8256 Condition E19 as: Monday to Friday 7:00am to 6:00pm and Saturdays from 8:00am to 6:00pm.
- 2. Work outside of standard construction hours is defined as Out-of-Hours Work (OOHW) and has been divided by the CNVS into 2 periods of sensitivity.
 - **OOHW Period 1** is the least sensitive OOH period and is defined as Monday to Saturday 6:00pm to 10:00pm (evenings; OOHE), Saturday 7:00am to 8:00am (days; OOHD) and Sunday and public holidays 8:00am to 6:00pm (days; OOHD).
 - **OOHW Period 2** is the most sensitive OOH period and is defined as Monday to Saturday 10:00pm to 7:00am (nights; OOHN) and Sundays and public holidays 6:00pm to 8:00am (nights, OOHN).

2.2.3 Justification for OOHW

Construction works for the SW Corridor Power Supply works will be undertaken where reasonable and feasible during standard construction hours, as described above. However, some works will need to be undertaken outside of standard construction hours due to safety or quality control considerations, or to comply with regulatory requirements.

Out of Hours (OOH) Works that apply to the SW Corridor Power Supply works include:

- E22(e) where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required
- EPL Condition O5.1 allows construction activities to undertaken outside of the hours where works
 during standard hours would adversely affect Sydney Trains' ability to provide safe and reliable rail
 services or a safe working environment.

It is noted that the jersey kerb installation works being carried out as part of the enabling works allows construction works within the Traction Substation work area to be completed safely during standard construction hours.

Oversize deliveries may need to take place outside of standard construction hours in order to comply with RMS requirements for oversize vehicle movements.

Any work outside standard construction hours must be undertaken in accordance with the Out of Hours Works Protocol and the CNVMP [1].

2.2.1 COVID-19 extended construction hours

The Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020 commenced on 9 April 2020 and will continue until 21 March 2021. The order permits standard construction hours on this project to be extended as follows:

- Saturday from 1pm to 6pm (no high noise work permitted)
- Sundays from 8am to 6pm (no high noise work permitted)
- Public holidays from 8am to 6pm (no high noise work permitted).

High noise work means activities such as rock breaking, rock hammering, sheet piling, pile driving or similar noisy activities, unless an existing consent or approval already allows these works to occur on any of the extended days.

Activities would be carried out during the COVID-19 extended construction hours, where they meet above requirements. Appropriate noise management levels for the extended hours period (i.e. Sundays/Public Holidays 8am to 6pm) are as outlined for the Day (D/ D(O)) period in Section 4.1.1.

3 Nearest sensitive receivers

3.1 Residential receivers

To assess and manage construction noise and vibration impacts, the residential areas surrounding the Sydenham to Bankstown alignment, including the Power Supply worksites have been divided into Noise Catchment Areas (NCAs) based on each area's similar acoustic environment prior to the start of construction work. The NCAs are based on those established in the EIS for the Project [2], with some modifications to allow for site specific characteristics.

All relevant residential sensitive receivers near the worksite are identified on an aerial photograph located in APPENDIX B.

3.2 Other sensitive receivers (PPA Condition E28)

Additional to residential receivers above, 'other' noise and vibration sensitive receivers such as passive recreation areas and places of worship surrounding the construction area have been identified and are summarised and identified on an aerial photograph located in in APPENDIX B.

CSSI-8256 Condition E28 states:

Noise generating Work in the vicinity of potentially-affected, religious, or educational institutions resulting noise levels above the noise management levels must not be timetabled within sensitive periods, unless other reasonable arrangements with the affected institutions are made at no cost to the affected institution or as otherwise approved by the Planning Secretary.

Systems Connect have developed a Community Communications Strategy (CCS-LW) (SMCSWLWC-SYC-1NL-PM-PLN-000027), which outlines the process for consultation with sensitive receivers. Specific to the Southwest Corridor works is Section 4.8 of the CCS-LW.

Systems Connect have undertaken consultation with identified sensitive receivers to determine sensitive periods. This has been taken into consideration in finalising respite strategies for high noise impacts. Sydney Metro and Systems Connect are working with sensitive receivers to further assess and determine other reasonable arrangements to be implemented.

3.3 Commercial and industrial premises

All commercial and industrial premises near the worksite have been considered in this assessment.

3.4 Heritage receivers

Heritage receivers have been identified in the Land Use Survey in Annexure B of the CNVMP. There are seven heritage-listed receivers close to the work areas, summarised in Table 3.1.

Table 3.1: Assessment heritage receivers

Name	Address/Location	Significance
Sydenham		
Sydenham Railway Station Group	Gleeson Avenue, Sydenham	State
Marrickville		
Marrickville Railway Station Group	Station Street, Marrickville	State
Stone house, including interiors	1 Myrtle Street, Marrickville	Local
Sewage Pumping Station	271, Carrington Road, Marrickville	State
Stonewalling, terracing and street planting	High, Junction, Ruby and Schwebel Streets (streetscape group)	Local
Dulwich Hill		
Dulwich Hill Railway Station Group	Wardell Road, Dulwich Hill	State
South Dulwich Heritage Conservation Area	Wardell Road, Wilga Avenue, Kays Avenue West & East, Challis Avenue, School Parade, Albemarle Street Dulwich Hill	Local
Inter-War Heritage Conservation Area Group	Hollands Avenue; Jocelyn Avenue and Woodbury Street	Local
Gladstone Hall, including interiors	114 Ewart Street, Dulwich Hill	State
Maronite Sisters Convent and High School (former Carmelite Convent), including interiors	194–210 Wardell Road, Dulwich Hill	Local
Hurlstone Park		
Hurlstone Park Railway Station Group	Floss Street, Hurstone Park	State
Hurlstone Park Railway Underbridge	Foord Street, Hurlstone Park	State
Canterbury		
Canterbury Railway Station Group	Canterbury Road, Canterbury	State
Federation railway bridge	Charles Street (over Cooks River)	State
Canterbury (Cooks River/Charles St) Underbridge	Charles Street, Canterbury	State
Inter war hotel (former Hotel Canterbury)	208 Canterbury Road	Local
	Lot 1, DP 124336; Lots 27 and 28, DP	
Federation post office building (former Canterbury Post Office)	193 Canterbury Road Lot 1, DP 124336; Lots 27 and 28, DP 4763	Local
Canterbury Sugar Mill (former)	2–4 Sugar House Road; Lot 1437, DP 1015590	State
Electricity Substation no. 275	94 Church Street	State
Campsie		
Campsie Railway Station Group	Wilfred Avenue, Campsie	State
Federation commercial building—Coffill's Buildings	191–197 Beamish Street, Lots A–D, DP 373377	Local
Inter war commercial building—Station House	203 Beamish Street, Lot 1, DP 3846	Local
Inter war court house (former Campsie Court House)	56–58 Campsie Street, Campsie	Local
War memorial clock tower	Anglo Road (Anzac Mall)	Local
Federation house	40 South Parade, Lot 1, DP 512836	Local

Name	Address/Location	Significance
Belmore		
Belmore Railway Station Group	Burwood Road, Belmore	State
Post-war bus shelter and public lavatories	32-36 Redman Pde, Belmore	Local
Federation house (former station master's cottage)	346 Burwood Road Lot 202, DP 1090882	Local
Lakemba		
Lakemba Railway Station Group	The Boulevarde, Lakemba	State
Federation weatherboard house	12 The Boulevarde, Lakemba; Lot 4, DP 6691	Local
Inter war post office building—Lakemba Post Office	54-60 The Boulevarde, Lot 1, DP 455268	Local
Electricity Substation no. 143	Railway Parade, Lakemba	State
Wiley Park		
Wiley Park Railway Station Group	The Boulevarde, Wiley Park	State
Inter war water pumping station—Lakemba Pumping Station (WP0003)	1B Hillcrest Street, Lot 1, DP 125481	State
Punchbowl		
Punchbowl Railway Station Group	Punchbowl Road, Punchbowl	State
War memorial and street trees	Broadway and Hillcrest Street (between The Boulevarde and Canterbury Road (Broadway) and adjoining 34 and 37 Broadway (Hillcrest Avenue) Punchbowl	Local
Post-war civic building (former Punchbowl Baby Health Centre)	748 Punchbowl Road, Punchbowl	Local
Bankstown		
Bankstown Railway Station Group	Bankstown City Plaza	State
Bankstown Parcels Office (former)	143 Bankstown City Plaza Lot 101, DP 1129021	State
Shop (former accommodation house)	109 Bankstown City Plaza Lot 1, DP 119533	Local

4 Construction Noise and Vibration objectives

4.1 Noise goals

4.1.1 Noise management levels (NMLs)

Construction noise management levels (NMLs) have been determined using the Construction Environmental Management Framework (CEMF)[11], CSSI-8256 Conditions, in accordance with the Sydney Metro City & Southwest Construction Noise and Vibration Strategy (SMCSNVS) [9] and as set out in the CNVMP.

For the SW Corridor Power Supply works external NMLs are derived from the ICNG, as identified in Section 5.1.2 of the CNVMP[1]. Airborne NMLs are determined using the ICNG. For residential receivers these are based on the background noise levels derived from long-term noise logging conducted by SLR on behalf of Transport for NSW (TfNSW) to quantify ambient noise levels for the Environmental Impact Statement (EIS) [2]. This has been incorporated into the CNVMP.

The NMLs for 'other' sensitive receivers are from the ICNG, as reported in Table 11 of the CNVMP. These are applicable when the other sensitive receiver is in use.

Airborne NMLs are summarised and presented in APPENDIX B.

Receivers are considered 'noise affected' where construction noise levels are greater than the NMLs identified in APPENDIX B. The noise affected level represents the point above which there may be some community reaction to noise. Where predicted and/or measured construction noise levels are above the NMLs, all feasible and reasonable work practices will be applied to meet the NMLs.

Where construction activities are tonal or impulsive in nature and are described in the ICNG as being particularly annoying, 5 dB(A) must be added to the activity noise. Activities that are defined in the Interim Construction Noise Guideline (ICNG) [4] as particularly annoying include but are not limited to the use of 'beeper' style reversing or movement alarms; power saws; vibratory rolling; jack hammering, rock hammering or rock breaking; impact piling.

During standard construction hours, a highly affected noise objective of $L_{Aeq(15min)}$ 75 dB(A) applies in relation to airborne noise at all residential receivers.

4.1.2 Sleep disturbance

Consistent with Section 5.1.3 of the CNVMP [1], an initial screening level of $L_{Amax} \le L_{A90(15min)} + 15$ dB(A) is used. In situations where this results in an external screening level of less than 55 dB(A), a minimum screening level of 55 dB(A) is set. Note that this is equivalent to a maximum internal noise level of 45 dB(A) with windows open.

Where noise events are found to be above the screening level, further analysis is made to identify:

• the likely number of events above 45 dB(A) (internal) that might occur during the night assessment

period

whether events are above an 'awakening reaction' level of 55 dB(A) L_{Amax} (internal) that equates to

NML of L_{Amax} 65 dB(A) (assuming open windows).

The ICNG recommends that where construction works are planned to extend over more than two consecutive nights, maximum noise levels and the extent and frequency of maximum noise level events

above the RBL should be considered.

During construction works at night, attended noise monitoring will be undertaken at representative

residences most impacted by the works during night-time periods (see Section 5). The noise monitoring will follow the procedures outlined in APPENDIX E of the CNVMP [1], which includes measurement of

 L_{Amax} noise metrics. If maximum noise levels are found to be above the sleep NML of 45 dB(A), the

responsible noise source(s) will be identified and further analysis undertaken to quantify the extent and

frequency of events above the NML. Additional feasible and reasonable mitigation measures may need

to be considered to reduce potential impacts.

4.1.3 Construction related road traffic noise objectives

On the roads immediately adjacent to construction sites, the community may associate heavy vehicle movements with the SW Corridor Power Supply works. Construction traffic movements on public roads

will aim to limit any increase in existing road traffic noise levels to no more than 2 dB(A). All feasible and

reasonable noise mitigation and management measures will be implemented.

4.2 Construction vibration goals

As reported in Section 5.4 and 5.5 of the CNVMP [1], construction vibration goals have been determined

using:

• for human exposure, the acceptable vibration values set out in the Environmental Noise

Management Assessing Vibration: A Technical Guideline (Department of Environment and

Conservation, 2006) [5]

for structural damage, the vibration limits set out in the

• British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings.

Guide to damage levels from ground-borne vibration [6] and

German Standard DIN 4150-3: Structural Vibration - effects of vibration on structures [7].

4.2.1 Disturbance to building occupants (human annoyance)

For disturbance to human occupants of buildings, we refer to 'Assessing Vibration; a technical guideline'

[5]. This document provides criteria which are based on the British Standard BS 6472-1992, 'Evaluation

of human exposure to vibration in buildings (1-80Hz)' [8].

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Intermittent vibration is assessed using vibration dose values (VDVs). For the assessment of potential vibration at the nearest vibration sensitive receivers preferred and maximum VDV goals for the day period (7:00am to 10:00pm) are presented in Table 4.1.

Table 4.1: Construction vibration disturbance goals

Location	Accordment period	Vibration Dose Value (VDV), m/s ^{1.75}					
Location	Assessment period ¹	Preferred values	Maximum values				
Critical areas ²	Day or Night	0.10	0.20				
Residences	Day	0.20	0.40				
	Night	0.13	0.26				
Offices, schools, educational institutions and places of worship	Day or Night	0.40	0.80				
Workshops	Day or Night	0.80	1.60				

Notes: 1. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am

4.2.2 Structural damage to buildings

A conservative vibration damage screening level per receiver type, assuming vibration predominantly has a frequency of 20 Hz, is given below:

- Reinforced or framed structures (Group 1): 25.0 mm/s
- Unreinforced or light framed structures (Group 2): 7.5 mm/s

At locations where the predicted and/or measured vibration levels are greater than shown above (peak component particle velocity), a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level.

It is noted that vibration levels required to cause minor cosmetic damage are typically 10 x higher than levels that will cause disturbance to building occupants. Many building occupants assume that building damage is occurring when they feel vibration or observe rattling of loose objects, however the level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures.

4.2.3 Heritage

Section 4.2.3 of the CNVMP [1] outlines the approach to manage potential vibration impacts on heritage items, where identified. The actions to be taken shall be to:

1) Identify heritage items where the 2.5 mm/s peak component particle velocity objective may be exceeded during specific construction activities

^{2.} Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source: BS 6472-1992

2) Structural engineering report to be undertaken on identified heritage items, to confirm structural integrity of the building and confirm if item is 'structurally sound'

- 3) If item confirmed as 'structurally sound', the screening criteria in Section 4.2.2 shall be adopted, or
- 4) If item confirmed as 'structurally unsound', the more conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity would be adopted.

4.2.4 Sensitive scientific and medical equipment

No sensitive scientific or medical equipment are known to be located near the assessed works. If they are identified, relevant vibration criteria should be established for each item in line with Section 5.5.3 of the CNVMP [1], and any corresponding management or mitigation measures determined.

4.2.5 Utilities and other vibration sensitive structures

Where utilities or other vibration sensitive structures are identified, relevant vibration criteria will be established for each item per Section 5.5.4 of the CNVMP [1], and any corresponding management or mitigation measures determined.

5 Construction Noise Assessment

5.1 Noise prediction methodology

5.1.1 Noise prediction model

Modelling and assessment of airborne noise impacts from activities associated with the construction works were determined by modelling the noise sources, receiver locations, topographical features, and possible noise mitigation measures using a Cadna-A computer noise model developed for this project. The model calculates the contribution of each noise source at identified sensitive receiver locations and allows for the prediction of the total noise from a site for the various stages of the construction works.

The noise prediction models take into account:

- Location of noise sources and sensitive receiver locations.
- Height of sources and receivers referenced to one metre digital ground contours for the site area and surrounding area.
- Sound Power Levels (L_w) of plant and equipment likely to be used during the various construction
 activities (see Table C1 in APPENDIX C). Table C1 also identifies the plant and equipment that will
 operate during each assessment period.
- Separation distances between sources and receivers.
- Ground type between sources and receivers.
- Attenuation from barriers (natural and purpose built).

Key details regarding the construction site layout, the likely plant and equipment (including truck movements), and hours of operation were informed by the Design and Construction Teams. This information is presented in APPENDIX C and formed the basis for all modelling assumptions used in this assessment.

5.1.2 Noise assessment assumptions

The SW Corridor Power Supply works have been assessed in the following three subsections:

- Section 5.2 High Voltage (HV) cabling
- Section 5.3 11kV Padmount Substation installation works
- Section 5.4 Traction Substation works

A safe work area has been established and will remain in place for the duration of the works to allow works to be completed during standard construction hours. For some areas this is not feasible and works in these areas would be completed under a Rail Possession or during the rail shutdown period,

outside standard construction hours. Indicative timing of works and activities that may require out of

hours works are clearly denoted in APPENDIX C and in the following sections.

The construction work areas are identified in the land use survey drawings presented in APPENDIX B.

A detailed computer noise model was prepared to predict noise levels at all relevant sensitive receivers.

Various combinations of work activities outlined in Section 2.1.1 are likely to occur, with some activities

using different equipment during out of hours works. The works have been subdivided in the following

three categories:

• High impact activities, denoted in APPENDIX C as 'HN' and would include chainsaw, wood

chipper/ mulcher, rock hammering, rock breaking, saw cutting, and vibratory rolling;

Typical activities, which will exclude the above high impact activities

Low impact activities, which involve cable pulling.

Predicted L_{Aeq} noise levels from the worksite are assessed against the NMLs and presented in summary

with colour coding to denote the highest level of exceedance of the NML. The results are presented in

terms of level above the NML.

For **Standard Hours** construction noise impacts are presented as follows:

Below NML

< 10dB(A) above NML - construction noise clearly audible</p>

◆ > 10dB(A) above NML - construction noise clearly moderately intrusive

 \square > 75dB(A) - highly noise affected (for residential receivers)

Outside Standard Hours construction noise impacts are presented as follows:

Below NML

< 5dB(A) above NML - construction noise noticeable
</p>

♦ 5 to 15dB(A) above NML - construction noise clearly audible

> 15 to 25dB(A) above NML - construction noise moderately intrusive

□ >25dB(A) above NML - construction noise highly intrusive.

Detailed predicted noise levels for each receiver are given in APPENDIX D.

The noise predictions presented in this CNVIS represent a realistic worst-case scenario when

construction occurs at work locations close to residences and other sensitive receivers. At each receiver,

noise levels will vary during the construction period based on the position of equipment within the

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SOUTH WEST CORRIDOR WORKS

worksite, the distance to the receiver, the construction activities being undertaken and the noise levels of particular plant items and equipment. Actual noise levels will often be less than the predicted levels presented in this CNVIS.

5.2 High Voltage (HV) cabling

5.2.1 Noise assessment assumptions

The assessment considered HV cabling work activities along the rail corridor in 27 zones between the Marrickville Dive (Zone 0) and Bankstown Station (Zone 26). The works are summarised in **Table 5.1** and presented in detail in Table C1-1 in APPENDIX C. The works have categorised as low noise activities (L), which involve cable pulling.

Table 5.1: Summary of HV cabling construction activities

Works Area (see APPENDIX B)	Activity	Construction hours	Assessment reference		
HV Cabling (Marrickville Dive to Campsie Trac					
Zone-0 Marrickville dive-Marrickville Station	HV Cabling	Standard hours and OOH	Z0-L		
Zone-1 Marrickville dive-Marrickville Station	HV Cabling	Standard hours and OOH	Z01-L		
Zone-2 Marrickville Station	HV Cabling	Standard hours and OOH	Z02-L		
Zone-3 Marrickville Station - Dulwich Hill Traction Substation	HV Cabling	Standard hours	Z03-L		
Zone-4 & 5 Dulwich hill Traction Substation - Dulwich Hill station	HV Cabling	Standard hours and OOH	Z04-05-L		
Zone-6 Dulwich Hill Station	HV Cabling	Standard hours and OOH	Z06-L		
Zone-7 Dulwich Hill Station - Hurlstone park station	HV Cabling	Standard hours	Z07-L		
Zone-8 Hurlstone Park station	HV Cabling	Standard hours and OOH	Z08-L		
Zone-9 Hurlstone Park station - Canterbury Traction substation	HV Cabling	Standard hours	Z09-L		
Zone-10&11 Canterbury Traction substation - Canterbury Station	HV Cabling	Standard hours	Z10-11-L		
Zone-12 Canterbury Station	HV Cabling	Standard hours and OOH	Z12-L		
Zone-13 Canterbury Station - Campsie Station	HV Cabling	Standard hours and OOH	Z13-L		
Zone-14 Campsie Station	HV Cabling	Standard hours and OOH	Z14-L		
Zone-15 & 16 Campsie Station to Campsie Traction substation	HV Cabling	Standard hours and OOH	Z15-16-L		
HV Cabling (Campsie to Bankstown)					
Zone-17 Campsie Traction substation to Belmore Station	HV Cabling	Standard hours and OOH	Z17-L		
Zone-18 Belmore Station	HV Cabling	Standard hours and OOH	Z18-L		
Zone-19 Belmore Station to Lakemba Station	HV Cabling	Standard hours	Z19-L		
Zone-20 Lakemba Station	HV Cabling	Standard hours and OOH	Z20-L		

Works Area (see APPENDIX B)	Activity	Construction hours	Assessment reference
Zone-21 Lakemba Station to Wiley Park Station	HV Cabling	Standard hours and OOH	Z21-L
Zone-22 Wiley Park Station	HV Cabling	Standard hours and OOH	Z22-L
Zone-23 Wiley Park Station to Punchbowl Station	HV Cabling	Standard hours	Z23-L
Zone-24 Punchbowl Station	HV Cabling	Standard hours and OOH	Z24-L
Zone-25 Punchbowl Station to Bankstown Station	HV Cabling	Standard hours	Z25-L
Zone-26 Bankstown Station	HV Cabling	Standard hours and OOH	Z26-L

Notes 'L' denotes low noise activities

Details of the plant and adopted sound power levels are presented in APPENDIX C.

5.2.2 Standard construction hours

Table 5.2 presents the predicted worst-case construction noise levels for each of the construction stages identified in **Table 5.1** at the most affected residential receiver in each NCA. The results are presented in terms of level above the NMI

Predicted noise levels are above the NMLs at noise sensitive receivers around the HV cabling work zones. The work zones are all within the rail corridor, providing some separation to the nearest sensitive receivers. During the works the nearest residential receivers to the work zones may experience moderately intrusive noise, depending on the location of the work activity relative to the receiver. The works will progress along the alignment. The two nearest residential receivers to the Zone 3 works may be highly noise affected if works occur near the residential boundary, although this is unlikely.

Proposed measures to minimise noise levels are outlined in Section 5.5. For more detailed predictions, see APPENDIX D. For more detailed additional noise management measures, refer to APPENDIX E.

5.2.3 Out of hours work

Some of the HV cabling works would need to be completed outside standard hours during rail possession or rail shutdown periods, when works are close to the live rail corridor. The OOH work zones are noted in Table 5.1 and Table C1-2 in APPENDIX C.

Predicted construction noise levels were compared with the project NML to give an indication of the likely noise impact at receiver locations. A summary of the results is presented in

Table 5.3. For more detailed predictions, see APPENDIX D.

Table 5.2: Summary of noise impacts at nearby receivers – HV cabling works (standard hours)

NCA	Z0-L	Z1-L	Z2-L	Z3-L	Z4-5- L	Z6-L	Z7-L	Z8-L	Z9-L	Z10- 11-L	Z12-L	Z13-L	Z14-L	Z15- 16-L	Z17-L	Z18-L	Z19-L	Z20-L	Z21-L	Z22-L	Z23-L	Z24-L	Z25-L	Z26-L
Std	Stand	ard hour	s 7am to	o 6pm M	londay to	o Friday	and 8an	n to 6pn	n Saturd	ay														
MDS_05	•	-	-	-	-	-	-	-	-	-	-	-	-	-										
S2B_01	0	•	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S2B_02	-	-	-		•	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S2B_03	-	-	-	-	-	-	•	•	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S2B_04	-	-	-	-	-	-	-	-	0	•	•	•	-	-	-	-	-	-	-	-	-	-	-	-
S2B_05	-	-	-	-	-	-	-	-	-	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-
S2B_06	-	-	-	-	-	-	-	-	-	-	-	•	•	•	•	-	-	-	-	-	-	-	-	-
S2B_07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	•	-	-	-	-	-	-	-
S2B_08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	•	0	-	-	-	-	-
S2B_09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	•	•	0	-	-	-
S2B_10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	•	0	•
S2B_11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	•
S2B_12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	•
S2B_13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OSR	•	•	•	•	•	•	•	•	•	0	•	•	•	•	•	•	•	•	0	•	•	•	0	•

Notes:

OSR: this includes all commercial, industrial, and other sensitive receivers.

Dash symbol ("-") shows where predicted levels are less than 30dB(A)

- Below NML
- < 10dB(A) above NML construction noise clearly audible</p>
- ♦ > 10dB(A) above NML construction noise clearly moderately intrusive
- \square > 75dB(A) highly noise affected (for residential receivers)

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Table 5.3: Summary of noise impacts at nearby receivers – HV cabling works (OOH)

NCA	Z0-L	Z1-L	Z2-L	Z3-L	Z4-5- L	Z6-L	Z7-L	Z8-L	Z9-L	Z10- 11-L	Z12-L	Z13-L	Z14-L	Z15- 16-L	Z17-L	Z18-L	Z19-L	Z20-L	Z21-L	Z22-L	Z23-L	Z24-L	Z25-L	Z26-L
OOH D/	Day p	eriod ou	t-of-hou	ırs (1pm	to 6pm,	Saturda	ys and 8	am to 6	pm, Sun	days and	d Public	Holidays	s)											
OOH E	Evenir	ng perio	d (6pm t	o 10pm,	Monday	to Sun	day)																	
MDS_05	•	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_01	*	-		N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_02	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_03	-	-	-	N/A	-	-	N/A		N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_04	-	-	-	N/A	-	-	N/A	-	N/A	N/A		_	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_05	-	-	-	N/A	-	-	N/A	-	N/A	N/A	•	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_06	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	•	_		-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_07	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	•	♦	N/A	-	-	-	N/A	-	N/A	-
S2B_08	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	♦	-	-	N/A	-	N/A	-
S2B_09	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	•	-	-	N/A	-	N/A	-
S2B_10	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	•	N/A	•
S2B_11	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	*
S2B_12	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	•
S2B_13	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
OSR	•	•		N/A	_	-	N/A		N/A	N/A		-		•	•		N/A		♦	•	N/A	_	N/A	•

Notes:

OSR: this includes all commercial, industrial and other sensitive receivers.

Dash symbol ("-") shows where predicted levels are less than 30dB(A)

- Below NML
- O < 5dB(A) above NML construction noise noticeable</p>

- ♦ 5 to 15dB(A) above NML construction noise clearly audible
- > 15 to 25dB(A) above NML construction noise moderately intrusive
- □ >25dB(A) above NML construction noise highly intrusive

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Table 5.4: Summary of noise impacts at nearby receivers – HV cabling works (OOH)

NCA	Z0-L	Z1-L	Z2-L	Z3-L	Z4-5- L	Z6-L	Z7-L	Z8-L	Z9-L	Z10- 11-L	Z12-L	Z13-L	Z14-L	Z15- 16-L	Z17-L	Z18-L	Z19-L	Z20-L	Z21-L	Z22-L	Z23-L	Z24-L	Z25-L	Z26-L
оон и	Night	period (10pm to	7am Mo	onday to	Friday a	and 10pr	n to 8pn	n Saturd	ays, Sun	ıdays & F	ublic H	olidays)											
MDS_05	•	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_01	-			N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_02	-	-	-	N/A			N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_03	-	-	-	N/A	-	-	N/A		N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_04	-	-	-	N/A	-	-	N/A	-	N/A	N/A			-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_05	-	-	-	N/A	-	-	N/A	-	N/A	N/A	0	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_06	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-				-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_07	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
S2B_08	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	•	-	-	N/A	-	N/A	-
S2B_09	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	•	-	-	N/A	-	N/A	-
S2B_10	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	0	N/A	•
S2B_11	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	•
S2B_12	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	•
S2B_13	-	-	-	N/A	-	-	N/A	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	N/A	-	N/A	-
OSR	•	•	-	N/A			N/A		N/A	N/A		•	_	♦	•		N/A		♦	♦	N/A		N/A	•

Notes:

OSR: this includes all commercial, industrial and other sensitive receivers.

Dash symbol ("-") shows where predicted levels are less than 30dB(A)

- Below NML
- < 5dB(A) above NML construction noise noticeable
 </p>

- ♦ 5 to 15dB(A) above NML construction noise clearly audible
- > 15 to 25dB(A) above NML construction noise moderately intrusive
- \square >25dB(A) above NML construction noise highly intrusive

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Due to the close proximity of residential receivers to the worksites, the nearest residential receivers are likely to experience moderately to highly intrusive noise levels, depending on the specific location of the work. Receivers would not be impacted for a lengthy period of time as works progress along the rail corridor.

Specific mitigation measures outlined in Section 5.5 are to be incorporated into the construction work plan to assist in reducing noise impacts during the works period, where practicable.

5.2.4 Sleep disturbance

Construction equipment may produce instantaneous noise events during operation. Toolbox talks will be used to advise all personnel of the need to follow quiet work practices during OOHW periods, including limiting the need for car door closing and warning personnel of the need to respect the residential receivers surrounding the local area work sites. No high noise impact activities are required for these works

Due to the nature of these low noise works, it is likely that maximum noise levels will be below the sleep disturbance NML of 65 dB(A) $L_{A,max}$ during the night period works.

5.3 11kV Padmount Substation installation works

5.3.1 Noise assessment assumptions

The assessment considered combinations of work activities at key project stages for each of the eleven 11 kV padmount substations which are summarised in **Table 5.5** and presented in detail in Table C1-1 in APPENDIX C. The works have been categorised as 'Typical' activities (T), which will exclude high impact activities such as chainsaw, rock hammering, saw cutting, and vibratory rolling.

Table 5.5: Summary of 11 kV Padmount Substation construction activities

Works Area (see APPENDIX B)	Activity	Construction hours	Assessment reference
Sydenham Station	11 kV Padmount installation	Standard hours	SY-T
Marrickville Station	11 kV Padmount installation	Standard hours	MVP-T
Dulwich Hill Station	11 kV Padmount installation	Standard hours	DHP-T
Hurlstone Park Station	11 kV Padmount installation	Standard hours	HPP-T
Canterbury Station	11 kV Padmount installation	Standard hours	CBP-T
Campsie Station	11 kV Padmount installation	Standard hours	CPP-T
Belmore Station	11 kV Padmount installation	Standard hours	BMP-T
Lakemba Station	11 kV Padmount installation	Standard hours	LKP-T
Wiley Park Station	11 kV Padmount installation	Standard hours	WPP-T
Punchbowl Station	11 kV Padmount installation	Standard hours	PBP-T
Bankstown Station	11 kV Padmount installation	Standard hours	BKP-T

Notes 'T' denotes 'typical activities'

Details of the plant and adopted sound power levels are presented in APPENDIX C.

5.3.2 Standard construction hours

Table 5.6 presents the predicted worst-case construction noise levels for each of the construction stages identified in **Table 5.5** at the most affected residential receiver in each NCA. The results are presented in terms of level above the NML.

Table 5.6: Summary of noise impacts at nearby receivers - 11 kV Padmount works (standard hours)

NCA	SY-T	MVP-T	DHP-T	HPP-T	CBP-T	CPP-T	BMP-T	LKP-T	WPP-T	PBP-T	BKP-T
Std	Standa	rd hours 7	am to 6pr	n Monday	to Friday	and 8am	to 6pm S	aturday			
MDS_04	•	-	-	-	-	-	-	-	-	-	-
MDS_05	•	-	-	-	-	-	-	-	-	-	-
S2B_01	•		-	-	-	-	-	-	-	-	-
S2B_02	-	-	•	-	-	-	-	-	-	-	-
S2B_03	-	-	•	•	-	-	-	-	-	-	-
S2B_04	-	-	-	-	•	-	-	-	-	-	-
S2B_05	-	-	-	-	0	-	-	-	-	-	-
S2B_06	-	-	-	-	-	•	-	-	-	-	-
S2B_07	-	-	-	-	-	-	•	-	-	-	-
S2B_08	-	-	-	-	-	-	-	•	-	-	-
S2B_09	-	-	-	-	-	-	-	•	•	-	-
S2B_10	-	-	-	-	-	-	-	-	-	•	-
S2B_12	-	-	-	-	-	-	-	-	-	-	•
S2B_13	-	-	-	-	-	-	-	-	-	-	•
OSR	•	•	0	•	•	•	•	•	•	•	•

Notes: OSR: this includes all commercial, industrial, and other sensitive receivers.

Dash symbol ("-") shows where predicted levels are less than 30dB(A)

- Below NML
- < 10dB(A) above NML construction noise clearly audible</p>
- lack > 10dB(A) above NML construction noise clearly moderately intrusive
- □ > 75dB(A) highly noise affected (for residential receivers)

Predicted noise levels are above the NMLs at noise sensitive receivers around the padmount substation worksites. The worksites are typically in close proximity to residential receivers. This means that during typical works the nearest residential receivers to the worksites may experience moderately intrusive noise, depending on the location of the work activity relative to the receiver. Three receivers may be highly noise affected during works at the Marrickville Station 11kV Padmount Substation site, when the works are closest to residential receivers.

The results above confirm that due to the substantial distance between each padmount substation worksite, there is no cumulative impact predicted should works at the sites be carried out concurrently. Should the works be carried out concurrently with the HV cabling or Traction Substation works, the cumulative noise impact would not increase predicted noise levels by more than 2 dB(A).

Proposed measures to minimise noise levels are outlined in Section 5.5. For more detailed predictions, see APPENDIX D. For more detailed additional noise management measures, refer to APPENDIX E.

5.4 Traction Substation works

5.4.1 Noise assessment assumptions

The assessment considered combinations of work activities at key project stages for each of the five traction substations (Dulwich Hill (DH); Canterbury (CB); Campsie (CP); Lakemba (LK); Punchbowl (PB)) which are summarised in **Table 5.7** and presented in detail in Table C1-2 in APPENDIX C. The works have been subdivided in the following two categories:

- High noise activities, denoted in APPENDIX C as 'HN' and would include chainsaw, wood chipper/ mulcher, rock hammering, rock breaking, saw cutting, and vibratory rolling;
- Typical activities, which will exclude the above high impact activities.

Table 5.7: Summary of Traction Substation construction activities

Works Area (see APPENDIX B)	Activity	Construction hours	Assessment reference
TSS Civil works at:	Enabling works	Standard hours	-T and
- Dulwich Hill (DH); - Canterbury (CB); - Campsie (CP); - Lakemba (LK); - Punchbowl (PB)	Piling (PB only)	Standard hours	-H PB-T and PB-H
	Excavation	Standard hours	-T and -H
- FullCliDOWI (FB)	CSR and Drainage installation	Standard hours	-T
	Earthing/ Backfill/ Asphalt/ Perimeter Fence Installation/ Facade Installation/ Landscape	Standard hours	-Т
	FRP works	Standard hours	-T and -H
	Enabling works Modular Building Installation	Standard hours	-T and -H
TSS Installation works at: - Dulwich Hill (DH);	Basement Excavation Excavation for TSS footings and basement	Standard hours	-Т
- Canterbury (CB);- Campsie (CP);	Basement Construction FRP for basement slab and walls	Standard hours	-Т
- Lakemba (LK);- Punchbowl (PB)	Delivery Delivery of building/s on site	Standard hours (except oversized delivery at night)	-T
	Fencing	Standard hours	-T
	Electrical Works	Standard hours	-T

Works Area (see APPENDIX B)	Activity	Construction hours	Assessment reference
TSS Possession Works at: - Dulwich Hill (DH);	Modular Buildings Installation and transformer	Standard hours and OOH	-T
- Canterbury (CB);	ULX Exploration	Standard hours and OOH	-T
- Campsie (CP);	ULX Construction	Standard hours and OOH	-T and -H
- Lakemba (LK); - Punchbowl (PB)	Drainage Batter Chute Construction	Standard hours and OOH	-T
	Transmission Pole Installation	Standard hours and OOH	-T
	Danger zone Excavation	Standard hours and OOH	-T and -H

Notes 'T' denotes 'typical activities'; 'H' denotes High impact activities,

Details of the plant and adopted sound power levels are presented in APPENDIX C.

5.4.2 Standard construction hours

Table 5.8 presents the predicted worst-case construction noise levels for each of the construction stages identified in **Table 5.7** at the most affected residential receiver in each NCA. The results are presented in terms of level above the NML.

Table 5.8: Summary of noise impacts at nearby receivers - Traction Substation works (standard hours)

NCA	Туріса	l works				High i	High impact works						
	DH	СВ	СР	LK	РВ	DH	СВ	СР	LK	РВ			
Std	Standard ho	urs 7am t	o 6pm Mo	nday to Fr	riday and 8	Bam to 6pr	m Saturda	y					
S2B_01	•	-	-	-	-	•	-	-	-	-			
S2B_02		-	-	-	-		•	-	-	-			
S2B_03	-	•	-	-	-	•		-	-	-			
S2B_04	-	•	-	-	-	-		-	-	-			
S2B_05	-	-	-	-	-	-	-	•	-	-			
S2B_06	-	-	•	-	-	-	-		•	-			
S2B_07	-	-	•	•	-	-	-	0	•	-			
S2B_08	-	-	-	•	-	-	-	-		-			
S2B_10	-	-	-	-	•	-	-	-	-				
S2B_11	-	-	-	-	•	-	-	-	-				
OSR	0	•	•	0	•	•	0	•	*	•			

Notes: OSR: this includes all commercial, industrial, and other sensitive receivers.

Dash symbol ("-") shows where predicted levels are less than 30dB(A)

- Below NML
- < 10dB(A) above NML construction noise clearly audible</p>
- ♦ > 10dB(A) above NML construction noise clearly moderately intrusive
- \square > 75dB(A) highly noise affected (for residential receivers)

Predicted noise levels area above the NMLs at noise sensitive receivers around the Traction Substation worksites. The worksites are typically in close proximity to residential receivers. This means that during typical works the nearest residential receivers to the worksites may experience moderately intrusive noise, depending on the location of the work activity relative to the receiver. Up to 4 receivers may be highly noise affected during works at the Dulwich Hill Traction Substation site, when the works are closest to residential receivers.

During high impact works, a number of nearby receivers may potentially be highly noise affected (i.e. exposed to noise levels above 75 dB(A)). This would potentially occur during Enabling works, Piling (Punchbowl only), Excavation, FRP works and Modular Building Installation. The highest impacts are at the Dulwich Hill TSS, where receivers are in very close proximity to the worksite. Up to 30 residential receivers may be highly noise affected.

The results above confirm that due to the substantial distance between each Traction Substation worksite, there is no cumulative impact predicted should works at the sites be carried out concurrently. Should the TSS works be carried out concurrently with the HV cabling or 11 kV Padmount installation works, the cumulative noise impact would not increase predicted noise levels by more than 2 dB(A).

Proposed measures to minimise noise levels are outlined in Section 5.5. For more detailed predictions, see APPENDIX D. For more detailed additional noise management measures, refer to APPENDIX E.

5.4.3 Out of hours work

As part of the SW Corridor Power Supply works, some works would need to be completed outside standard hours during rail possession or rail shutdown periods, or where oversized delivery is restricted to the night period, as noted in **Table 5.7** and Table C1-2 in APPENDIX C.

Predicted construction noise levels were compared with the project NML to give an indication of the likely noise impact at receiver locations. A summary of the results is presented in Table 5.9.

Table 5.9: Summary of noise impacts at nearby receivers - Traction Substation works (OOH)

NCA	Typical	works				High i	High impact works					
NCA	DH	СВ	СР	LK	РВ	DH	СВ	СР	LK	РВ		
OOH D/ OOH E		Day period out-of-hours (1pm to 6pm, Saturdays and 8am to 6pm, Sundays and Public Holidays) Evening period (6pm to 10pm, Monday to Sunday)										
S2B_01	*	-	-	-	-	-	-	-	-	-		
S2B_02		-	-	-	-		•	-	-	-		
S2B_03	-	_	-	-	-	•		-	-	-		
S2B_04	-		-	-	-	-		-	-	-		
S2B_05	_	-	•	-	-	-	-	0	-	-		
S2B_06	-	-	_	-	-	-	-		•	-		
S2B_07	-	-	•	0	-	-	-	\	•	-		

NCA	Typical w	orks				High impact works						
INCA	DH	СВ	СР	LK	РВ	DH	СВ	СР	LK	РВ		
S2B_08	-	-	-	•	-	-	-	-		-		
S2B_10	-	-	-	-	•	-	-	-	-			
S2B_11	-	-	-	-		-	-	-	-			
OSR	0	•	•	0		0	•	*	0			
OOH N	Night per	riod (10pm	to 7am Mo	onday to Fr	riday and 10	Opm to 8pi	m Saturday	s, Sundays	& Public F	Holidays)		
S2B_01	•	-	-	-	-		-	-	-	-		
S2B_02		-	-	-	-		•	-	-	-		
S2B_03	-		-	-	-	•		-	-	-		
S2B_04	-		-	-	-	-		-	-	-		
S2B_05	-	-	•	-	-	-	-	•	-	-		
S2B_06	-	-		-	-	-	-		•	-		
S2B_07	-	-	0	•	-	-	-	\	•	-		
S2B_08	-	-	-		-	-	-	-		-		
S2B_10	-	-	-	-	•	-	-	-	-			
S2B_11	-	-	-	-		-	-	-	-			
OSR	0	•	•	•	•	♦	•	•	•			

Notes: OSR: this includes all commercial, industrial and other sensitive receivers.

- Below NML
- \bigcirc < 5dB(A) above NML construction noise noticeable
- ♦ 5 to 15dB(A) above NML construction noise clearly audible
- > 15 to 25dB(A) above NML construction noise moderately intrusive
- □ >25dB(A) above NML construction noise highly intrusive

Dash symbol ("-") shows where predicted levels are less than 30dB(A)

Where Traction Substation works are completed over a rail possession weekend or during rail shutdown, works would be completed outside standard construction hours. The need for possession works to complete the TSS works has been reduced by the establishment of safe work zones within the rail corridor. These safe work zones allow the bulk of TSS works to be completed during standard construction hours. The possession works are limited as noted in Table C1-2 in APPENDIX C.

Due to the close proximity of residential receivers to the worksites, the nearest residential receivers are likely to experience moderately to highly intrusive noise levels, depending on the specific location of the work and the type of activity that is completed during the night period. Typically, receivers would not be impacted for a lengthy period of time as most the TSS possession works are up to 2 days per site and would typically include respite weekends (i.e. there would not be consecutive weekends of OOHW). There may be some exceptions, such as the June 2021 possession, which is a two week shutdown.

Where practicable, high impact works will be completed during the OOH Day and OOH Evening period, to reduce the potential for sleep disturbance on neighbouring residential receivers.

The results above confirm that due to the substantial distance between each Traction Substation worksite, there is no cumulative impact predicted should works at the sites be carried out concurrently.

Specific mitigation measures outlined in Section 5.5 are to be incorporated into the construction work plan to assist in reducing noise impacts during the works period, where practicable. The use of temporary noise screens would reduce noise to the nearest single storey receivers by approximately 5 dB(A) (sometimes more if line of sight is broken), and should be used, where practicable, where works are required during the more sensitive night period.

Measures for managing potential noise impacts are provided in Section 5.5. For more detailed predictions, see APPENDIX D. For more detailed additional noise measures, refer to APPENDIX E.

5.4.4 Sleep disturbance

Construction equipment may produce instantaneous noise events during operation. Due to the proximity of the residential receivers to the works, it is likely that maximum noise levels from sources such as truck airbrakes and banging from metal on metal contact will exceed the sleep disturbance NML of 65 dB(A) L_{A,max} during the night period works.

These activities will be managed by setting up relevant traffic management measures to minimise the use of air brakes when on site, using broadband reversing alarms on heavy vehicles, and minimising heavy vehicle movements where possible (note there is only 1 delivery truck likely to be required during the night period). Truck drivers will be instructed to avoid excessive acceleration from a stopped position and vigorous slamming of truck doors. The potential of loose items or plant/equipment that could generate metal-on-metal bangs will be identified and managed.

In addition, Toolbox talks will be used to advise all personnel of the need to follow quiet work practices during OOHW periods, including limiting the need for car door closing and warning personnel of the need to respect the residential receivers surrounding the local area work sites. High noise works will be limited during the night period, where practicable, to reduce the potential for sleep disturbance.

Other management measures are outlined in Section 5.5.3 to aid in providing additional noise reduction benefits where predicted levels are above the objective.

5.5 Noise mitigation and management

5.5.1 Consultation with affected receivers

CSSI-8256 Condition E28 requires consultation with affected community, religious or educational institutions where construction noise is found to exceed the NMLs to assist in managing works outside sensitive periods. Systems Connect will continue consultation with potentially affected landholders (taking into consideration consultation outcomes undertaken by Sydney Metro to date) regarding specific mitigation measures applicable to the works:

 Ongoing direct contact with residents and businesses on streets surrounding the site via doorknocks, phone and email.

- Bi-annual newsletters distributed to businesses and residents within 500m of the site.
- Monthly notification distributed to businesses and residents within 100m of the site and include updates on recent works and works coming up.
- Community information session on site with environment, engineers, community on an as-needed basis.
- Specific consultation with businesses impacted by our works (adjacent to work areas).
- Invitation to all property owners within 500m to register for weekly email updates included in the bi-annual newsletter.

5.5.2 Site Noise Control Measures

The following standard noise control measures, in addition to those outlined in APPENDIX C, are recommended to reduce potential noise impacts:

Table 5.10: Site Noise Control Measures

Control type	Control measure	Typical use					
At-Source	Limit equipment in use	Only the equipment necessary during each stage of the OOHW will be used.					
Control Measures	Timing of equipment in use	Where practicable, activities and plant will be limited as outlined in Table C1 (APPENDIX C).					
	Limit activity duration	Any equipment not in use for extended periods shall be switched off. For example, heavy vehicles should switch engines off when not in use.					
	Use and siting of plant	Avoid/ limit simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver. Direct noise-emitting plant away from sensitive receivers where practicable. Locate fixed location plant items as far from sensitive receivers as practicable.					
	Equipment selection	Use quieter and less noise/ vibration emitting construction methods where feasible and reasonable.					
	Temporary noise screens	Where practicable, out of hours works should utilise temporary noise screens (e.g. Echo-barrier, or similar) to provide noise screening during noisier works, such as concrete pours etc that are required to be completed during more sensitive time periods. Temporary noise screens can provide 5 to 10 dB noise reduction, where they can break line of site.					
	Truck movements	Avoid the use of park air brakes on site at night. Set up relevant traffic management measures to minimise the use of air brakes when leaving the site. Air brake silencers are to be correctly installed and fully operational for any heavy vehicles (as per CNVMP). Minimise unnecessary acceleration on site.					
	Non-tonal reversing alarms	Alternative reverse alarms, such as 'quackers' will be installed on all plant and equipment, where practicable.					

Control type	Control measure	Typical use
Noise Management Measures	Site inductions & Toolbox Talks	All employees, contractors and subcontractors will receive a Project induction. The environmental component may be covered in toolboxes and should include:
		 location of nearest sensitive receivers
		 relevant project specific and standard noise and vibration mitigation measures;
		 permitted hours of work;
		OOHW Procedure and Form
		construction employee parking areas.
	Community consultation	Inform community of construction activity and potential impacts.
	Respite periods	High noise impact activities are carried out in continuous blocks of up to 3 hours. Respite from high noise impact activities will be provided between each block for at least 1 hour. No high noise impact activities will be carried out during this 1 hour respite period.
	Work scheduling around sensitive areas	Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels would be scheduled during less sensitive time periods.
		When working adjacent to schools, medical facilities and childcare centres, scheduling noisy activities around HSC exam times, child care sleep times and other identified sensitive times should be considered, where feasible and reasonable.
		When working adjacent to churches and places of worship noisy activities should be scheduled outside services, where feasible and reasonable.
	Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
	Noise monitoring	Noise monitoring is to be carried out as detailed in Section 5.5.4.

5.5.3 Additional Noise Mitigation Measures

Table 5.11 below should be used to advise the appropriate additional noise mitigation during construction, based on the CNVS [10] and the CNVMP [1].

Predicted LAeq.15min noise level above When is the work being Identify additional management undertaken? measures to be implemented Background (RBL) Noise Management Level (NML) Standard Hours 0 to 10 dB(A) > 10 to 20 dB(A) ≤ 10 dB(A) M-F 7am to 6pm Sat 8am to 1pm > 20 to 30 dB(A) > 10 to 20 dB(A) ►LB, M [MM2] [MM2] > 20 dB(A)> 30 dB(A)LB, M OOHW Period 1 0 to 10 dB(A) \leq 5 dB(A) M-F 6pm to 10pm > 10 to 20 dB(A) > 5 to 15 dB(A) ► LB [MM1] ►LB. M [MM2] Sat 1pm to 10pm > 20 to 30 dB(A) > 15 to 25 dB(A) Sun/ PH 8am to 10pm > 30 dB(A) > 25 dB(A) LB, M, IB, PC, RO, SN OOHW Period 2 0 to 10 dB(A) $\leq 5 dB(A)$ > 10 to 20 dB(A) > 5 to 15 dB(A) LB. M [MM2] M-F 10pm to 7am Sat 10pm to 8am > 20 to 30 dB(A) > 15 to 25 dB(A) LB, M, IB, PC, RO, SN Sun/ PH 6pm to 8am > 30 dB(A) > 25 dB(A) ►LB, M, IB, PC, RO, SN, AA Notes: Use the abbreviation codes in the table above to confirm management measures required Code in square brackets [] refers to noise management code for affected receivers identified in each CNVIS LB = Letter box drops SN = Specific notifications RO = Project specific respite offer M = Monitoring PC = Phone calls and emails AA = Alternative accommodation IB = Individual briefings

Table 5.11: Additional Airborne Noise Mitigation Measures

APPENDIX E presents a summary of the additional noise mitigation measures applicable for construction activities where, after application of all reasonable and feasible mitigation options, predicted construction noise levels still exceed the NMLs.

Prior to the commencement of the site establishment works, residential receivers around the Traction Substation worksite, in particular those identified in APPENDIX E will be notified to advise that noise from the works may at times be audible. All potentially impacted receivers will be kept informed of the nature of works to be carried out, the expected noise levels and duration, as well as be given the project enquiries and complaints 1800 numbers (see Section 5.5.6).

5.5.4 Attended Noise Monitoring

Attended noise monitoring will be undertaken during works at one of the representative residential receivers identified in the table below in the NCAs most impacted by the works (i.e. a minimum of one location for each NCA). Nominated attended measurement locations have been selected with the best opportunity to validate the predicted noise levels. Noise monitoring is subject to obtaining the property owner/occupier's consent to access the property (where required). If consent to access property is denied, monitoring will be done on public land on the property boundary, provided it is safe to do so.

Table 5.12: Nominated verification monitoring locations

NCA	Nominated receiver address	Monitoring location
Sydenham St	tation 11 kV Padmount Substation	
S2B_01	1 MYRTLE STREET, MARRICKVILLE	Northern western property boundary (in rail reserve)
S2B_01	135 MEEKS ROAD, MARRICKVILLE	Southern property boundary (on Meeks Road)
Marrickville S	Station 11 kV Padmount Substation	
S2B_01	23 LEOFRENE AVENUE, MARRICKVILLE	Northern property boundary (in rail reserve)

NCA	Nominated receiver address	Monitoring location
S2B_01	21 RIVERDALE AVENUE, MARRICKVILLE	North western property boundary (on Riverdale Ave)
Dulwich Hill Station 11 kV Padmount Substation		
S2B_02	65 EWART STREET, DULWICH HILL	North eastern property boundary (on Ewart Ln)
S2B_02	11 BEDFORD CRESCENT, DULWICH HILL	North western property boundary (on Bedford Cres)
Hurlstone Park Station 11 kV Padmount Substation		
S2B_03	7 COMMONS STREET, HURLSTONE PARK	Northern property boundary (in rail reserve)
Canterbury Station 11 kV Padmount Substation		
S2B_04	4 BROUGHTON STREET, CANTERBURY	South western property boundary (in rail reserve)
S2B_04	15 CHARLES STREET, CANTERBURY	North eastern property boundary (on Charles Street)
Campsie Station 11 kV Padmount Substation		
S2B_06	3 WILFRED AVENUE, CAMPSIE	South eastern property boundary (on Wilfred Ave)
S2B_06	32-34 CAMPSIE STREET, CAMPSIE	South eastern property boundary (on Wilfred Ave)
Belmore Station 11 kV Padmount Substation		
S2B 07	2 ACACIA STREET, BELMORE	Northern property boundary (in reserve to north of property)
_	on 11 kV Padmount Substation	
S2B_08	49 RAILWAY PARADE, LAKEMBA	South eastern property boundary (on Railway Pde)
Wiley Park Station 11 kV Padmount Substation		
S2B_09	2 SHADFORTH STREET, WILEY PARK	South eastern property boundary (on Stanlea Pde)
Punchbowl Station 11 kV Padmount Substation		
S2B_10	41 URUNGA PARADE, PUNCHBOWL	Southern property boundary (on Urunga Pde)
Bankstown Station 11 kV Padmount Substation		
S2B_12	99 NORTH TERRACE, BANKSTOWN	Southern property boundary (on North Terrace)
Dulwich Hill Traction Substation		
S2B_02	29 ALBERMARLE STREET, MARRICKVILLE	Northern property boundary (in rail reserve)
S2B_02	20 RANDALL STREET, MARRICKVILLE	North eastern property boundary (on Randall Street)
Canterbury Traction Substation		
S2B_03	2 CANBERRA STREET, HURLSTONE PARK	Southern property boundary (in rail reserve)
S2B_04	8 HUTTON STREET, HURLSTONE PARK	Northern property boundary (on Hutton Street)
Campsie Traction Substation		
S2B_06	50 LILIAN STREET, CAMPSIE, NSW	North western property boundary (on Lillian Street)
S2B_06	62 LILIAN STREET, CAMPSIE, NSW	North western property boundary (on Lillian Street)
S2B_06	13-15 AGLO STREET, CAMPSIE, NSW	North western property boundary (on Lillian Lane)
Lakemba Traction Substation		
S2B_08	11 THE BOULEVARDE , LAKEMBA, NSW	North western property boundary (on The Boulevarde)
S2B_08	17 THE BOULEVARDE , LAKEMBA, NSW	North western property boundary (on The Boulevarde)
Punchbowl Traction Substation		
S2B_11	105 STANSFIELD AVENUE, BANKSTOWN	Southern property boundary (in reserve to south of property)
S2B_11	72 SOUTH TERRACE, BANKSTOWN	North eastern property boundary (on South Terrace)

Notes: Monitoring on private property is subject to owner consent and where relevant, occupier consent. If consent to access property is denied, monitoring will be done on public land on the property boundary, provided it is safe to do so.

If verification monitoring shows that the external noise levels are consistently above the predicted levels (i.e. on 2 or more consecutive monitoring nights), investigation will be undertaken to understand the cause of the exceedance and relevant reasonable and feasible mitigation measures will be implemented.

Periodic assessment of plant noise levels will be undertaken in accordance with Section 9.2.3 and Table 20 of the CNVMP to confirm the plant noise levels are within the APPENDIX C Table C1.

All noise monitoring will follow the procedures outlined in Appendix D of the CNVMP.

5.5.5 Managing site specific activities and cumulative noise impacts (Gatewave)

This CNVIS has established the overall impacts associated with the SW Corridor Power Supply works. A 3D construction noise and vibration management tool (Gatewave, www.gatewave.com.au) has been developed specifically for the Sydney Metro LWW to allow specific work areas and activities to be assessed as construction works progress. It also allows cumulative noise impact from other aspects of the Project or, where relevant noise from other construction projects, to be assessed and managed in accordance with the CNVMP.

Gatewave will be used regularly to plan, assess and manage works progressively and to coordinate works to ensure relevant mitigation measures are in place.

Gatewave incorporates ground elevation contours, building heights, the built environment and atmospheric conditions to predict construction noise in accordance with the International Standard ISO 9613-2:1996 implementing quality standard ISO 17534-1:2015. All sensitive receivers identified by the land use survey (see Section 3) are integrated into the Gatewave tool.

5.5.6 Complaints Handling

Noise complaints received and responded to will be managed in accordance with the CNVMP and the Community Consultation Strategy.

Transport for NSW operate a 24-hour construction complaints line (1800 171 386).

Enquiries/ complaints may also be received through the Sydney Metro project email (linewide@transport.nsw.gov.au).

6 Construction vibration impacts

6.1 Minimum working distances for vibration intensive plant

Potential vibration generated to receivers is dependent on separation distances, the intervening soil and rock strata, dominant frequencies of vibration, and the receiver structure. Review of the plant and equipment listed for the key construction activities in APPENDIX C, no vibration intensive plant has been identified for:

- HV cabling works
- 11 kV Padmount Substation installation works

Vibration intensive plant has been identified for the Tractions Substation works. The dominant vibration generating plant and equipment include:

- Drill Rig
- Vibratory Roller (7T Smooth Drum)
- Roller (2t)
- Excavator with hammer (35-45T)
- Excavators with hammer (12T)
- Rock Saw attachment on a medium sized excavator
- Concrete / road / rail saw
- Compactor / Wacker packer
- Excavator with auger (5t).

The recommended minimum working distances for vibration intensive plant are presented in Table 6.1 and Table 6.2. Site specific buffer distances for vibration intensive plant items must be measured on site where plant and equipment are likely to operate close to or within the minimum working distances for cosmetic damage (Table 6.1).

Unlike noise, vibration cannot be readily predicted. There are many variables from site to site, such as soil type and conditions, sub surface rock, building types and foundations, and actual plant on site.

The data relied upon in this assessment (tabulated below) is taken from a database of vibration levels measured at various sites or obtained from other sources (such as BS5228-2:2009). They are not specific to this project as final vibration levels are dependent on many factors including the actual plant used, its operation and the intervening geology between the activity and the receiver.

Table 6.1: Minimum working distances (m) for cosmetic damage (continuous vibration)

	Minimum working distance (m)						
Plant item	Reinforced or framed structures (e.g. commercial buildings) ¹	Unreinforced or light framed structures (e.g. residential buildings) 1	Sensitive structures (e.g. heritage structures) ²				
Concrete saw	5	5	5				
Place compactor/Wacker packer							
Drill Rig	5	5	10				
Rock Saw attachment on a medium sized excavator							
Excavator 10-15t with hydraulic hammer attachment							
Smooth drum roller (<13t) - Low vibration							
Excavator 35t with hydraulic hammer attachment	5	10	10				
Smooth drum roller (<13t) - High vibration	5	5	15				

Note 1: Initial screening test criteria reduced by 50% due to potential dynamic magnification in accordance with BS7385.

Table 6.2: Minimum working distances (m) for human annoyance (continuous vibration)

	Minimum working distances, m					
Plant item	Critical areas ^{1,4}	Residences		Offices ^{3,4}	Workshops ⁴	
	Cittical aleas	Day ²	Night ²	Offices	workshops	
Concrete saw	15	10	10	5	5	
Place compactor/Wacker packer	20	10	15	5	5	
Drill Rig	30	20	20	10	10	
Excavator 10-15t with hydraulic hammer attachment	30	20	25	15	10	
Rock Saw attachment on a medium sized excavator	45	25	35	15	10	
35t Excavator with hydraulic hammer attachment	40	25	30	20	15	
Smooth drum roller (13t) - Low vibration	75	40	55	20	10	
Smooth drum roller (13t) - High vibration	105	55	75	30	15	

Notes 1: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring.

Note 2: In accordance with Section 5.5.2 of CNVMP, a site inspection should determine whether a heritage structure is structurally unsound.

Note 3: Minimum working distances are in 5m increments only to account for the intrinsic uncertainty of this screening method. Jackhammers and direction drills are likely to have minimum working distances smaller than 5 m (e.g. 1m in accordance with TfNSW CNS).

^{2:} Daytime is 7 am to 10 pm; Night-time is 10 pm to 7am.

 $^{{\}tt 3: Examples \ include \ of fices, \ schools, \ educational \ institutions \ and \ place \ of \ worship.}\\$

^{4:} Applicable when in use.

^{5:} Operating for 30% of the time in high vibration mode.

6.2 Vibration assessment

6.2.1 Structural damage

The number of buildings which are close to or within the minimum working distances for cosmetic damage are shown in Table 6.3 and in APPENDIX F.

Table 6.3: Number of buildings within minimum working distances for cosmetic damage

		Number of buildings ¹		
Work Area	Plant item	Reinforced or framed structures (e.g. commercial buildings)	Screening criteria for non-heritage structures	Screening criteria for heritage structures ²
Dulwich Hill	Concrete saw	0	1	5
TSS	Place compactor/Wacker packer	-		
	Drill Rig	-		
	Rock Saw attachment	-		
	Excavator 10-15t with hydraulic hammer attachment			
	35t Excavator with hydraulic hammer attachment			
	Smooth drum roller (13t) - Low vibration			
	Smooth drum roller (13t) - High vibration			
Canterbury	Concrete saw	0	0	0
TSS	Place compactor/Wacker packer	-		
	Drill Rig	-		
	Rock Saw attachment	-		
	Excavator 10-15t with hydraulic hammer attachment			
	35t Excavator with hydraulic hammer attachment			
	Smooth drum roller (13t) - Low vibration			
	Smooth drum roller (13t) - High vibration			
Campsie	Concrete saw	0	0	0
TSS	Place compactor/Wacker packer			
	Drill Rig			
	Rock Saw attachment			
	Excavator 10-15t with hydraulic hammer attachment			
	35t Excavator with hydraulic hammer attachment			

		Number of buildings ¹				
Work Area	Plant item	Reinforced or framed structures (e.g. commercial buildings)	Screening criteria for non-heritage structures	Screening criteria for heritage structures ²		
	Smooth drum roller (13t) - Low vibration					
	Smooth drum roller (13t) - High vibration					
Lakemba TSS	Concrete saw	0	0	0		
	Place compactor/Wacker packer	_				
	Drill Rig					
	Rock Saw attachment					
	Excavator 10-15t with hydraulic hammer attachment					
	35t Excavator with hydraulic hammer attachment					
	Smooth drum roller (13t) - Low vibration					
	Smooth drum roller (13t) - High vibration					
Punchbowl	Concrete saw	0	0	0		
TSS	Place compactor/Wacker packer	_				
	Drill Rig	_				
	Rock Saw attachment					
	Excavator 10-15t with hydraulic hammer attachment					
	35t Excavator with hydraulic hammer attachment					
	Smooth drum roller (13t) - Low vibration					
	Smooth drum roller (13t) - High vibration					

Note:

- 1. Site inspection should determine structural conditions of all potentially vibration affected buildings.
- 2. Potential heritage structures reference (Land Use Survey in Annexure B of the CNVMP).

During vibration intensive TSS works at Dulwich Hill TSS there are 6 heritage structures and 1 non-heritage structure located within the minimum working distances established for cosmetic damage during the works, as identified in Table 6.4. Detailed vibration predictions are presented in APPENDIX F.

Vibration monitoring is recommended to determine site specific conditions and/or to verify that vibration levels achieve compliance with the structural damage objectives should plant be required to operate within the safe working distance identified in Table 6.1. If the monitoring above identifies that vibration is likely to exceed the structural damage objectives, a different construction method with lower source vibration levels will be considered.

6.2.2 Human annoyance

APPENDIX F and Table 6.4 identifies specific receivers that may be exposed to vibration that may cause adverse comments during construction works. However, due to the limited time the vibration intensive plant will be operating close to these properties, the risk of annoyance is considered low.

Attended vibration measurement should be carried out in the event of complaint from the nearest receiver to confirm that vibration is within the acceptable range for human annoyance (see Section 6.3.3). The assessing vibration guideline [5] notes that inside dwellings, adverse comments often arise when occupants can perceive (feel) vibration, particularly when the vibration arises from a source located outside their home (or outside their control), and assume that the vibration has the potential to damage their building or contents.

However, it is noted that vibration levels required to cause minor cosmetic damage are typically 10 x higher than levels that will cause disturbance to building occupants. Many building occupants assume that building damage is occurring when they feel vibration or observe rattling of loose objects, however the level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures.

At properties near the worksite, it is likely that the nearest receivers will be able to feel vibration levels when vibration-generating equipment is being utilised. Properties where vibration levels may be above the vibration disturbance goals in Table 4.1 and there is a probability of adverse comment are shown in Table 6.4.

Table 6.4: Number of buildings within minimum working distances for human annoyance

		Critical	Residences ⁵		- en 24	
Work Area	Plant item	areas ^{1,4}	Day ²	Night²	Offices ^{3,4}	Workshops ⁴
	Concrete saw	0	46	N/A	0	0
TSS	Place compactor/Wacker packer	-				
	Drill Rig	-				
	Rock Saw attachment	-				
	Excavator 10-15t with hydraulic hammer attachment					
	35t Excavator with hydraulic hammer attachment	-				
	Smooth drum roller (13t) - Low vibration	-				
	Smooth drum roller (13t) - High vibration	-				
Canterbury	Concrete saw	0	15	N/A	0	0
TSS	Place compactor/Wacker packer	-				
	Drill Rig					
	Rock Saw attachment					

\A/\ A	Diamet itams	Critical	Residences ⁵		Off. 34	W- 1 1 4
Work Area	Plant item	areas ^{1,4}	Day ²	Night ²	Offices ^{3,4}	Workshops ⁴
	Excavator 10-15t with hydraulic hammer attachment					
	35t Excavator with hydraulic hammer attachment	-				
	Smooth drum roller (13t) - Low vibration	_				
	Smooth drum roller (13t) - High vibration					
Campsie	Concrete saw	0	29	N/A	2	0
TSS	Place compactor/Wacker packer	_				
	Drill Rig	_				
	Rock Saw attachment	_				
	Excavator 10-15t with hydraulic hammer attachment	_				
	35t Excavator with hydraulic hammer attachment	_				
	Smooth drum roller (13t) - Low vibration					
	Smooth drum roller (13t) - High vibration					
Lakemba	Concrete saw	0	24 N/A	N/A	0	0
TSS	Place compactor/Wacker packer	_				
	Drill Rig	_				
	Rock Saw attachment	_				
	Excavator 10-15t with hydraulic hammer attachment	_				
	35t Excavator with hydraulic hammer attachment	_				
	Smooth drum roller (13t) - Low vibration	_				
	Smooth drum roller (13t) - High vibration	_				
Punchbowl	Concrete saw	0	27	N/A	1	0
TSS	Place compactor/Wacker packer					
	Drill Rig					
	Rock Saw attachment					
	Excavator 10-15t with hydraulic hammer attachment					
	35t Excavator with hydraulic hammer attachment					
	Smooth drum roller (13t) - Low vibration					

Mank Anaa	DI C	Critical areas ^{1,4} Residences ⁵ Day ² Night ²			Offices ^{3,4}	Workshops ⁴
Work Area	Plant item			Night ²	Offices	
	Smooth drum roller (13t) - High vibration					

Notes: 1: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring.

- 2: Daytime is 7 am to 10 pm; Night-time is 10 pm to 7am.
- 3: Examples include offices, schools, educational institutions and place of worship.
- 4: Applicable when in use.
- 5: Hotels and childcare centres are included in the residence category.
- 6: Most vibration intensive plant (i.e. Smooth drum roller (13t) High vibration) has been used to estimate the maximum number of buildings within MWD for human annoyance.

From Table 6.4, there are residential properties and offices that may experience vibration which can cause adverse comment when vibration-generating plant is operated nearby (Smooth drum roller (13t) - High vibration). The property is identified in APPENDIX F.

The above assessment is based on vibration-generating equipment being operating continuously at the closest location to nearby receivers. When vibration-generating equipment operates further from the closest point, the predicted vibration levels will reduce along with the probability of adverse comment.

Attended vibration measurements are proposed to be carried out proactively and in response to vibration complaints. If measurement results indicate exceedances of the vibration objectives for human annoyance at these locations, vibration control and management measures will be provided to reduce vibration impact (see Section 6.3.1).

After applying all feasible and reasonable vibration mitigation measures, if vibration monitoring still identifies that measured vibration levels are above the relevant vibration criteria for human annoyance, appropriate additional mitigation measures should be considered (see Section 6.3.2).

6.3 Vibration mitigation measures

6.3.1 Vibration control and management measures

In addition to the vibration control measures presented in the CNVMP, the following vibration management measures are provided to minimise vibration impact from construction activities to the nearest affected receivers and to meet the relevant human comfort vibration and structural damage limits identified in Section 4.2.

Table 6.5: Site vibration control measures

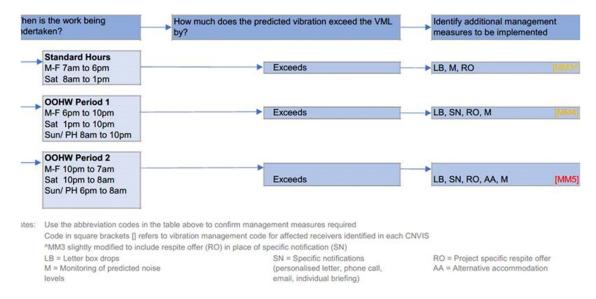
Control type	Control measure	Typical use
Construction Planning	Building condition surveys	Undertake building dilapidation surveys on all buildings located within the buffer zones established for cosmetic damage prior to commencement of activities with the potential to cause property damage (see Section 6.1).

Control type	Control measure	Typical use
	Community consultation	Implement community consultation measures – inform community of construction activity & potential impacts – inform community that the level of vibration at which people perceive it, or at which loose objects may rattle, is far lower than the level at which minor cosmetic damage is expected to occur
	Equipment selection/ construction method	Use less vibration emitting construction methods where feasible $\&$ reasonable, for example vibratory rollers can, where practicable, be operated with the vibratory mode switched off to reduce vibration impact.
	Plan work activities to minimise vibration.	Plan traffic flow, parking & loading/unloading areas to maximise distances between truck routes and sensitive receivers.
Complaints Management	Construction Complaints Management System	Complaints will be managed in accordance with the Construction Complaints Management System (see Section 6.2.2). Each complaint shall be investigated and where vibration levels are established as exceeding the set limits, appropriate amelioration measures shall be put in place to mitigate future occurrences. Management measures may include modification of construction methods such as using smaller equipment and establishment of safe buffer zones as mentioned above.

6.3.2 Additional vibration mitigation measures

After applying all feasible and reasonable mitigation measures identified in Table 6.5, if vibration monitoring at representative locations are still above relevant vibration objectives for human annoyance, the appropriate additional vibration mitigations measures, as outlined in Section 8.2 of the CNVMP.

Table 6.6: Additional vibration mitigation measures



6.3.3 Vibration monitoring

Attended vibration monitoring is to be undertaken to determine and verify site specific minimum working distances for cosmetic damage and human annoyance. Attended vibration monitoring will be undertaken during works whenever vibration significant plant items are operating close to or within the determined minimum working distances or in response to a vibration complaint.

6.3.4 Managing site specific activities and cumulative vibration impacts (Gatewave)

The Project environment team will use Gatewave to manage construction vibration impact by defining specific work areas and identifying properties within minimum working distances established for cosmetic damage and human annoyance.

6.3.5 Management of complaints

Vibration complaints received and responded to will be managed in accordance with the CNVMP and the Community Consultation Strategy.

Transport for NSW operate a 24-hour construction complaints line (1800 171 386).

Enquiries/ complaints may also be received through the Sydney Metro project email (linewide@transport.nsw.gov.au).

7 Ground-borne noise assessment

Due to the nature of the Traction Substation works, which are surface works, airborne noise is expected to be much higher than ground-borne noise levels at the nearest sensitive receivers. On this basis, the potential impact of ground-borne noise from construction activities is expected to be negligible.

As such, the risk of annoyance due to ground-borne noise is considered low and has not been addressed further in this CNVIS.

8 Traffic noise assessment

Low levels of heavy vehicle movements are likely to be associated with South West Corridor Power Supply works, and the majority of the these will be at the start and end of the works period. As such, the increase in road traffic noise levels is likely be less than 2 dB(A) and so construction traffic will have minimal impact on the main roads used to access the site.

Notwithstanding this, the Heavy Vehicle Code of Conduct includes several measures, including limiting of compression braking, minimisation of vehicle idling, which will ensure that noise impacts of heavy vehicle traffic on surrounding streets are minimised.

9 Cumulative impacts

All concurrent Sydney Metro construction works have been considered and addressed in this CNVIS, including works within the South West Corridor which fall under the Systems Connect work scope. Systems Connect are aware of ongoing, potentially concurrent construction activities within the vicinity of the Traction Substation worksite. The works, summarised in Table 9.1, may have the potential to generate cumulative noise impacts on receivers.

These works have been considered but it has been determined that, due to the nature of the other unrelated construction works, no additional physical mitigation measures are deemed reasonable. Nevertheless, in accordance with the CNVMP Systems Connect will endeavour to take all reasonable steps to collaborate with other Projects to minimise cumulative noise and vibration impact where Systems Connect are above management levels and coordinate respite for affected sensitive receivers, whenever practicable.

Gatewave, a 3D construction noise and vibration management tool (<u>www.gatewave.com.au</u>) will be used to assess and manage cumulative noise impact from other aspects of the Project or, where relevant noise from other construction projects, in accordance with the CNVMP.

Table 9.1: Other construction works close to S2B P4 South West Corridor Works

Construction company	Project	Timing of activities	Hours of works	Works location	Activity types	General plant types
John Holland & Laing O'Rourke	Sydney Metro –	TBC	Standard construction hours, outside construction hours	Sydenham Station	New station entrances at Burrows Road and Railway Parade	
Sydenham and rail possession works Metro Upgrade		New concourse over the station with lifts and stairs to each platform, including the two new Sydney Metro platforms				
Not awarded yet	Sydney Metro - South West Corridor Station Works	TBC	Standard construction hours, outside construction hours and rail possession works	Stations from Sydenham to Bankstown	Station upgrade construction works	
Sydney Trains	Sydney Train maintenance works	Based on Sydney Trains trackwork schedule	Based on Sydney Trains trackwork schedule	Any point along the railway corridor. Immediately adjacent to Systems Connect worksite	Rail and signalling maintenance works	Utility relocation, minor earthworks, signal and rail modification.
Systems Connect	Sydney Metro - Line-wide Works		Bulk Power Supply (Campsie) works	Campsie Station to Canterbury Transmission Substation	Trenching, cable pulling, rehabilitation	Excavator with bucket, tipper trucks, vibratory roller

10 Conclusion

Works associated with the South West Corridor power supply works have been identified and described in this report. Potentially affected noise and vibration sensitive receivers and relevant construction noise and vibration objectives have been identified and discussed to allow the assessment of potential construction impacts.

The expected construction noise levels have been predicted and presented in Section 5.2 and APPENDIX D. The expected duration of construction activities is outlined in Table C1 of APPENDIX C.

Predicted noise levels from the HV cabling work zones are above the NMLs at noise sensitive receivers. The work zones are all within the rail corridor, providing some separation to the nearest sensitive receivers. During standard hours works the nearest residential receivers to the work zones may experience moderately intrusive noise, depending on the location of the work activity relative to the receiver. Outside standard hours the nearest residential receivers are likely to experience moderately to highly intrusive noise levels. Receivers would not be impacted for a lengthy period of time as works progress along the rail corridor.

Predicted noise levels are above the NMLs at noise sensitive receivers around the padmount substation worksites. The worksites are typically in close proximity to residential receivers. This means that during typical works the nearest residential receivers to the worksites may experience moderately to highly intrusive noise during and outside of standard construction hours. No high impact works are anticipated, which will reduce the potential for sleep disturbance on neighbouring residential receivers.

Predicted noise levels area above the NMLs at noise sensitive receivers around the Traction Substation worksites. The worksites are typically in close proximity to residential receivers. This means that during typical works the nearest residential receivers to the worksites may experience moderately intrusive noise, depending on the location of the work activity relative to the receiver. During high impact works, a number of nearby receivers may potentially be highly noise affected (i.e. exposed to noise levels above 75 dB(A)). This would potentially occur during Enabling works, Piling (Punchbowl only), Excavation, FRP works and Modular Building Installation. The highest impacts are at the Dulwich Hill TSS, where receivers are in very close proximity to the worksite. Where practicable, high impact works will be completed during the OOH Day and OOH Evening period, to reduce the potential for sleep disturbance on neighbouring residential receivers.

Specific mitigation measures outlined in Table C2 (APPENDIX C) and in Section 5.5 are to be incorporated into the construction work plan to assist in reducing noise impacts during the works period, where practicable.

Vibration impacts and management measures have been presented in Section 6 to aid in minimising any potential vibration impacts. During vibration intensive TSS works at Dulwich Hill TSS there are 6 heritage structures and 1 non-heritage structure located within the minimum working distances established for cosmetic damage during the works. Measures to manage the risk of impact are presented in Section 6.3. The risk of structural damage to buildings near the remaining worksites is

assessed as low. Several receivers may be exposed to vibration that may cause adverse comments during construction works. However, due to the limited time the vibration intensive plant will be operating close to these properties, the risk of annoyance is considered low.

The potential impact of ground-borne noise from construction activities is expected to be negligible due to the expectation that airborne noise will be much higher than ground-borne noise levels at the nearest sensitive receivers.

Minimal construction vehicles are proposed as part of the works, and so construction traffic noise on the local road network associated with the works will have minimal impact on receivers in proximity to public roads.

References

[1] Sydney Metro City & Southwest – Line Wide Works Contract Construction Noise and Vibration Management Plan (SMCSWLWC-SYC-1NL-PM-PLN-000032-A-CNVMP-C2B)

- [2] SLR Consulting Australia Pty Ltd 2017 Sydney Metro Sydenham to Bankstown Technical Paper 2: Noise and Vibration Report Number 610.15897-R02 28 August 2017
- [3] SLR Consulting Australia Pty Ltd 2016 Sydney Metro Chatswood to Sydenham Technical Paper 2: Noise and Vibration Report Number 610.14718R1 28 April 2016
- [4] Department of Environment and Climate Change 2009 NSW Interim Construction Noise Guideline
- [5] Department of Environment Conservation NSW 2006 Assessing Vibration; a technical guideline
- [6] British Standard BS 7385 Part 2 1993, Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration
- [7] German Standard DIN 4150-3:2016-12 Vibration in buildings Part 3: Effects on structures
- [8] British Standard BS 6472-2008, Evaluation of human exposure to vibration in buildings (1-80Hz)
- [9] Transport for NSW Sydney Metro City & Southwest Construction Noise Strategy (ref: 610.14213-R3)08 August 2016
- [10] Transport for NSW Construction Noise and Vibration Strategy (ref: 7TP-ST-157/4.0) May 2018
- [11] Transport for NSW Sydney Metro Construction Environmental Management Framework August 2016
- [12] Department of Environment, Climate Change and Water 2011 NSW Road Noise Policy
- [13] NSW Department of Planning Development near rail corridors and busy road interim guideline 2008

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: OdB 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 100dBThe sound of a rock band 115dBLimit of sound permitted in industry 120dBDeafening
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}	observation. The time during which the noise remains at levels different from that of the ambient

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.
ООН	Out of Hours (i.e. outside standard construction hours)
OOHW	Out of Hours Work (i.e. works carried out outside standard construction hours)
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 Nearest sensitive receivers and noise management levels

Table B1: Noise sensitive receivers and construction noise management levels

S2B SOUTH WEST CORRIDOR WORKS

NCA	work area	Receiver Type	Reference RBL		Noise Levels, dB(A	A)	Resident	tial NMLs based	on ICNG (extern	nal)	Sleep Dis	t. L _{Amax}	Comments
MDS_04/05	Marrickville Dive	Residential south east of railway line and south	C2S EIS B.01	59	53	41	69	64	58	46	56	65	
2B_01	Rail corridor	west of Bedwin Street Residential buildings up and down side of railway	S2B EIS B.04	41	41	34	51	46	46	39	55	65	
	nan corridor	line with some commercial buildings	325 El3 5.04	72		31	31	-10	-10	33	33	03	
B_02	Rail corridor	Predominantly residential buildings up and down side of railway line	S2B EIS B.05	40	40	33	50	45	45	38	55	65	
B_03	Rail corridor and Bulk Power Supply	·	S2B EIS B.06	38	38	34	48	43	43	39	55	65	
B_04	Rail corridor and Bulk Power Supply	Commercial around Canterbury Railway Station an residential buildings up side of railway line and south west of Cooks River	d S2B EIS B.07	40	40	35	50	45	45	46	55	65	
3_05	Rail corridor and Bulk Power Supply	Predominantly residential buildings up and down side of railway line	S2B EIS B.09	36	36	32	46	41	41	46	55	65	
B_06	Rail corridor and Bulk Power Supply	Commercial around Campsie Railway Station and residential buildings up and down side of railway line	S2B EIS B.10	45	42	35	55	50	47	40	55	65	
3_07	Rail corridor	Commercial around Belmore Railway Station and residential buildings up and down side of railway line	S2B EIS B.13	41	41	35	51	46	46	40	55	65	
3_08	Rail corridor	Commercial around Lakemba Railway Station andresidential buildings up and down side of railway line	S2B EIS B.14	47	47	41	57	52	52	46	56	65	
3_09	Rail corridor	Predominantly residential buildings up and down side of railway line with educational buildings	S2B EIS B.16	44	44	36	54	49	49	41	55	65	
3_10	Rail corridor	Commercial buildings surrounding Punchbowl Railway Station with residential.	S2B EIS B.19	47	47	41	57	52	52	46	56	65	
3_11	Rail corridor	Residential buildings up and down side of railway line	S2B EIS B.20	47	47	39	57	52	52	44	55	65	
3_12	Rail corridor	Commercial buildings surrounding Bankstown Railway Station	S2B EIS B.22	54	51	42	64	59	56	47	57	65	
B_13	Rail corridor	Residential buildings up and down side of railway line with some commercial buildings	S2B EIS B.23	42	42	39	52	47	47	44	55	65	
S_01	Bulk Power Supply	Predominantly residential buildings. The exception is the first row of buildings along Canterbury Road, which are mixed commercial/ residential		40	40	35	50	45	45	40	55	65	
ther sensitiv							45	45	45	45			Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)
Studio building (music recording studio)													
Studio building (film or television studio)						50	50	50	50			Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)	
Cinema space, theatre, auditorium						55	55	55	55			Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)	
	g areas: Hotels near major ı	<u> </u>					60	60	60	60			Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)
Classrooms at schools and other educational institutions Chilcare centre (internal play and sleeping areas)						55 50	55 50	55 50	55 50			Source: ICNG, assuming a conservative façade loss of 10 dB(A) Source: AAAC - guideline for Child Care Centre Acoustic Assessment, assuming a	
Hospital wards and operating theatres						65	65	65	65			conservative façade loss of 10 dB(A) Source: ICNG, assuming a conservative façade loss of 20 dB(A)	
Places of worship Library (reading areas)					55 65	55 65	55 65	55 65			Source: ICNG, assuming a conservative façade loss of 10 dB(A) Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)		
Office building (general office areas)						65	65	65	65			Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)	
	Hotel (bars and lounges)						70	70	70	70			Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)
otel (bars an	d lounges)									, 0			
	d lounges) entres – Municipal Buildings	;					60	60	60	60			Source: AS2107 'maximum', assuming a conservative façade loss of 10 dB(A)

SYDNEY METRO: CITY AND SOUTHWEST LINE WIDE WORKS

RENZO TONIN ASSOCIATES

Railway platform and concourse areas	75	75	75	75	Source: AS2107 'maximum', assuming a conservative façade loss of 20 dB(A)
Café/ Restaurant/ Bar (outdoors)	60	60	60	60	Source: AS2107 'maximum1'
Passive recreation areas (e.g. area used for reading, meditation)	60	60	60	60	Source: ICNG
Active recreation areas (e.g. sports fields)	65	65	65	65	Source: ICNG
Commercial premises (including offices and retail outlets)	70	70	70	70	Source: ICNG
Industrial premises	75	75	75	75	Source: ICNG

Notes: 1 - Levels are estimated assuming an open windows (i.e. 10dBA façade losss)

D(S): standard construction hours from 7 am to 6 pm Monday to Friday and from 8 am to 6 pm Saturday

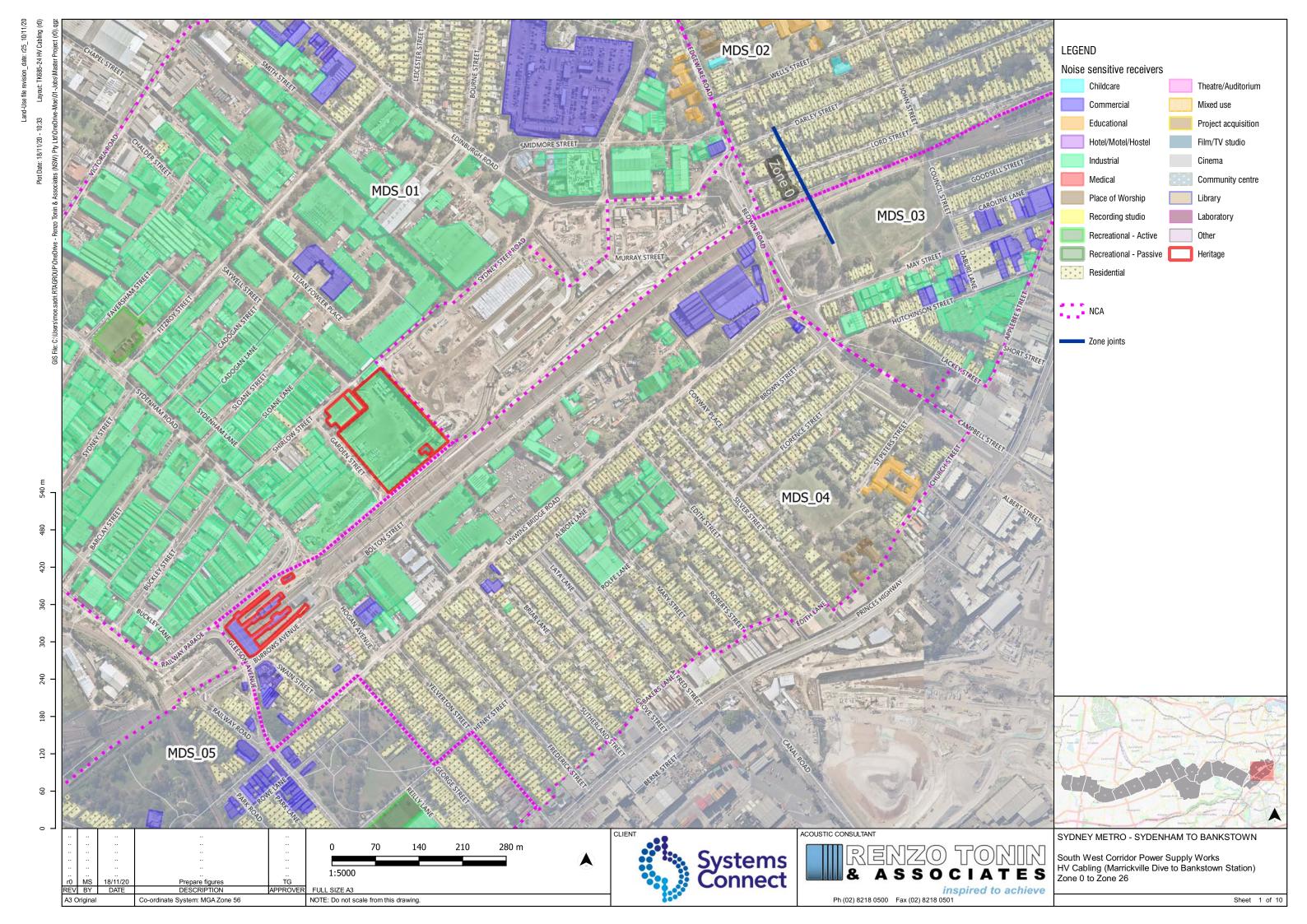
D(O): out-of-hours day period from 8 am to 6 pm Sunday and Public holidays - OOHW P1

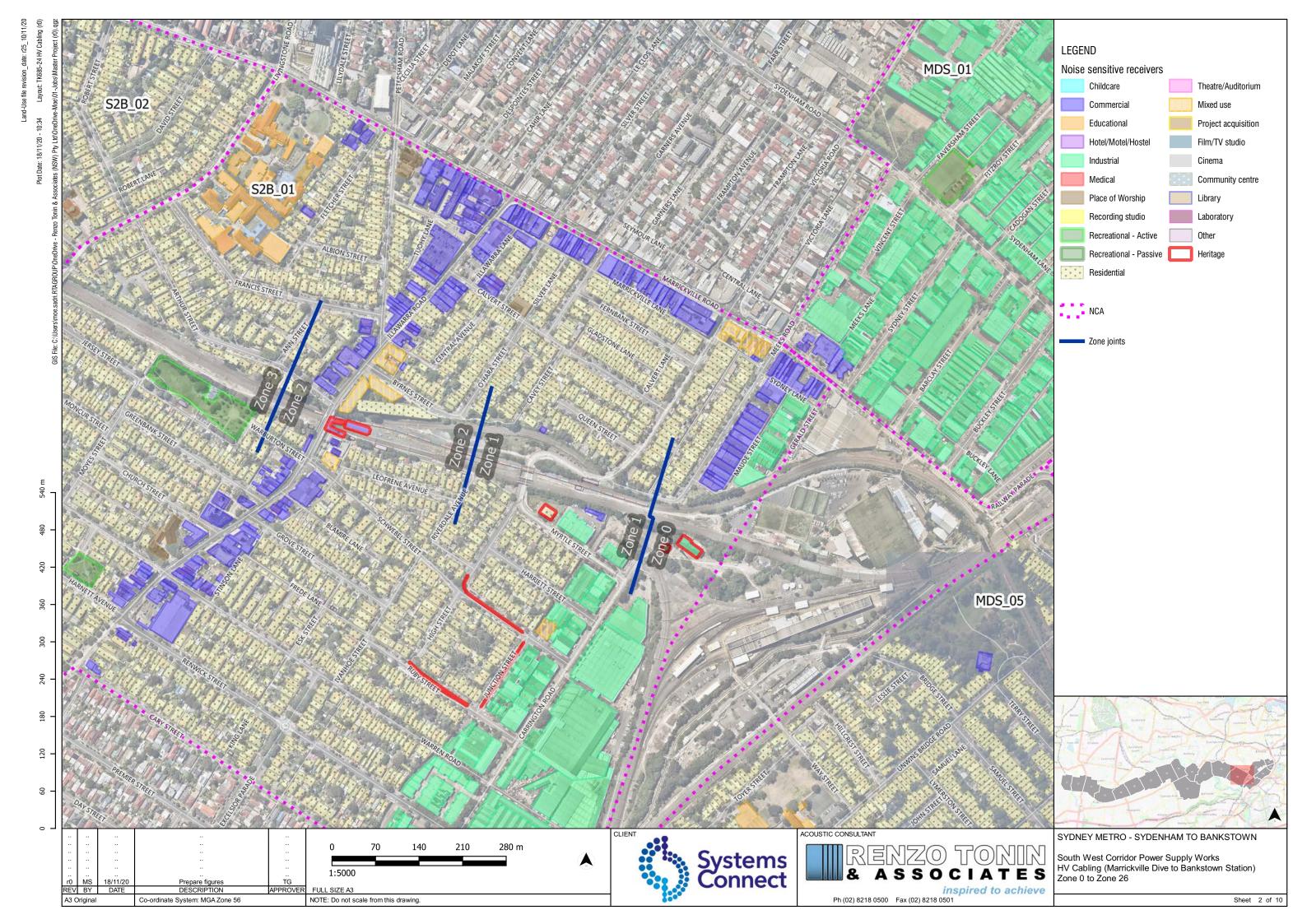
E: evening period from 6 pm to 10 pm Monday to Sunday - OOHW P1

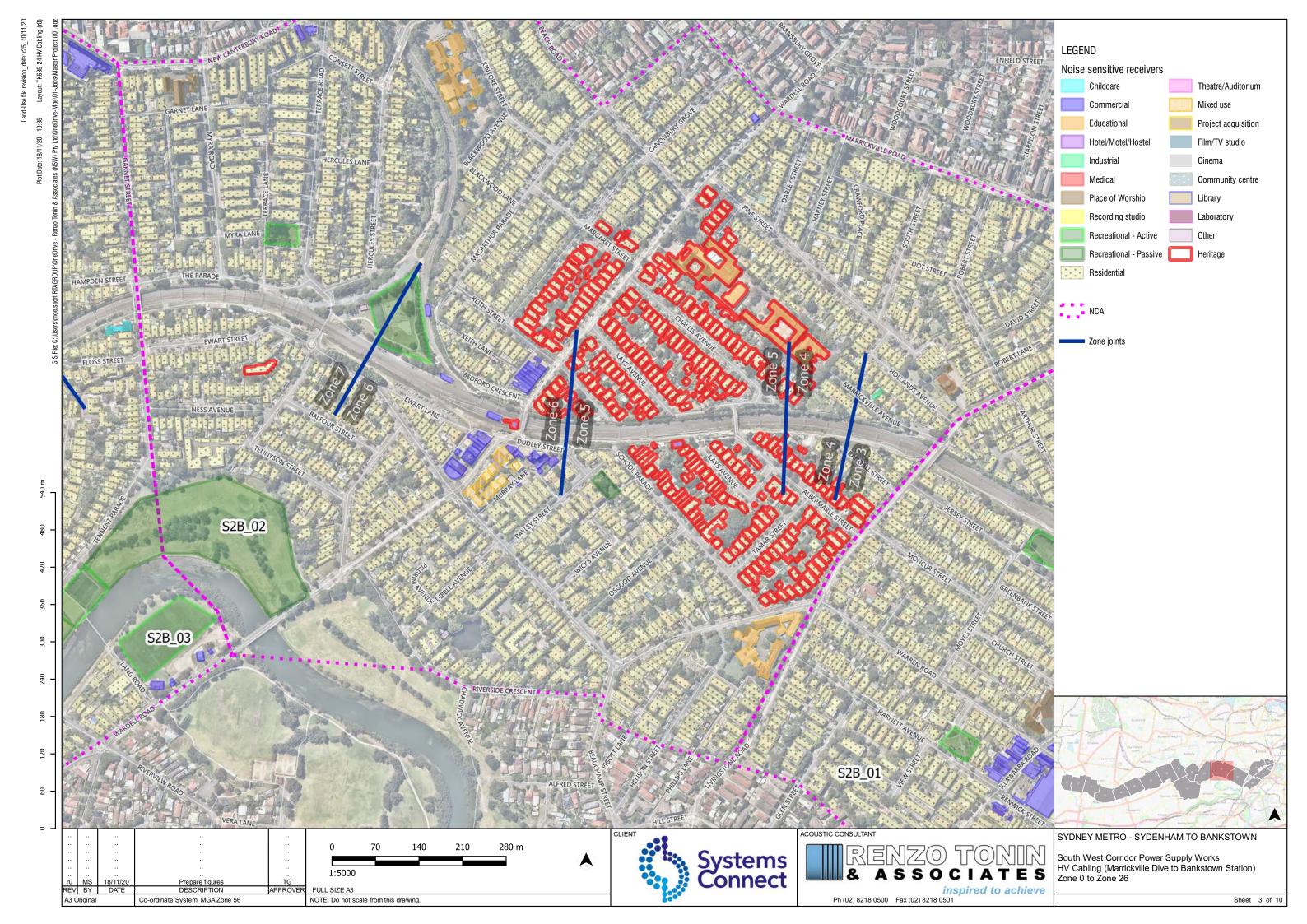
NS: night shoulder period from 10 pm to 12 am Monday to Sunday - OOHW P1

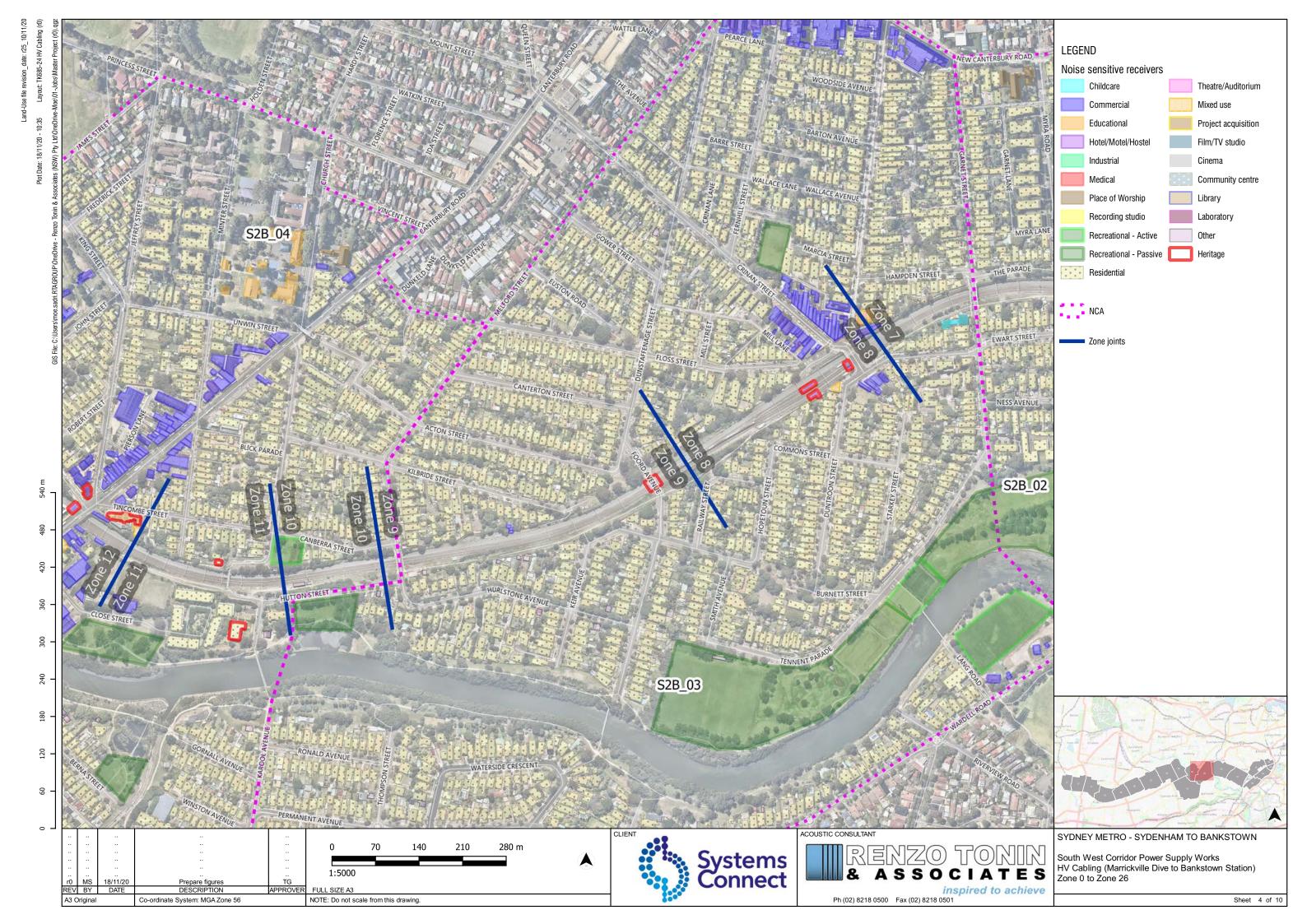
N: night-time period from 10 pm to 7 am Monday to Friday, from 10 pm am to 8 am Saturday, Sunday and Public holidays - OOHW P2

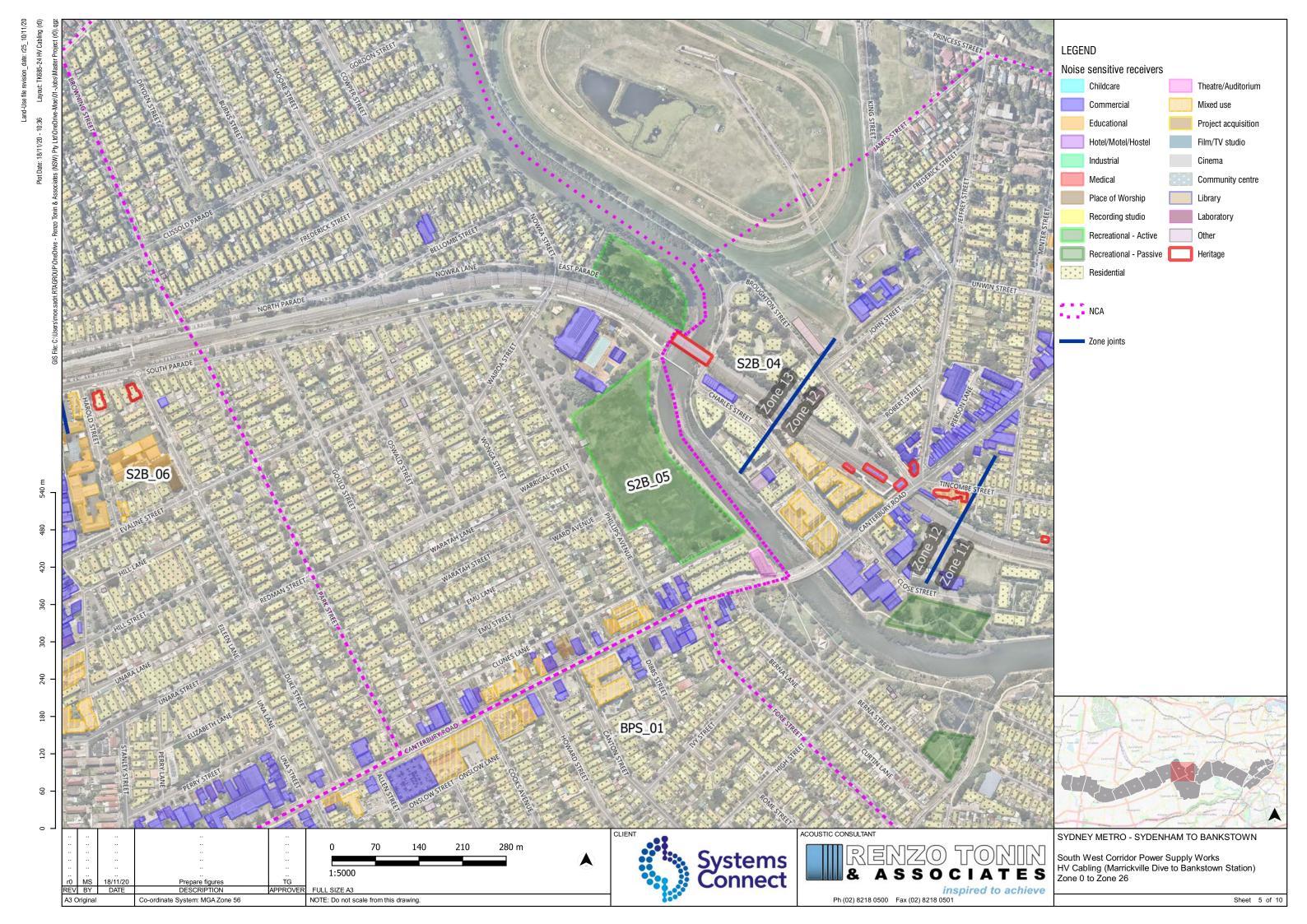
MS: morning shoulder period from 5 am to 7 am Monday to Friday, from 6 am to 8 am Saturday, Sunday and Public holidays - OOHW P1

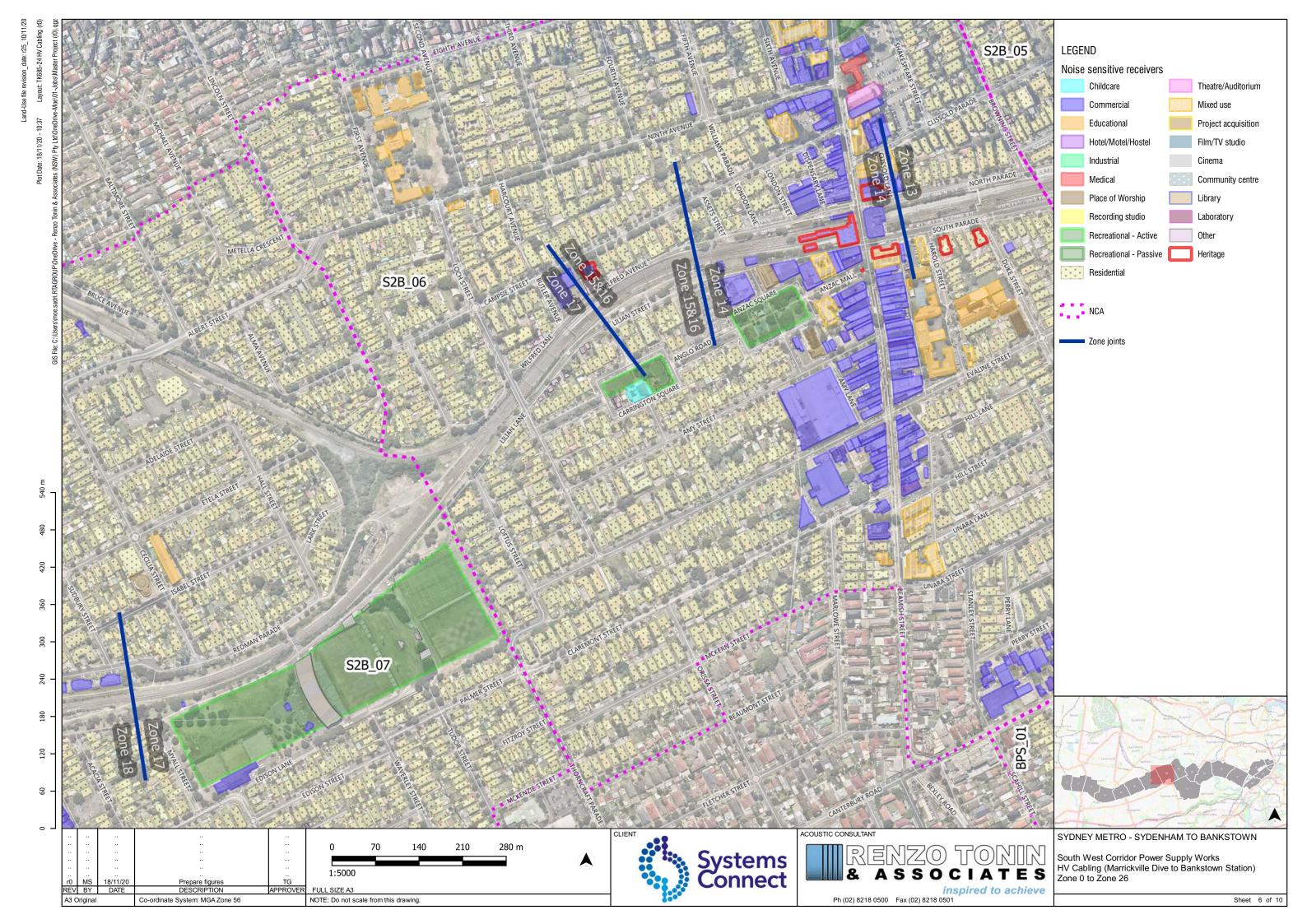


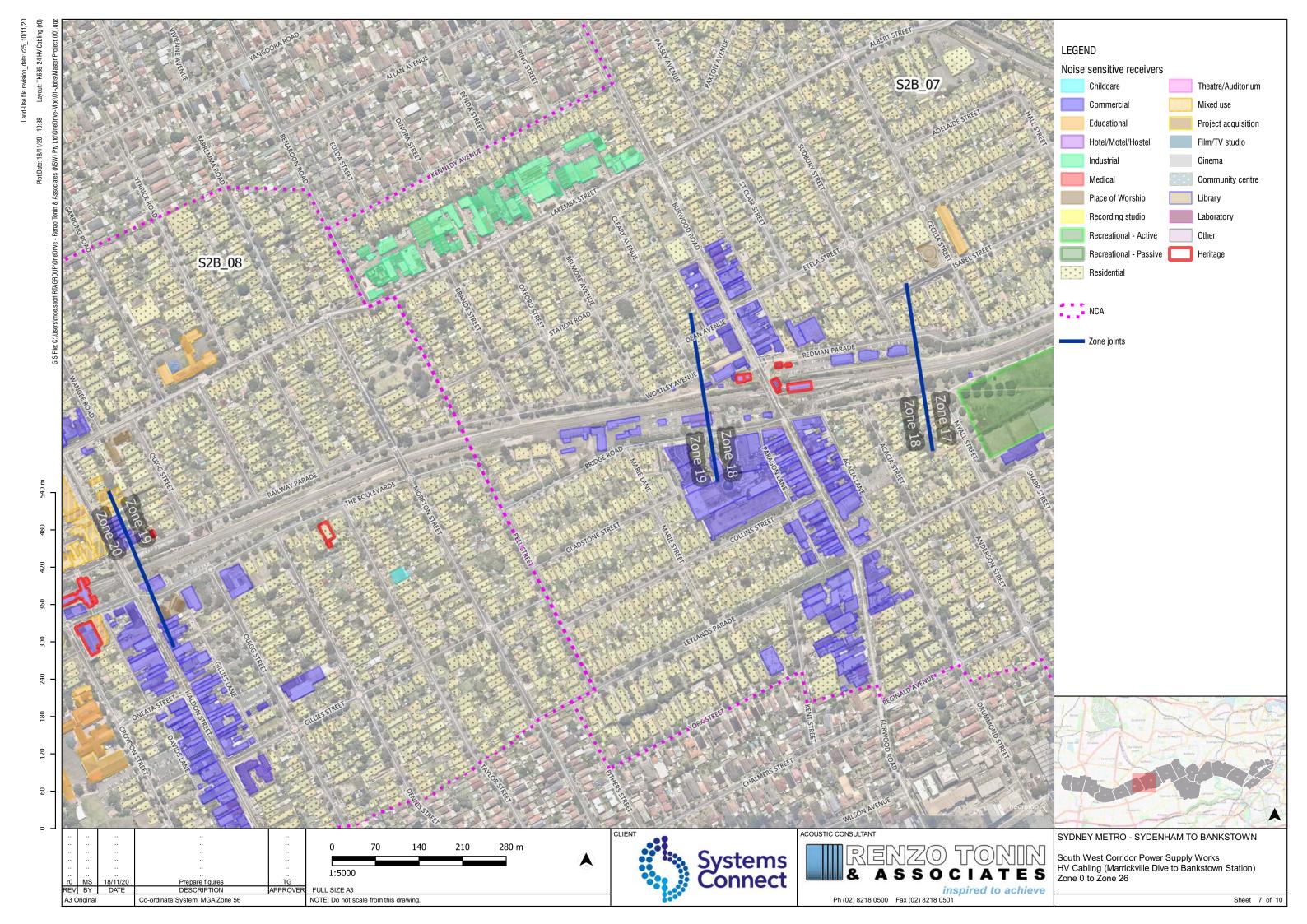


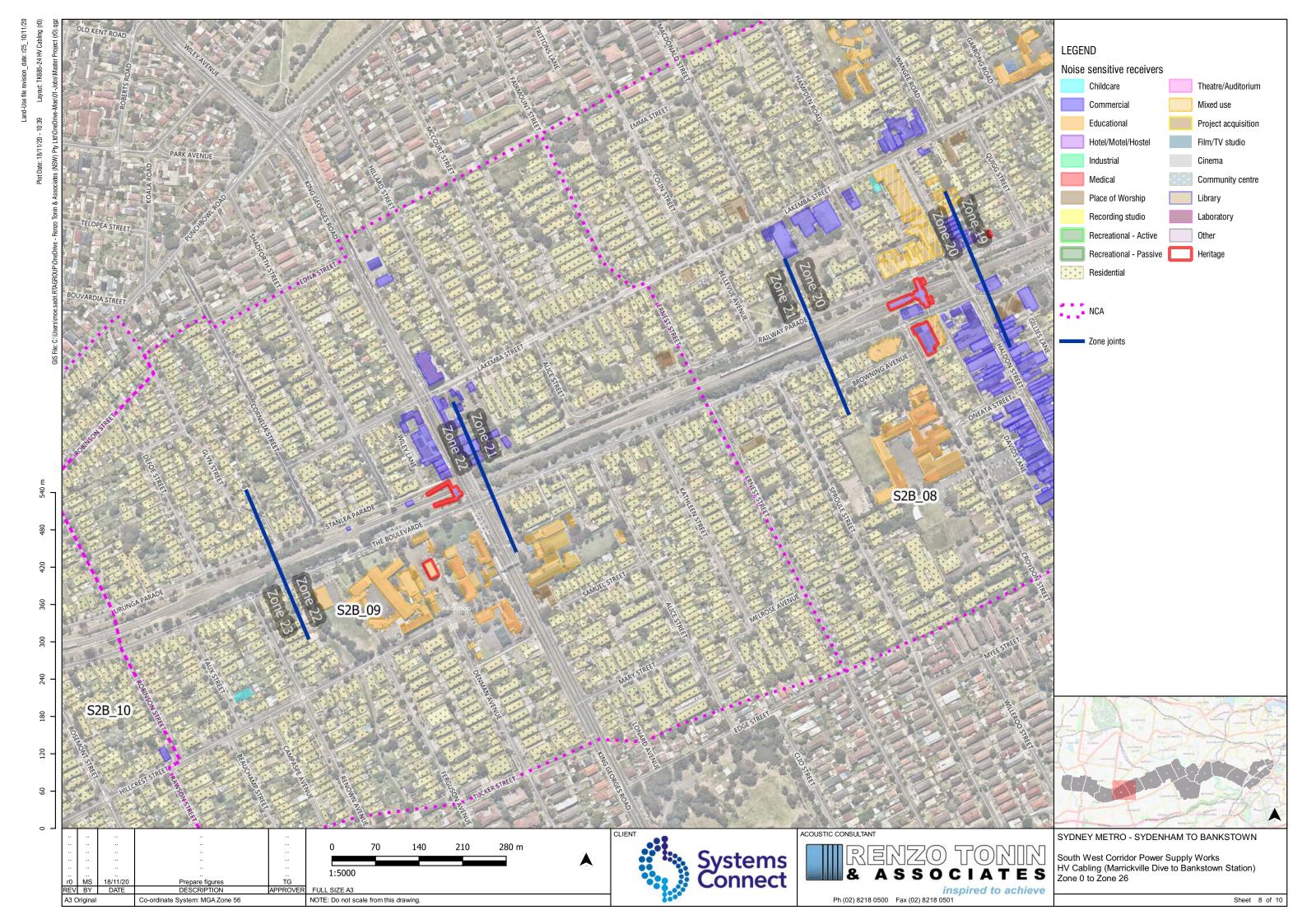


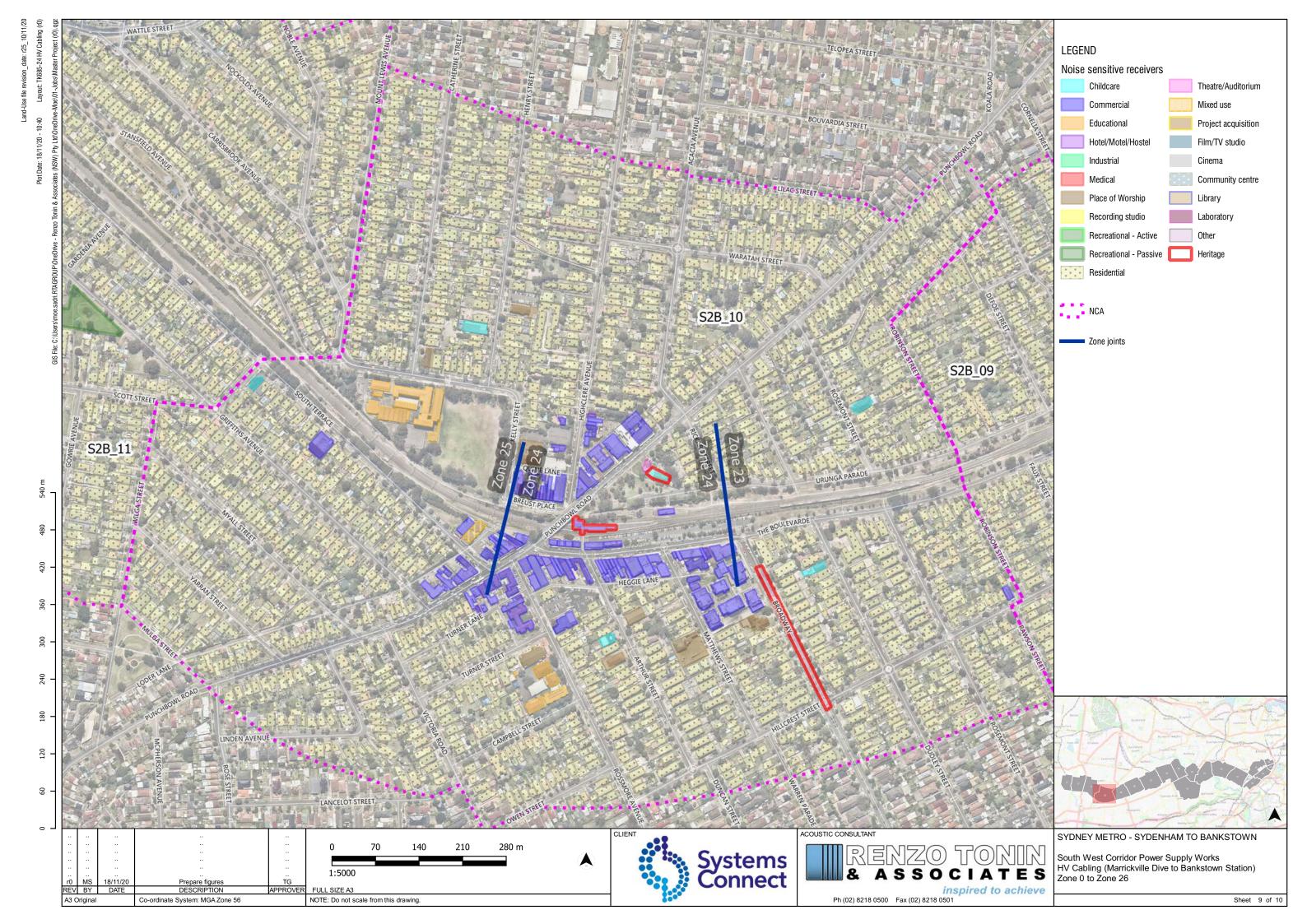


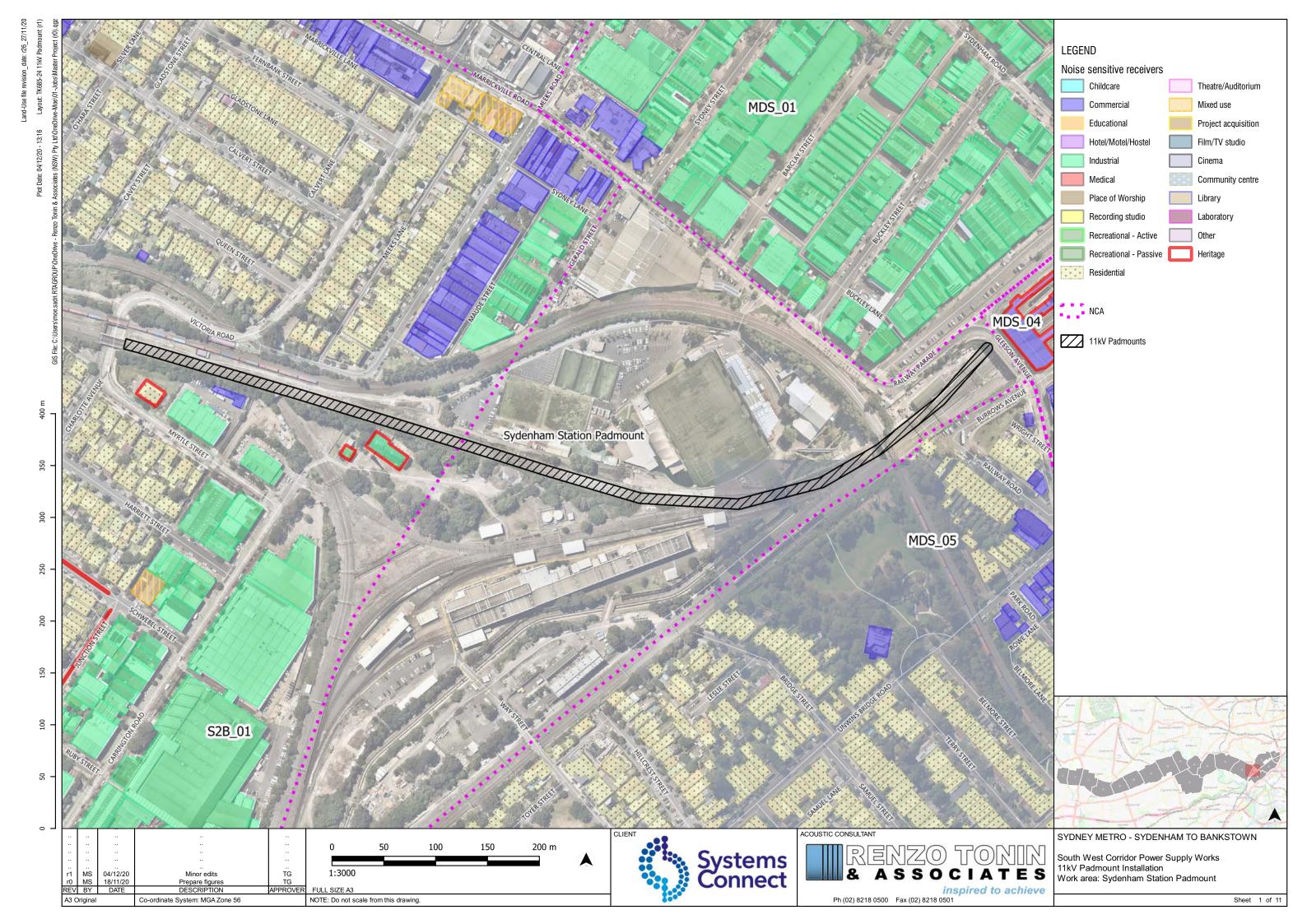


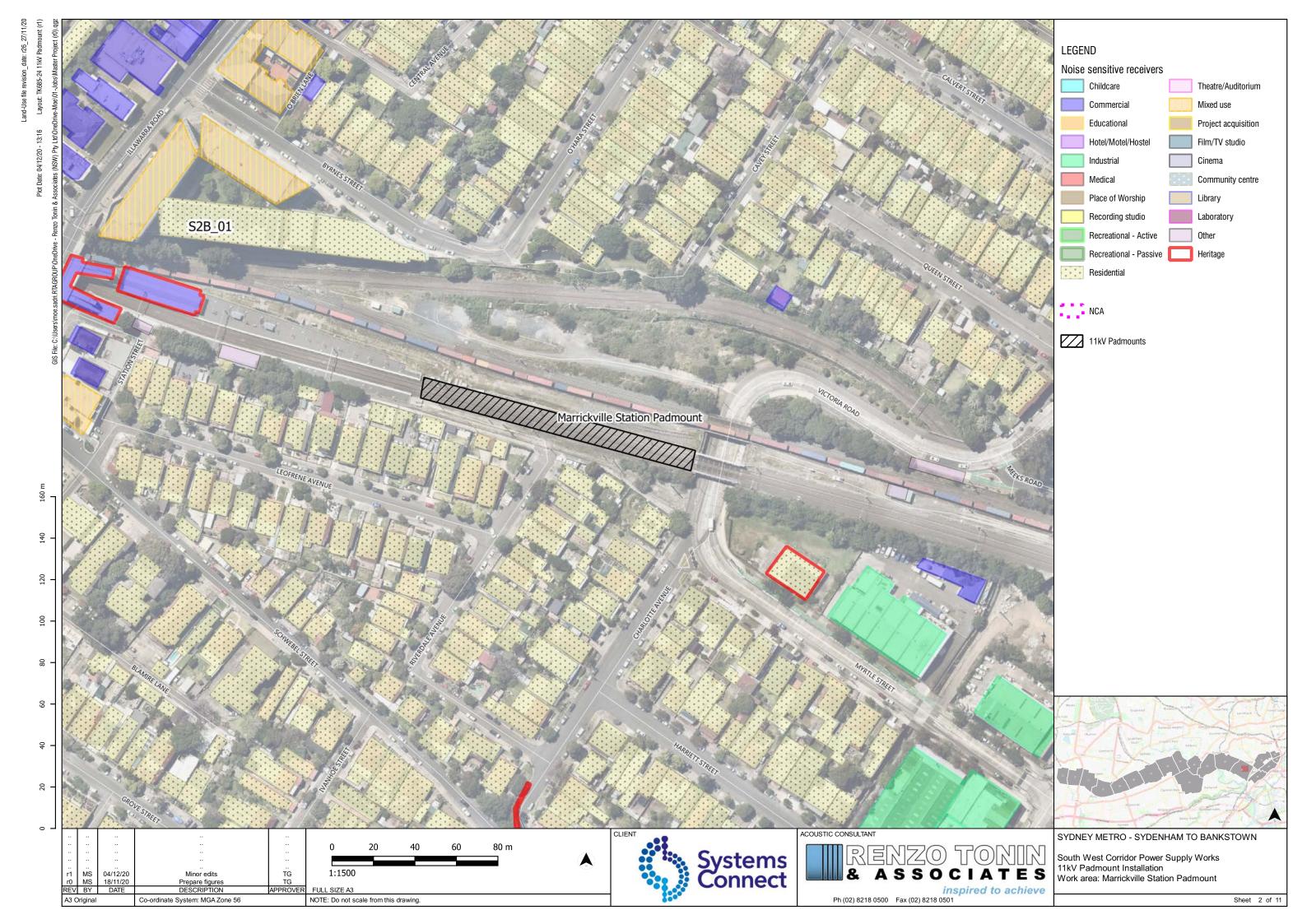




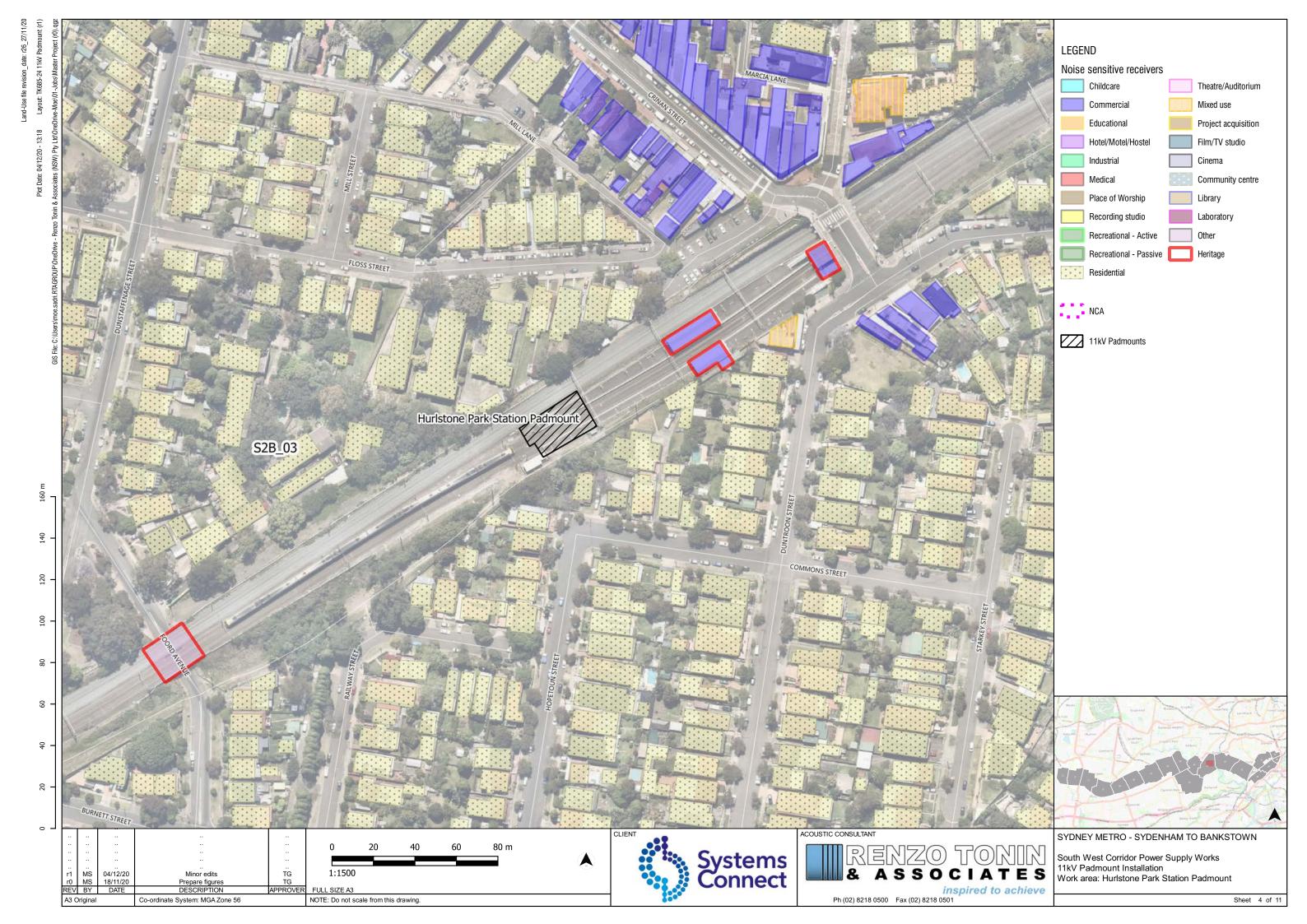


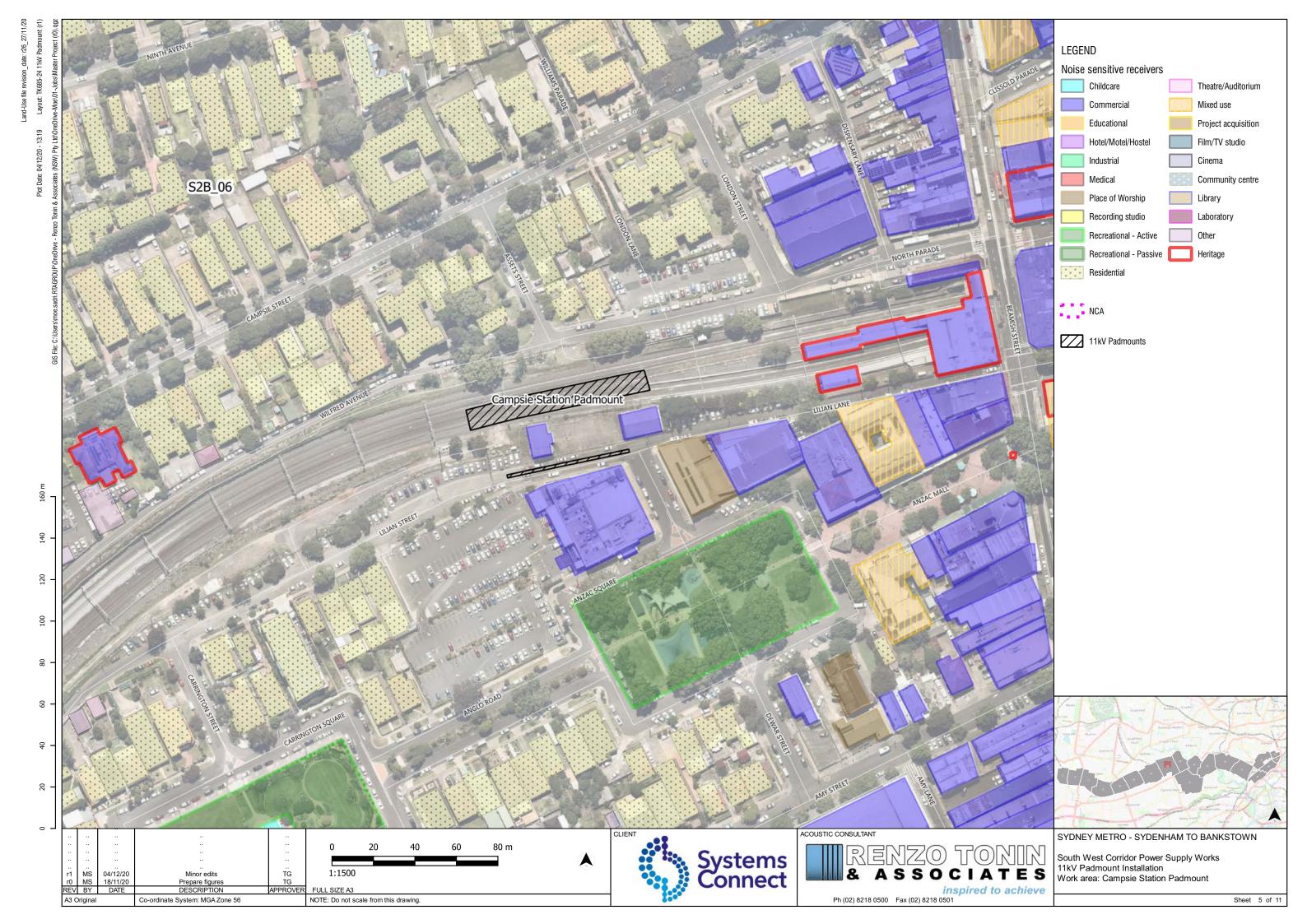


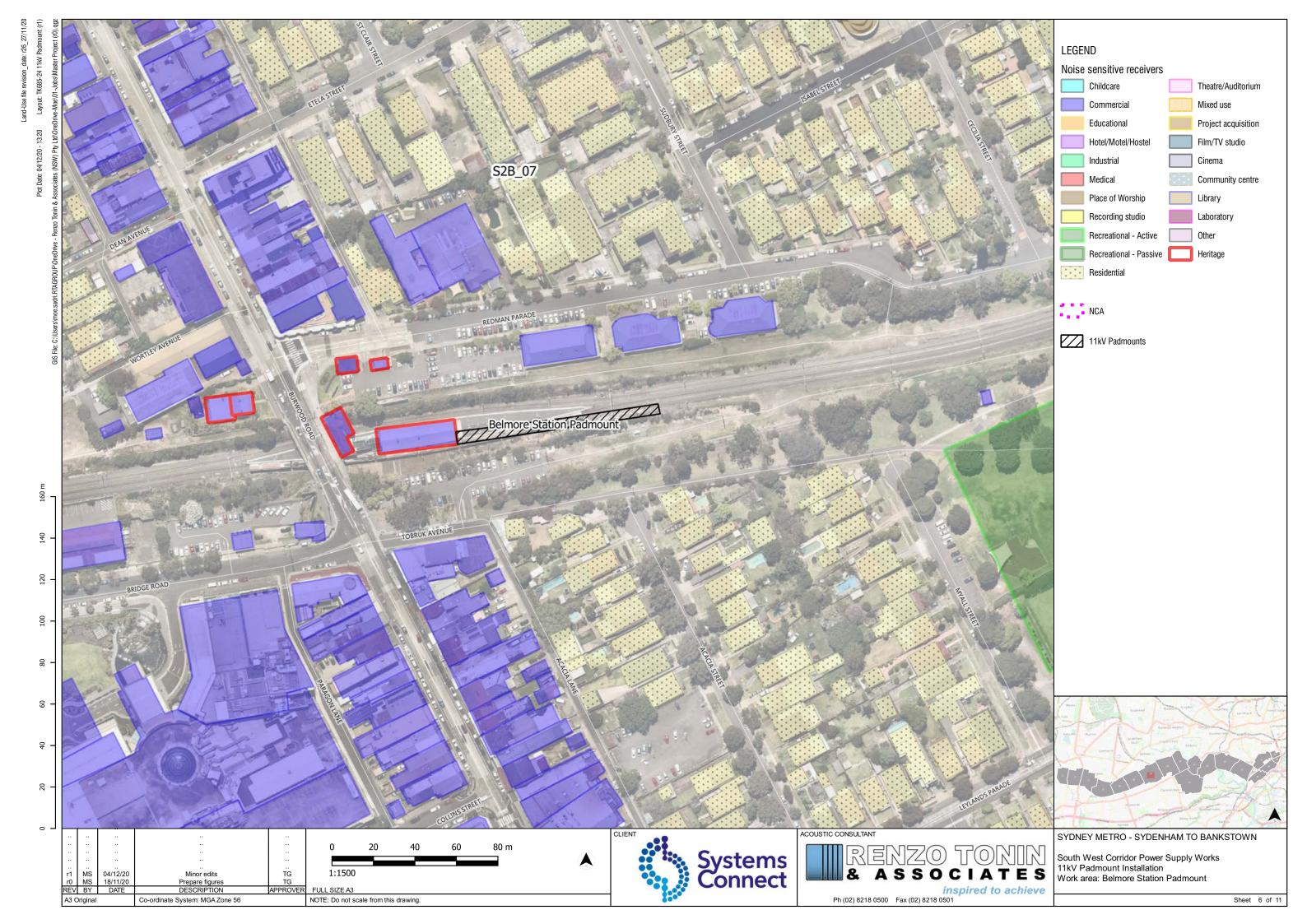


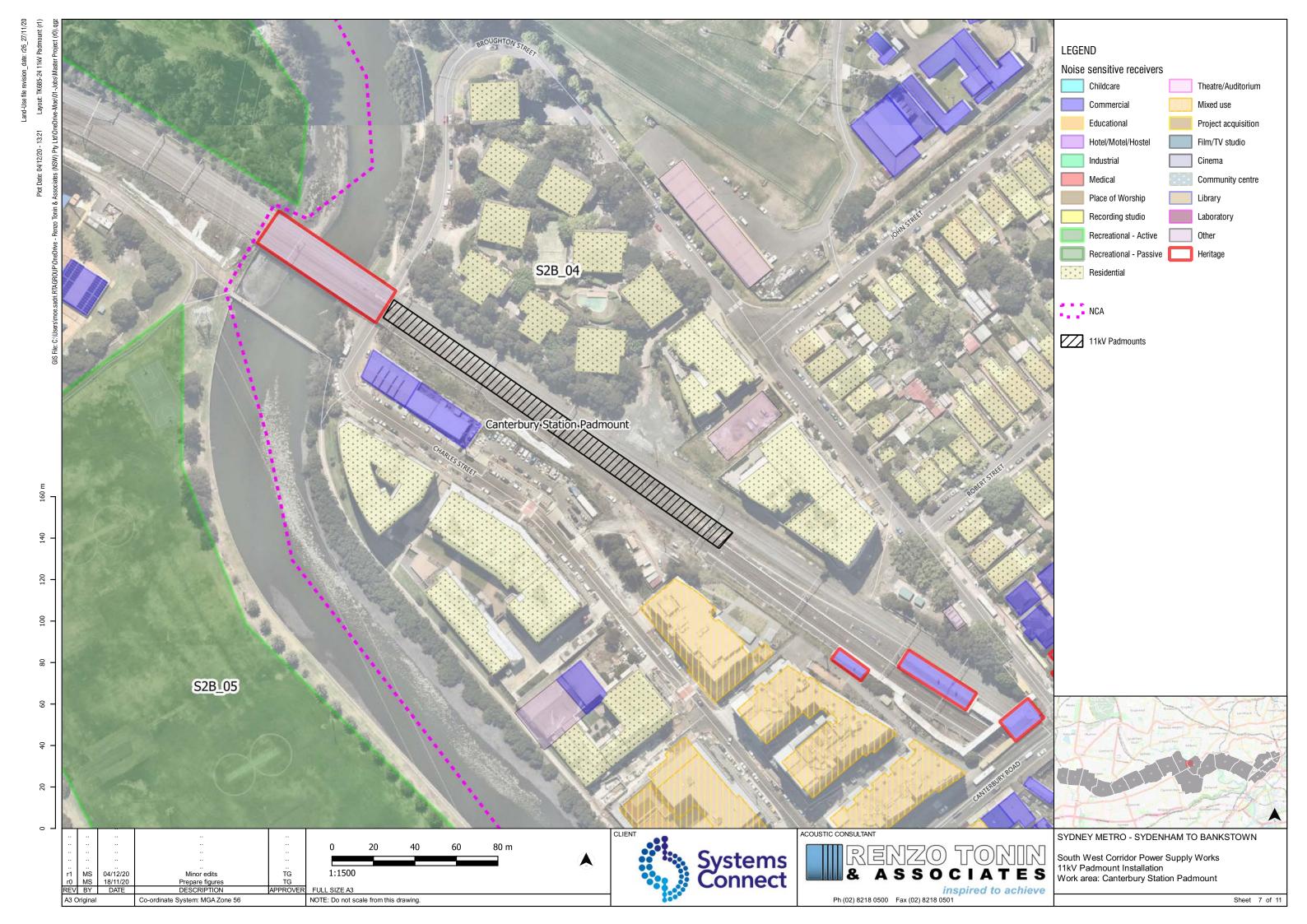


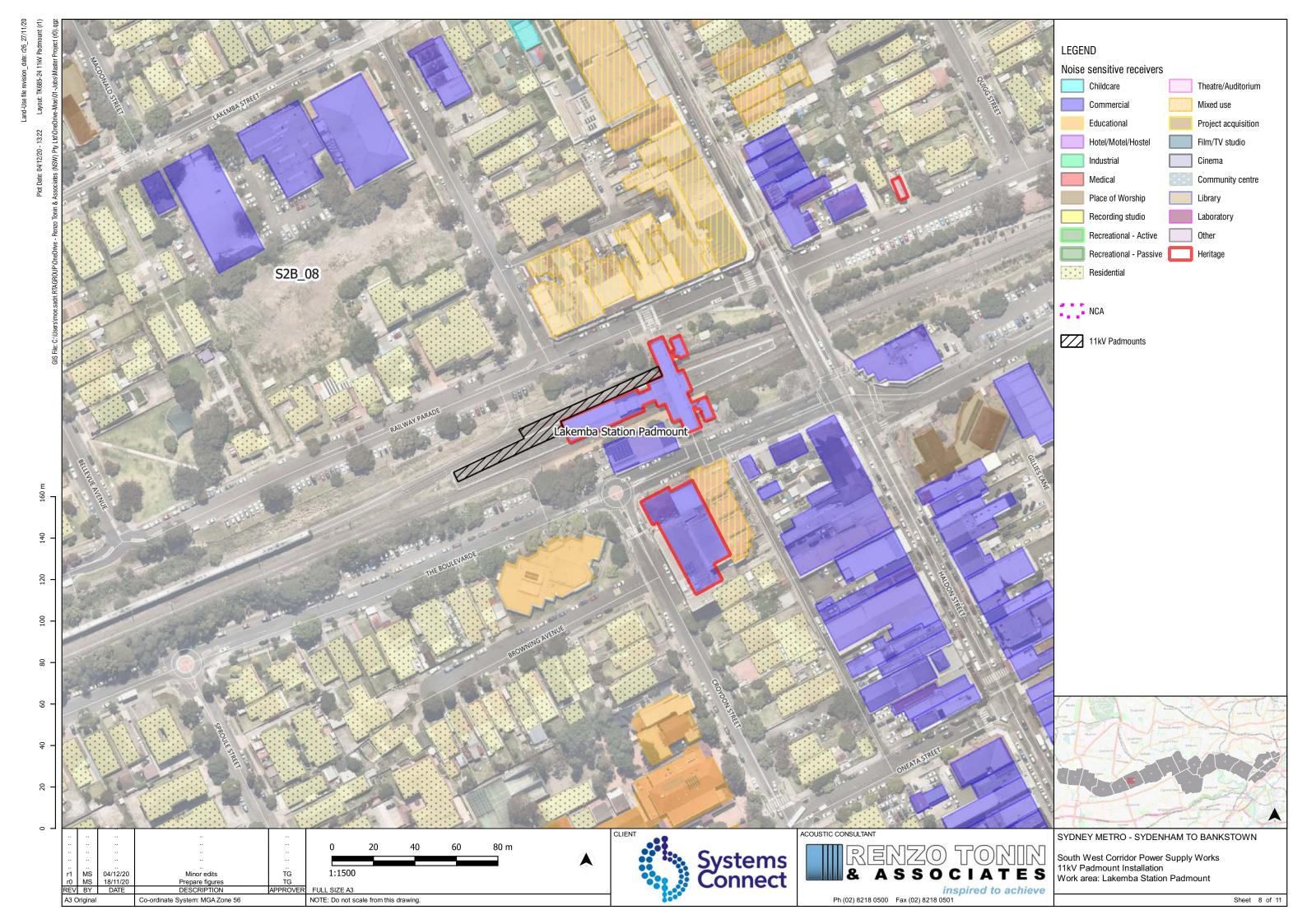


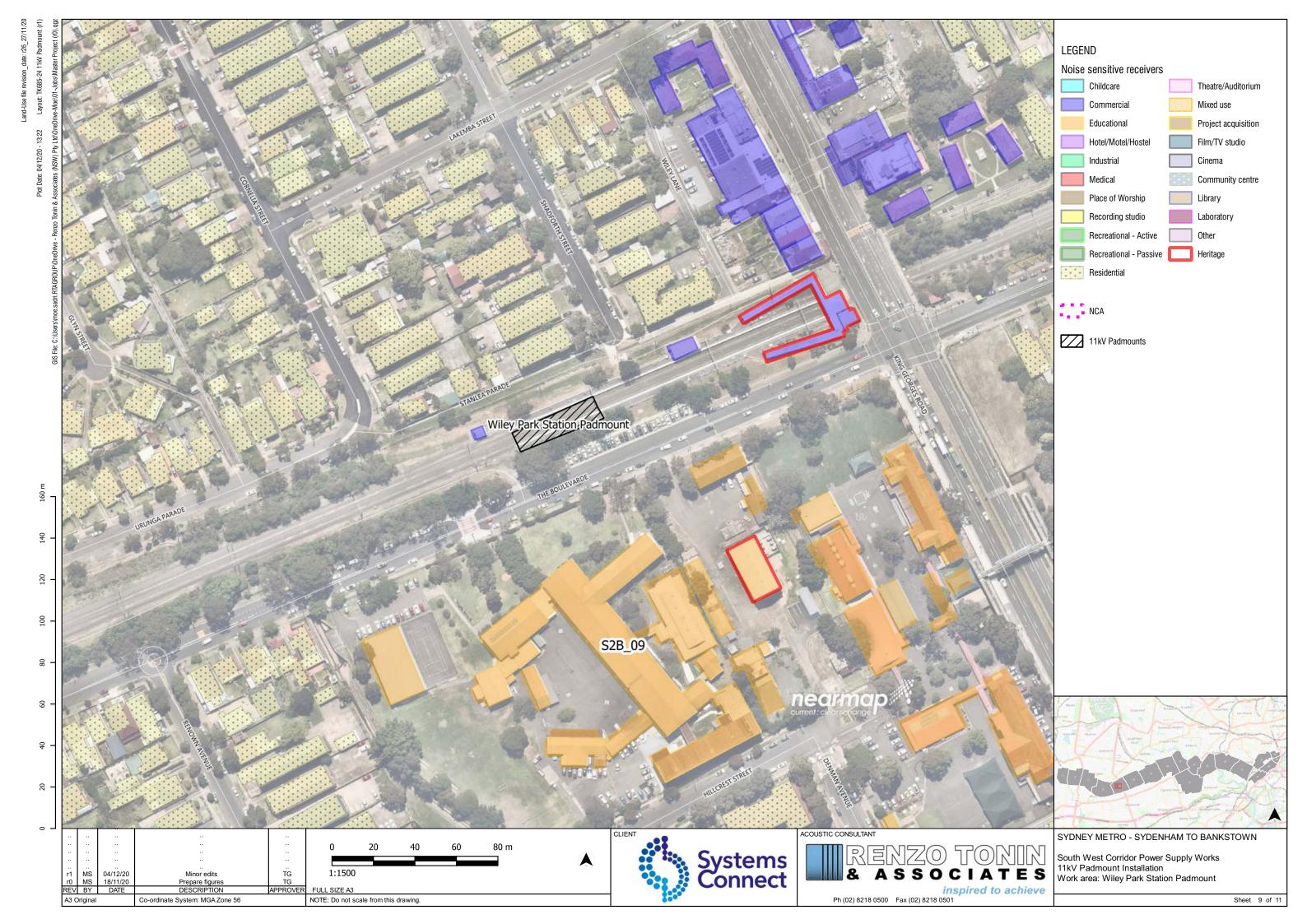


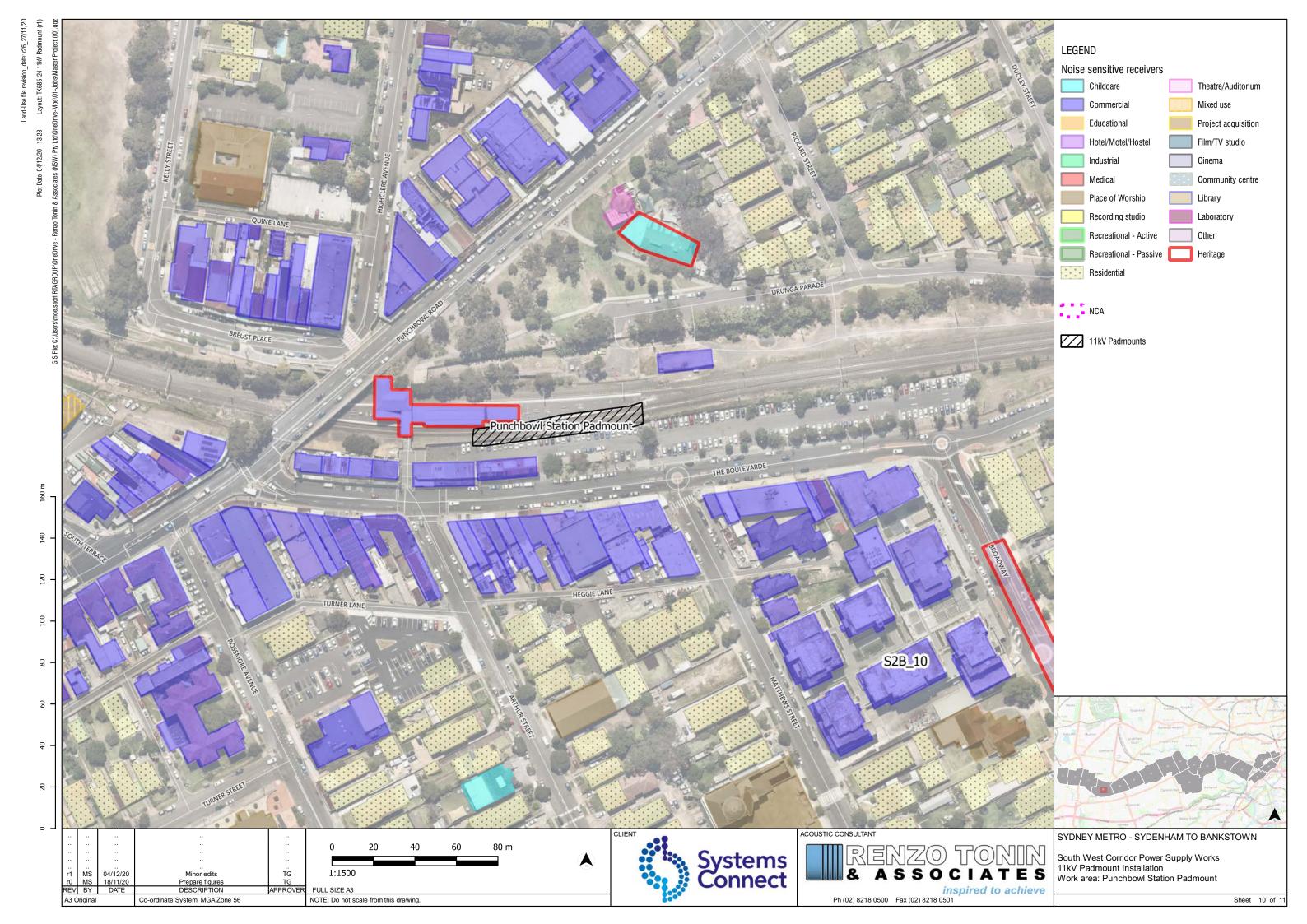


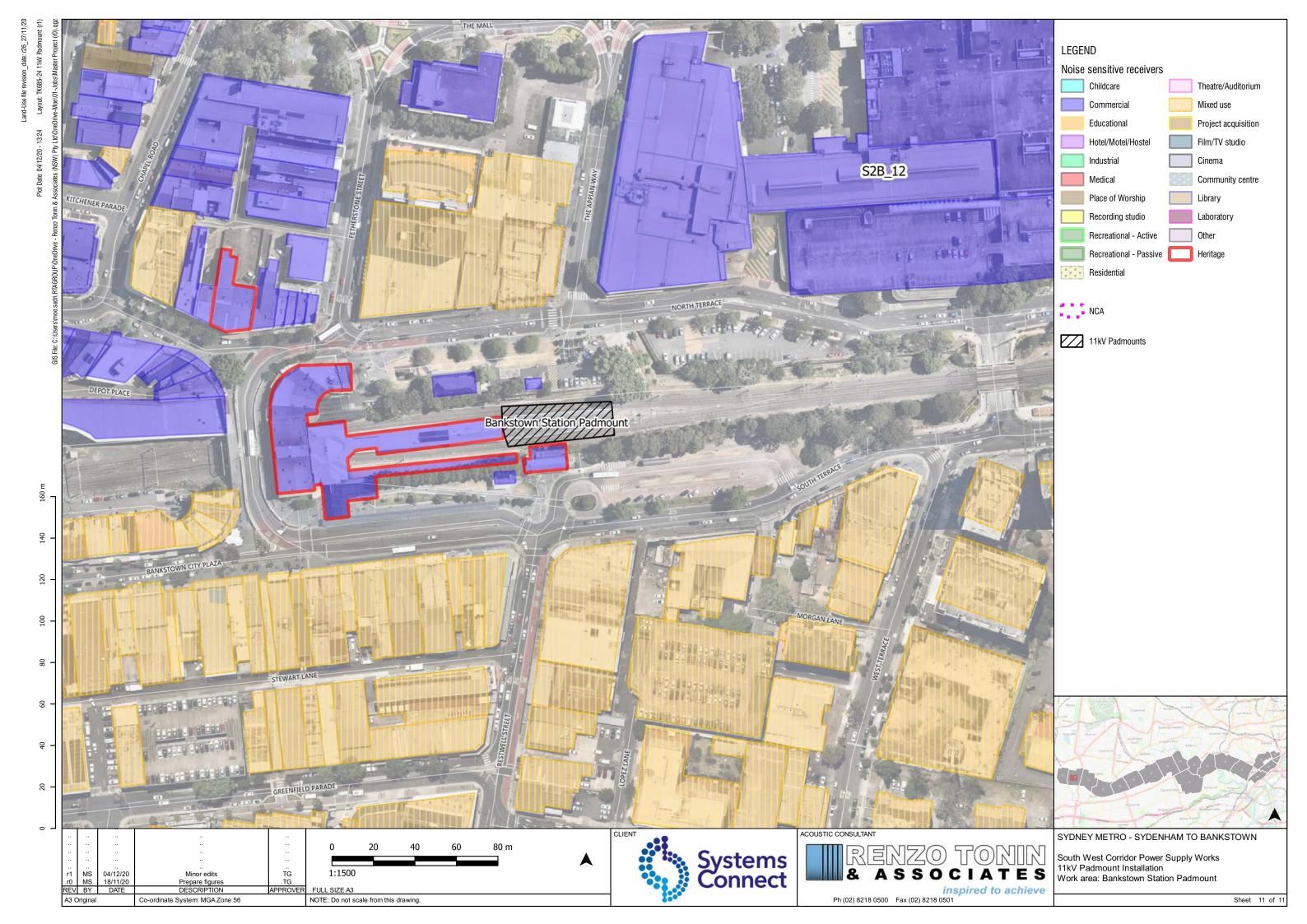


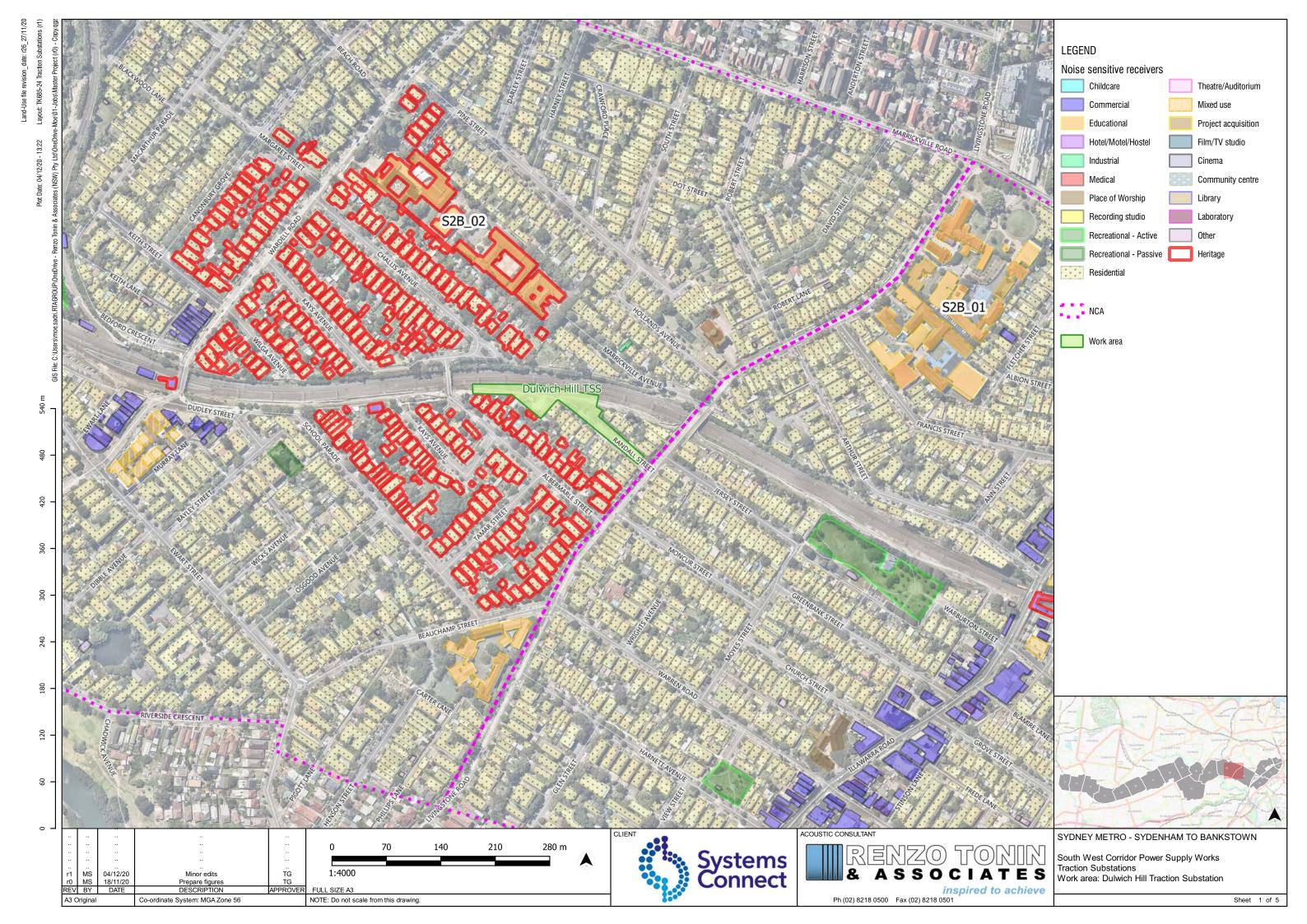


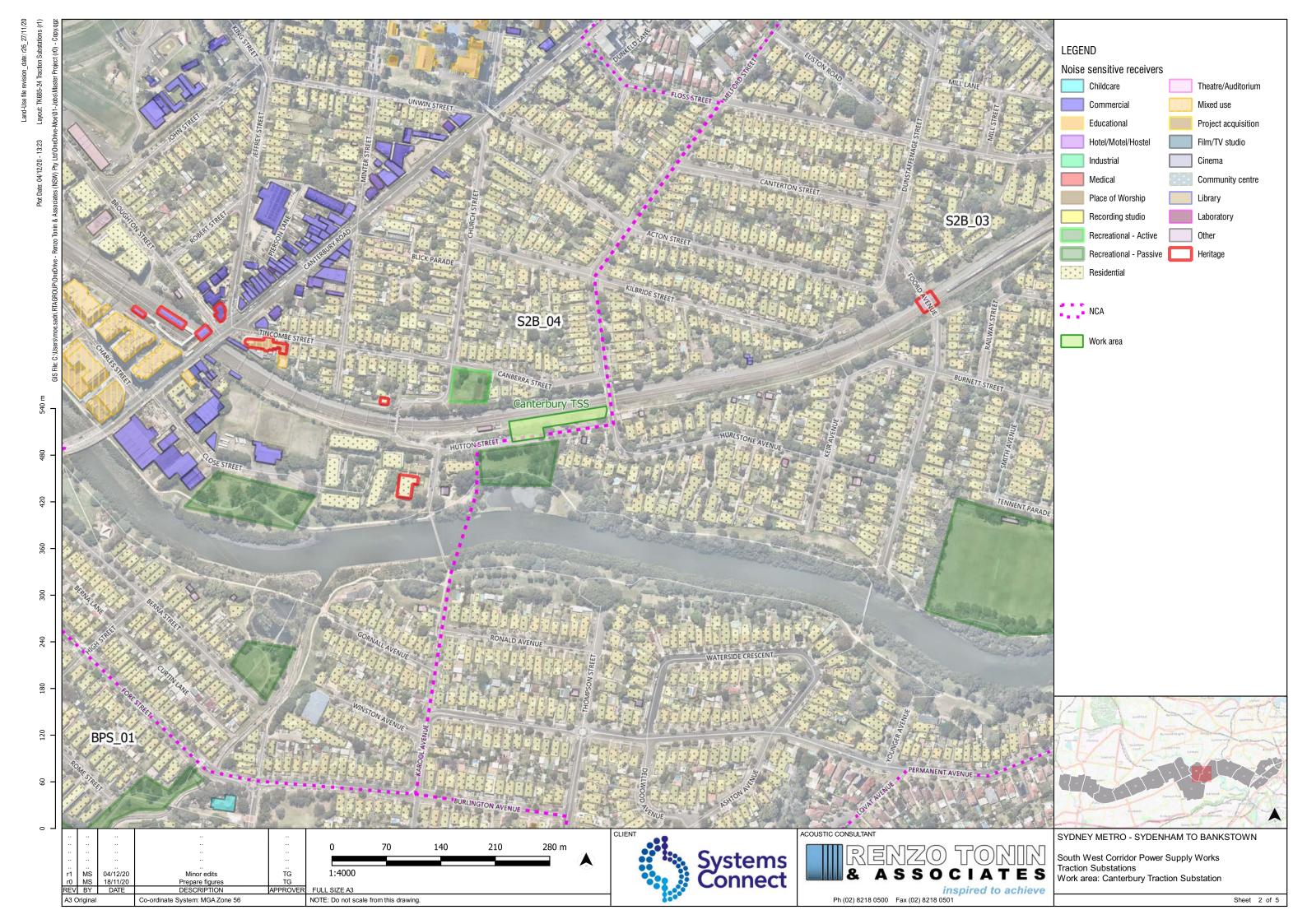


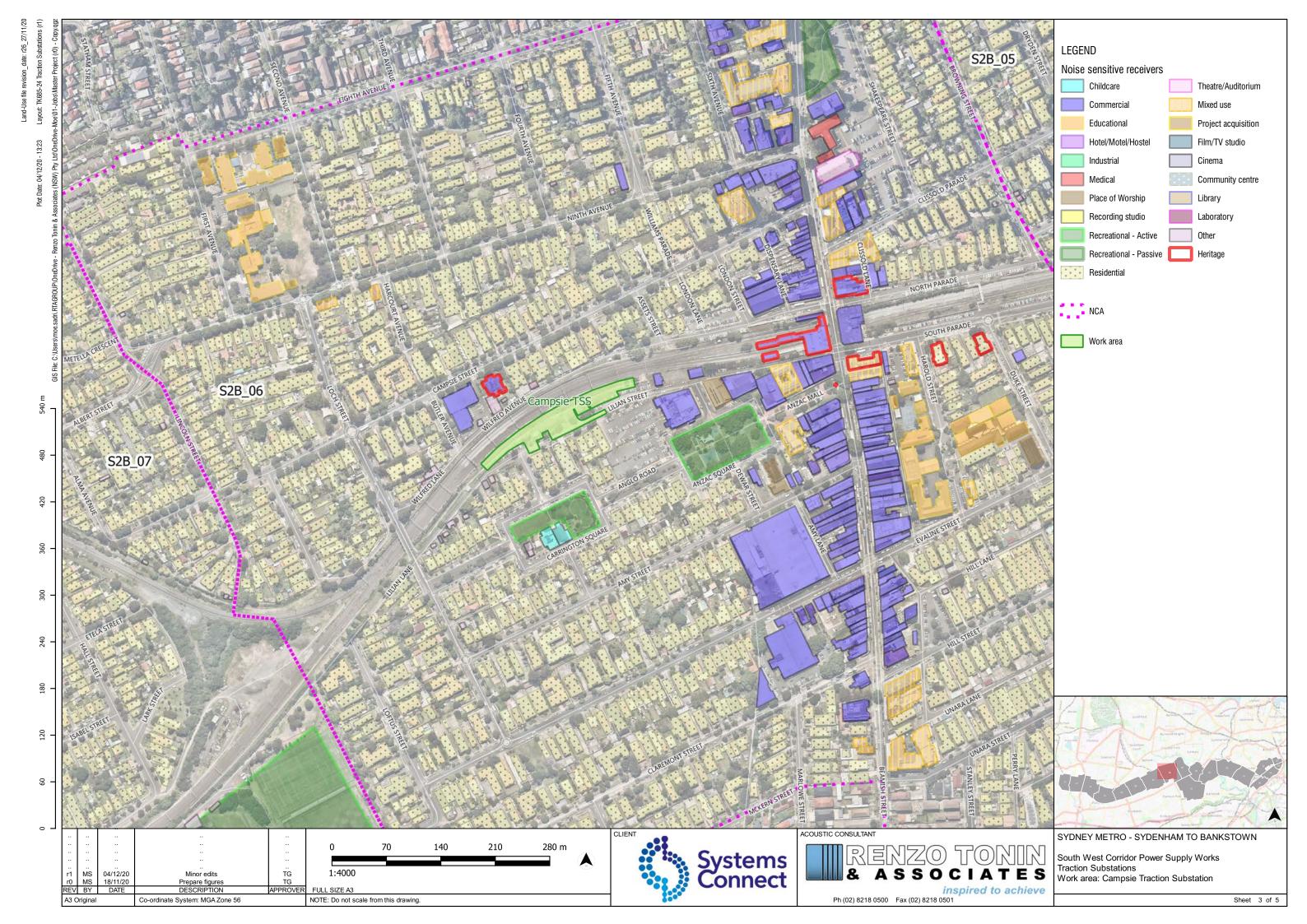


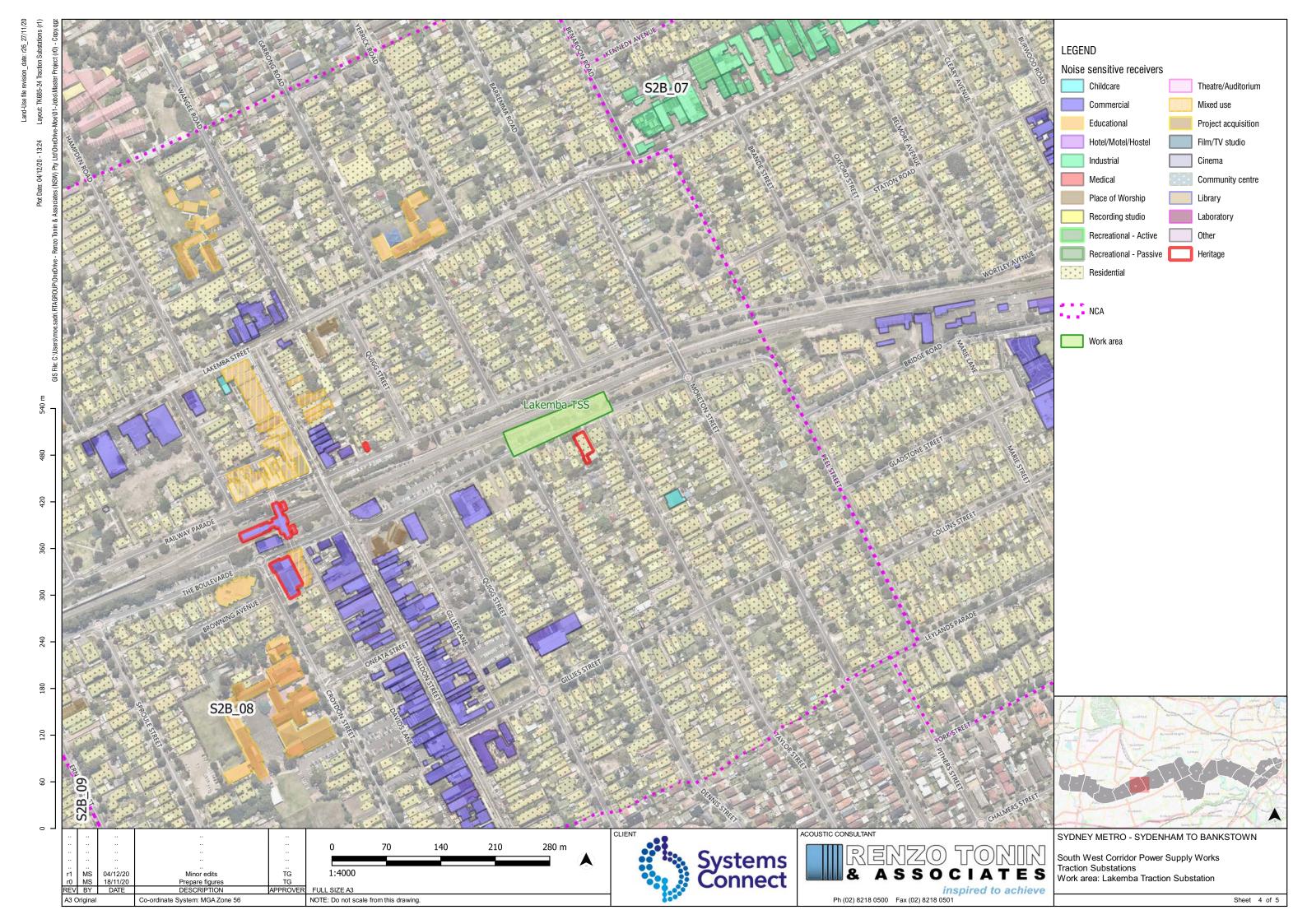


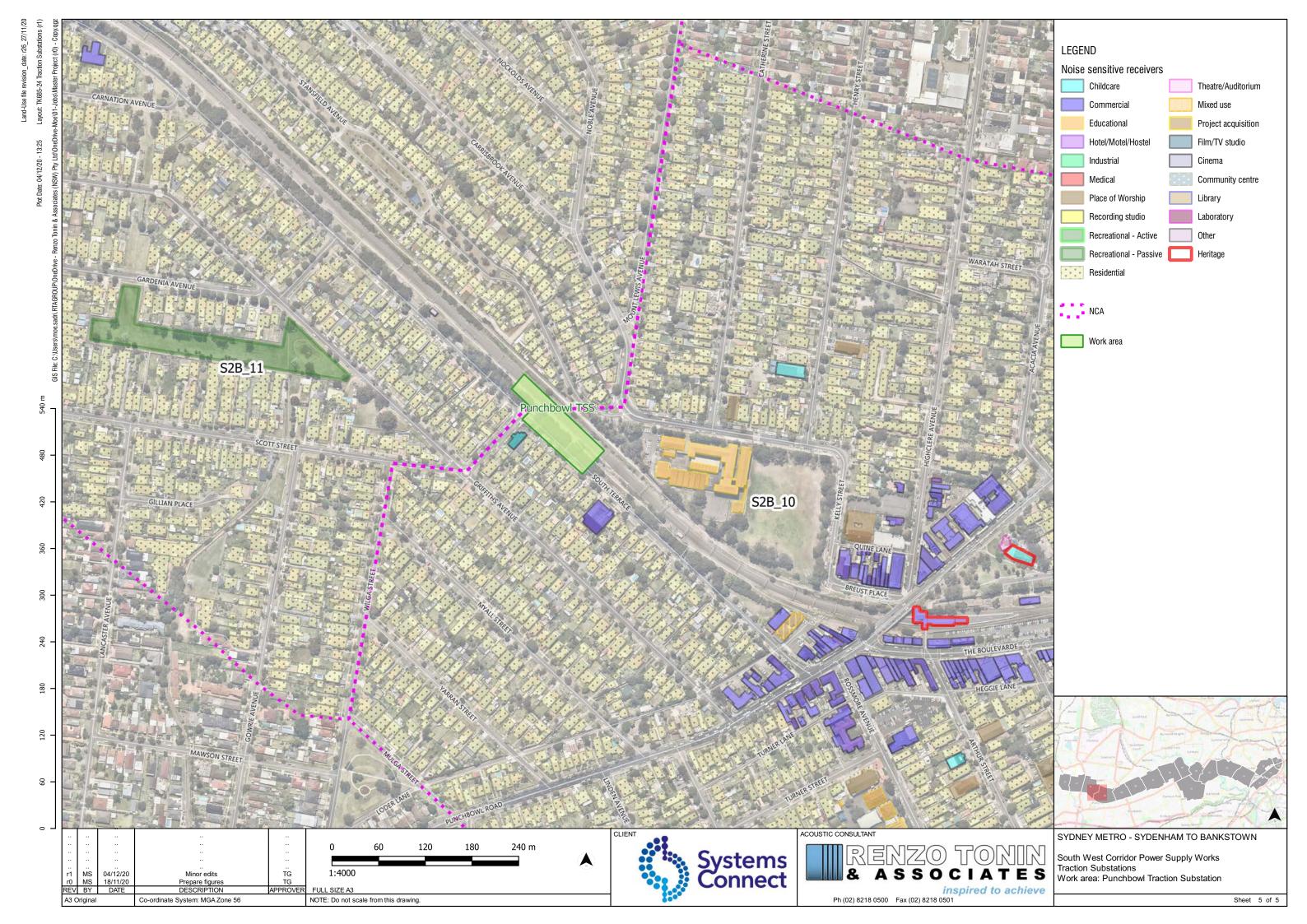












APPENDIX C Construction timetable/ activities/ management

V Cabling (Marrickville Dive to Campsie Traction Substation) ne-0 - Sec1.2.3.4 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainaqe (6.14-6.42) Location (UP Metro) ne-1 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainaqe (6.14-6.42) Location (UP Metro) ne-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) ne-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) ne-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro)	HV Cabling HV Cabling HV Cabling HV Cabling HV Cabling	Indicative timing/duration	Z0-L Z1-L Z3-L	Area 55 Area 15 Area 138 Area 139 Area 5	Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	Plant/ Equipment (as provided by client) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle	6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6pm - 10pm 6 1 1 1 1 1 6 1 1 1 1 7 1 1 1 1 1 1 1	Night 10pm - 7am 6 1 1 1 1 1 1 1 6 1 1 1 7 1 1 1 1 1 1	- 95 95 99 98 95 - 95 99 98 95 - 95 99	Penalty	- 100 102 102 98 - 100 102 98 - 102 98	High noise plant (EPL Vibration intensive plant	Notes 15kVA Generator- Deisel. Qty Qty=1 Qty=1 4 Cylinder Diesel enqine. Qty: 15kVA Generator- Deisel. Qty Qty=1 Qty=1 4 Cylinder Diesel enqine. Qty:
ne-0 - Sec1.2.3.4 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) ne-1 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) ne-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) ne-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) ne-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) ne-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling HV Cabling	Feb 2021 - Mar 2021 Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z1-L Z2-L	Area 55 Area 15 Area 138 Area 139 Area 5	Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	6 1 1 1 1 1 6 1 1 1 7 7	6 1 1 1 1 1 6 6 1 1 1 1 7 7	6 1 1 1 1 6 6 1 1 1 1 1 1 7 7 1 1 1 1	95 99 98 95 - 95 99 98 95 95		- 100 102 102 98 - 100 102 102 98	· · · · · · · · · · · · · · · · · · ·	Qty=1 Qty=1 4 Cylinder Diesel engine. Qty 15kVA Generator- Deisel. Qty Qty=1 Qty=1 4 Cylinder Diesel engine. Qty
ne-0 - Sec1.2.3.4 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) ne-1 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) ne-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) ne-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) ne-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) ne-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling HV Cabling	Feb 2021 - Mar 2021 Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z1-L Z2-L	Area 55 Area 15 Area 138 Area 139 Area 5	Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	6 1 1 1 1 6 1 1 1 7 1 1 1 1 1 1 1 1	1 6 1 1 1 1 7 1	6 1 1 1 1 1 6 1 1 1 1 1 7 7	99 98 95 - 95 99 98 95 - 95		102 102 98 - 100 102 102 98	· · · · · · · · · · · · · · · · · · ·	Qty=1 Qty=1 4 Cylinder Diesel engine. Qty 15kVA Generator- Deisel. Qty Qty=1 Qty=1 4 Cylinder Diesel engine. Qty
Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) ie-1 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) ie-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) ie-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) ie-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) ie-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling HV Cabling	Feb 2021 - Mar 2021 Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z1-L Z2-L	Area 55 Area 15 Area 138 Area 139 Area 5	Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 1 1 1 6 1 1 1 1 7 7 1 1 1 1 1	1 6 1 1 1 1 7 1	1 1 1 1 6 1 1 1 1 7 1	99 98 95 - 95 99 98 95 - 95		102 102 98 - 100 102 102 98	· · · · · · · · · · · · · · · · · · ·	Qty=1 Qty=1 4 Cylinder Diesel engine. Qty 15kVA Generator- Deisel. Qty Qty=1 Qty=1 4 Cylinder Diesel engine. Qty
Location (UP Metro) e-1 (Marrickville dive-Marrickville Station) Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) e-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling	Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z2-L	Area 15 Area 138 Area 139 Area 5	Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck	1 1 1 6 1 1 1 1 7 7 1 1 1 1 1	1 6 1 1 1 1 7 1	1 1 1 6 1 1 1 1 7 1	98 95 - 95 99 98 95 - 95		102 102 98 - 100 102 102 98	· · · · · · · · · · · · · · · · · · ·	Qty=1 Qty=1 4 Cylinder Diesel engine. Qt 15kVA Generator- Deisel. Qt Qty=1 Qty=1 Qty=1 4 Cylinder Diesel engine. Qt
Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) e-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling	Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z2-L	Area 15 Area 138 Area 139 Area 5	Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 6 1 1 1 7 7 1 1 1 1	1 6 1 1 1 1 7 1	1 1 6 1 1 1 7 7	95 - 95 99 98 95 - 95		98 - 100 102 102 98 -	· · · · · · · · · · · · · · · · · · ·	4 Cylinder Diesel engine. Qt 15kVA Generator- Deisel. Qt y=1 Qty=1 4 Cylinder Diesel engine. Qt
Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) e-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling	Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z2-L	Area 15 Area 138 Area 139 Area 5	EWP Cable Stands/Cradle Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 6 1 1 1 7 7 1 1 1 1	1 1 1 1 1 7 1	1 6 1 1 1 7 7	95 99 98 95 - 95		98 - 100 102 102 98 -		4 Cylinder Diesel engine. Qt 15kVA Generator- Deisel. Qt Qty=1 Qty=1 4 Cylinder Diesel engine. Qt
Sydney Trains Track Chainage (6.14-6.42) Location (UP Metro) e-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling HV Cabling	Nov 2021 - Jan 2022 Nov 2021 - Jan 2022	Z2-L	Area 15 Area 138 Area 139 Area 5	Winch - trailer mounted 5T Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	6T Winch 25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Raii) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Raii)	6 1 1 1 1 7 7 1 1 1 1	1 1 1 1 1 7 1	6 1 1 1 1 7 1 1	95 99 98 95 - 95		100 102 102 98		15kVA Generator- Deisel. Qt Qty=1 Qty=1 4 Cylinder Diesel engine. Qt
e-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022		Area 138 Area 139 Area 5	Telehander / Franna crane (20t) Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	25t Franna Crane Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 1 1 7 1 1 1 1	1 1 1 1 7 1 1 1	1 1 1 1 7 1 1	99 98 95 - 95	-	102 102 98		Qty=1 Qty=1 4 Cylinder Diesel engine. Qt
e-2 (Marrickville Station) Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022		Area 139 Area 5	Crane (Hiab) EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	Heavy Rigid Crane Truck EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 1 7 1 1 1 1	1 1 1 7 1 1 1	1 1 1 7 1 1	98 95 - 95	-	102 98 -		Qty=1 4 Cylinder Diesel engine. Q
Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich Hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich Hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich Hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022		Area 139 Area 5	EWP Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	EWP (Hi-Rail) Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 7 1 1 1 1	1 1 7 1 1	1 1 7 1 1	95 - 95	-	98 -		4 Cylinder Diesel engine. Q
Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich Hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich Hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich Hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022		Area 139 Area 5	Cable Stands/Cradle Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	Cable Stands/Cradle 6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 7 1 1 1	1 7 1 1 1 1	1 7 1 1	- 95	-	-		
Sydney Trains Track Chainage (6.42-6.75) Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022		Area 139 Area 5	Winch - trailer mounted 5T Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	6T Winch 6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	7 1 1 1 1	7 1 1 1	7 1 1	95	-			
Location (Station) e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)			Z3-L	Area 5	Lifting Platform Crane (Hiab) EWP Cable Stands/Cradle	6T Telehandler Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 1 1	1 1 1	1		-	100		
e-3 (Marrickville Station - Dulwich hill Traction Substation) Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)			Z3-L		Crane (Hiab) EWP Cable Stands/Cradle	Heavy Rigid Crane Truck EWP (Hi-Rail)	1 1 1	1 1	1					15kVA Generator- Deisel. Q
Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)			Z3-L	Area 38	EWP Cable Stands/Cradle	EWP (Hi-Rail)	1	1		95	-	95		Qty=1
Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)			Z3-L	Area 38	Cable Stands/Cradle		1		1	98	-	102		Qty=1
Sydney Trains Track Chainage (6.75-6.87) Location (Down Metro) e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)			23-L	Area 38				1	1	95	-	98		4 Cylinder Diesel engine. Q
e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022					10	-	-	-	-	-		
e-4 & 5 (Dulwich hill Traction Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022			Winch - trailer mounted 5T	6T Winch	1	-	-	95	-	100		15kVA Generator- Deisel. Q
Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022			Telehander / Franna crane (20t)	25t Franna Crane	1	-	-	99	-	102		Qty=1
Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	HV Cabling	Nov 2021 - Jan 2022			Crane (Hiab)	Heavy Rigid Crane Truck	1	-	-	98	-	102		Qty=1
Sydney Trains Track Chainage (6.87-7.75) Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)	Inv Cabling	NOV 2021 - Jan 2022	74.1	Aron 122 125	EWP	EWP (Hi-Rail)	1	-	-	95	-	98		4 Cylinder Diesel engine. Q
Location (Down Metro) e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)			Z4-L		Cable Stands/Cradle	Cable Stands/Cradle	6	1	6	-	-	- 100		45114.6
e-6 (Dulwich hill Station) Sydney Trains Track Chainage (7.75-8.09)				Area 401, 132	Winch - trailer mounted 5T	6T Winch	1		1	95	-	100		15kVA Generator- Deisel. C
Sydney Trains Track Chainage (7.75-8.09)				Area 136, 137	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
Sydney Trains Track Chainage (7.75-8.09)			Z5-L	Area 35, 134 Area 37	Crane (Hiab)	Heavy Rigid Crane Truck FWP (Hi-Rail)		1	1	98	-	102		Qty=1
Sydney Trains Track Chainage (7.75-8.09)	LIN Cablia a	Nov 2021 - Jan 2022			EWP					- 33	-	98		4 Cylinder Diesel engine. Q
	HV Cabling	Nov 2021 - Jan 2022	Z6-L	Area128, 129	Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-	-		4511/4.6
EOCATION (Station)				Area 130, 131 Area 6, 36	Winch - trailer mounted 5T	6T Winch 6T Telehandler	1	1	1	95	-	100		15kVA Generator- Deisel. Q
				Aled 0, 50	Lifting Platform		1	1	1	95 98	-	95 102		Qty=1
					Crane (Hiab) EWP	Heavy Rigid Crane Truck EWP (Hi-Rail)	1	1	1	95	-	98		Qty=1
7 (Dubuick hill Casting Hundstone and station)	UN/ Cabilian	l 2021 A 2021	Z7-L	Area 33	Cable Stands/Cradle		12	12	12	- 95	-	- 98		4 Cylinder Diesel engine. Q
ne-7 (Dulwich hill Station - Hurlstone park station) Sydney Trains Track Chainage (8.09-8.66)	HV Cabling	June 2021 - Aug 2021	ZI-L	Area 34	· ·	Cable Stands/Cradle	12	12	12	95	-	100		1514/A Commenter Deirol C
Location (Down Metro)				Area 54	Winch - trailer mounted 5T Telehander / Franna crane (20t)	6T Winch 25t Franna Crane	1			99	-	100		15kVA Generator- Deisel. Q
Location (Down Metro)				Alea 34	Crane (Hiab)	Heavy Rigid Crane Truck	1	-	-	98	-	102		Qty=1 Qty=1
					FWP	FWP (Hi-Rail)	1	-	-	95		98		4 Cylinder Diesel engine. Q
e-8 (Hurlstone park station)	HV Cabling	Nov 2021 - Jan 2022	Z8-L	Area 126, 127	Cable Stands/Cradle	Cable Stands/Cradle	6	6	6			-		4 Cylinder Dieser engine. Q
Sydney Trains Track Chainage (8.66-9.03)	Tiv Cabiling	1407 2021 3411 2022	20 2	Area 122, 123	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. C
Location (Station)				Area 124, 125	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
Education (Station)				Area 7, 32	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Q
e-9 (Hurlstone park station - Canterbury Traction substation)	HV Cabling	Aug 2021 - Oct 2021	Z9-L	Area 52	Cable Stands/Cradle	Cable Stands/Cradle	10	10	10	-	-	-		,
Sydney Trains Track Chainage (9.03-9.55)	, ,			Area 51	Winch - trailer mounted 5T	6T Winch	1			95	-	100		15kVA Generator- Deisel. C
Location (Down Metro)					Telehander / Franna crane (20t)	25t Franna Crane	1			99	-	102		Qty=1
,					Crane (Hiab)	Heavy Rigid Crane Truck	1	Ī		98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. C
e-10&11 (Canterbury Traction substation - Canterbury Station)	HV Cabling	Oct 2021 - Nov 2021	Z10-L	Area 120, 121	Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-	-		
Sydney Trains Track Chainage (9.55-9.97)				Area 118, 119	Winch - trailer mounted 5T	6T Winch	1			95	-	100		15kVA Generator- Deisel. C
Location (Down Metro)				Area 1, 31	Telehander / Franna crane (20t)	25t Franna Crane	1	_	_	99	-	102		Qty=1
			Z11-L	Area 50	Crane (Hiab)	Heavy Rigid Crane Truck	1			98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1		1	95	-	98		4 Cylinder Diesel engine. Q
e-12 (Canterbury Station)	HV Cabling	Nov 2021 - Jan 2022	Z12-L	Area 114, 155	Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-	-		
Sydney Trains Track Chainage (9.97-10.30)				Area 112, 113	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. C
Location (Station)				Area 116, 117	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
				Area 8, 30	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102	-	Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. C
	HV Cabling	June 2021 - Aug 2021	Z13-L		Cable Stands/Cradle	Cable Stands/Cradle	12	12	12	-	-	-		
Sydney Trains Track Chainage (10.30-11.54)				Area 48	Winch - trailer mounted 5T	6T Winch	2	2	2	95	-	100	-	15kVA Generator- Deisel. C
ocation (Down Metro)				Area 47	Telehander / Franna crane (20t)	25t Franna Crane	2	2	2	99	-	102	-	Qty=1
					Crane (Hiab)	Heavy Rigid Crane Truck	2	2	2	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. C
	HV Cabling	Nov 2021 - Jan 2022	Z14-L		Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-	-		
Sydney Trains Track Chainage (11.54-11.88)					Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. C
Location (Station)					Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
				Area 108, 109		Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
				Area 106, 107		EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. C
	HV Cabling	Nov 2021 - Jan 2022	Z15-L		Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-			
Sydney Trains Track Chainage (11.88-12.06)					Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. C
Location (Station)			Z16-L		Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
				Area 99, 101, 415 Area 412, 413, 414		Heavy Rigid Crane Truck EWP (Hi-Rail)	1	1	1	98	-	102 98		Qty=1 4 Cylinder Diesel engine. Q

Table C1-1: Construction Timetable/ Activities/ Equip	ment												S2B SOUTH WEST CORRIDOR	WORKS - HV Cabling and Padmount
Activity/ Work Area	Details	Indicative timing/	Modelling ID	Gatewave Area ID	Plant/ Equipment	Plant/ Equipment	Day	Evening	Night	Sound Power L Model, dB(A)	evel (Lw re: 1pW	/) in Noise	High noise plant (EPL Vibration intensive plant	Notes
		duration				(as provided by client)	7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}	£1)	
IV Cabling (Campsie to Bankstown)														
one-17 - 1,2,3 (Campsie Traction substation to Belmore Station)	HV Cabling	Feb 2022 - Apr 2022	Z17-L	Area 27	Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-	-		
Sydney Trains Track Chainage (12.06-13.680)					Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Down Metro)					Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
					Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
one-18 (Belmore Station)	HV Cabling	Feb 2022 - Apr 2022	Z18-L	Area 95, 96	Cable Stands/Cradle	Cable Stands/Cradle	7	7	7	-	-	-		
Sydney Trains Track Chainage (13.680-14.04)				Area 97, 98	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Station)				Area 93, 94	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
				Area 10, 26	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
one-19- 1&2 (Belmore Station to Lakemba Station)	HV Cabling	Mar 2022 - May 2022	Z19-L		Cable Stands/Cradle	Cable Stands/Cradle	6			-	-	-		
Sydney Trains Track Chainage (14.04-14.980)					Winch - trailer mounted 5T	6T Winch	1			95	-	100		15kVA Generator- Deisel. Qty=1
Location (Down Metro)					Telehander / Franna crane (20t)	25t Franna Crane	1			99	-	102		Qty=1
				Area 43	Crane (Hiab)	Heavy Rigid Crane Truck	1		_	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1		_	95	-	98		4 Cylinder Diesel engine. Qty=1
one-20 (Lakemba Station)	HV Cabling	Mar 2022 - May 2022	Z20-L	Area 79, 80	Cable Stands/Cradle	Cable Stands/Cradle	7	7	7	-	-	-		
Sydney Trains Track Chainage (14.980-15.260)				Area 76, 75	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Station)				Area 77, 78	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
				Area 21, 11	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
Zone-21 - 1&2 (Lakemba Station toWiley Park Station)	HV Cabling	Apr 2022 - June 2022	Z21-L	Area 42	Cable Stands/Cradle	Cable Stands/Cradle	6	6	6	-	-	-		
Sydney Trains Track Chainage (15.260-15.840)					Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Down Metro)					Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
					Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
one-22 (Wiley Park Station)	HV Cabling	Apr 2022 - June 2022	Z22-L	Area 73, 74	Cable Stands/Cradle	Cable Stands/Cradle	7	7	7	-	-	-		
Sydney Trains Track Chainage (15.840-16.20)	_			Area 69, 70	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Station)				Area 71, 72	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
				Area 12, 41	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
one-23 (Wiley Park Station to Punchbowl Station)	HV Cabling	Apr 2022 - June 2022	Z23-L	Area 20	Cable Stands/Cradle	Cable Stands/Cradle	6			-	-	-		
Sydney Trains Track Chainage (16.20-16.860)		'			Winch - trailer mounted 5T	6T Winch	1	_		95	-	100		15kVA Generator- Deisel. Qty=1
Location (Down Metro)					Telehander / Franna crane (20t)	25t Franna Crane	1	_		99	-	102		Qty=1
·					Crane (Hiab)	Heavy Rigid Crane Truck	1	_		98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1			95	-	98		4 Cylinder Diesel engine. Qty=1
one-24 - 1&2 (Punchbowl Station)	HV Cabling	May 2022 - July 2022	Z24-L	Area 68	Cable Stands/Cradle	Cable Stands/Cradle	7	7	7	-	-	-		
Sydney Trains Track Chainage (16.20-16.860)				Area 67, 64	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Station)				Area 63, 66, 65	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
· ·				Area 13, 19	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
one-25 - 1&2 (Punchbowl Station to Bankstown Station)	HV Cabling	Oct 2022 - Dec 2022	Z25-L	Area 17	Cable Stands/Cradle	Cable Stands/Cradle	6			_	-	-		
Sydney Trains Track Chainage (16.860-18.320)	,			Area 62, 60, 18	Winch - trailer mounted 5T	6T Winch	1			95	-	100		15kVA Generator- Deisel. Qty=1
Location (Down Metro)				Area 61, 59, 3	Telehander / Franna crane (20t)	25t Franna Crane	1			99	-	102		Qty=1
				Area 40	Crane (Hiab)	Heavy Rigid Crane Truck	1			98	-	102		Qty=1
					EWP	EWP (Hi-Rail)	1			95	-	98		4 Cylinder Diesel engine. Qty=1
Zone-26 (Bankstown Station)	HV Cabling	Oct 2022 - Dec 2022	Z26-L	Area 40	Cable Stands/Cradle	Cable Stands/Cradle	7	7	7	-	-	-	-	
Sydney Trains Track Chainage (18.32-19.200)	,			Area 39	Winch - trailer mounted 5T	6T Winch	1	1	1	95	-	100		15kVA Generator- Deisel. Qty=1
Location (Station)				Area 16	Telehander / Franna crane (20t)	25t Franna Crane	1	1	1	99	-	102		Qty=1
,				Area 58	Crane (Hiab)	Heavy Rigid Crane Truck	1	1	1	98	-	102		Qty=1
				Area 14, 57	EWP	EWP (Hi-Rail)	1	1	1	95	-	98		4 Cylinder Diesel engine. Qty=1
1kV Padmount Substation Installation (Marrickville to B	ankstown)													
admount Location	Cranage	Oct 2021 - Jan 2022			Telehander / Franna crane (20t)	25t franna Crane	1 for 1day	-	-	99	-	102		
Sydenham Station	Crane Support		SYP-T	Area 56	Delivery truck	Flatbed Truck	1 for 1day	-	-	106	-	111		
Marrickville Station	Kiosk delivery		MVP-T	Area 15	Crane (Grove GMK5220 - 220 T)	200t Crane	1 for 1day	-	-	99	-	106		
Dulwich Hill Station	Kiosk landing		DHP-T	Area 33	Hand tools	hand tools	Y	-	-	103	-	111		
Hurlstone Park Station	Wiring works		HPP-T	Area 7, 32	Hand tools (Power)	power tools	Y	-	-	107	-	118		
Canterbury Station			CBP-T	Area 49	, , , , , , , , , , , , , , , , , , , ,							1.0		
Campsie Station			CPP-T	Area 29, 209										
Belmore Station			BMP-T	Area 96, 98										
Lakemba Station			LKP-T	Area 21, 76, 77										
Wiley Park Station			WPP-T	Area 12, 41										
Punchbowl Station			PBP-T	Area 64, 67, 68										
Bankstown Station			BKP-T	Area 14, 57										
Surmato Att Station	1		5.41	7.1.Cd 17, 37										

	Table C2: Construction Timetable					SW HV Cabli	ing and 11i	kV Padmount Subs	station Contructio															SW HV	Cabling and 118	V Padmount Substati	on Contruction									
The content will be content	Non Posession work				DEC	ja	ın	feb		mar	apr		may	jun		jul	aug		sept	oct		nov	de	nc j	an	feb		mar	apr	may		jun		jul	aug	
	Possession work Phase	Aspect	Description of Activity	Effort (Days)	Month 1	М	fonth 2	Month	13	Month 4	Month 5		Month 6	Month 7	-	Month 8	Month 9	N.	forth 10	Month 11	Mor	nth 12	Month 13	,	Month 14	Month 15		Month 16	Month 17	Mont	h 18	Month 19	м	onth 20	Month 2	1
	Sydney Trains Track Chainage (4.15-18.800)	HV CABLING	SITE SETUP CABLE INSTALLATION	12																++++																-
State	Location (UP Metro) Zone-1 (Marrickville Station)	HV CABLING	IONTING SITE SETUP			ĦĦ											++++	HH	+++	++++					+++					-		HH		\Box	HH	##
Series Se	Sydney Trains Track Chainage (6.14-6.42)		CABLE INSTALLATION	12																																##
Set Property of the control of the c	Zone-2 (Marrickville Station)	HV CABLING	CARLE INSTALLATION	7																																##
STORY OF THE WORK	Location (Station)	MALCARI INC	JOINTING	- 1																													111			
Set	Traction Substation) Sydney Trains Track Chainage (6.75-6.87)	IIV CHELING		12	+++		+++	+++++	++++	++++	++++	+++	++++	++++	+++	+++		++++	++++	++++	++++				+++	+++++	++++	++++		+++	++++	++++	+++	++++	++++	++++
	Location (Down Metro) Zone-4 & 5 (Dulwich hill Traction	HV CABLING	JOINTING SITE SETUP																																	7777
	Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75)		CABLE INSTALLATION	6																																++++
	Zone-6 (Dulwich hill Station)	HV CABLING														$\pm \pm \pm \pm$	++++								$\pm\pm\pm$		++++			$\pm \pm \pm$		$\pm\pm\pm\pm$			++++	$\pm\pm\pm$
	Sydney Trains Track Chainage (7.75-8.09) Location (Station)			9												$\pm \pm \pm \pm$	++++								$\pm\pm\pm$		++++			$\pm \pm \pm$		$\pm\pm\pm\pm$			++++	$\pm\pm\pm$
Series	Zone-7 (Dulwich hill Station - Hurlstone park station)	HV CABLING		12			Ш		шш	шш					ш										\bot		ШШ					шш			шш	\bot
See	Sydney Trains Track Chainage (8.09-8.66) Location (Down Metro)		JOINTING	-																													##			##
Section Sect	Zone-8 (Huristone park station) Sydney Trains Track Chainage (8.66-9.03)	HV CABLING		9		ш	ш																										ш			+++
Section Sect	Zone-9 (Huristone park station -	HV CABLING			+++	+++	++	++++	++++	++++	++++	+++	++++	++++	+++	+++	++++	 			++++				+++	++++	++++		++++	+++	++++	++++	+++	$^{\rm +++}$	++++	+++
Section Sect	Cameroury Traction substation(Sydney Trains Track Chainage (9.03-9.55) Location (Down Metro)		CABLE INSTALLATION	9	##	ĦĦ	Ħ	+++	+++	+++		##		+++	$\pm\pm\pm$	$\pm \pm \pm$									+++					###	ш		##	ĦĦ	$_{\rm HH}$	##
The state The	Zone-10&11 (Canterbury Traction substation - Canterbury Station)	HV CABLING	SITE SETUP		шт	шН	Шt	шт	шт	шн	шт	шН		ШП	ЩΗ	ШΗ		ш	ШП	шн			1111				шН	шп	ш	шН	шн		╜	ШΗ	ш	廿廿
	Sydney Trains Track Chainage (9.55-9.97) Location (Down Metro)		JOINTING	*	H	H	Ħ	HH	H	HH.	+HH	HH	$\Pi\Pi$	$\Pi\Pi$	HH	HH	$\Pi\Pi$	H	HH	\Box			H		+H+	\Box	$\Pi\Pi$	\mathbf{H}	+HH	$+\Pi\Pi$	ΗН	+	H	H	HH	4#
Series Se	Zone-12 (Canterbury Station) Sydney Trains Track Chainage (9.97-10.30)	HV CABLING	SITE SETUP CABLE INSTALLATION	6		HH	H	HH	HH	$\Pi\Pi$	HH		$\blacksquare \blacksquare$		+++	+	++++		\mathbf{HH}		\blacksquare				+H		$\mathbf{H}\mathbf{H}$		$\Pi\Pi\Pi$	$\pm H$	$\Pi\Pi$		Ħ	HH	HH	+
The state 1	Location (Station) Zone-13 - Sec 1,2 & 3 (Canterbury Station -	- HV CABLING	JOINTING			HH	Ħ	+++	$\Pi\Pi$	$\Pi\Pi$	+++		++++	+++					$\Pi\Pi$		+++				+++		$\Box\Box$				HH	$\Pi\Pi$	##	Ш	$\Box\Box$	\blacksquare
Series Se	Carrosie Station) Surbasy Trains Track Chainage (10 10-11 54)			28	ш	ш	ш	++++			$\pm \pm \pm \pm$	ш	++++	$\pm \pm $				++++			++++		+++		ш		ШШ	++++		$\pm\pm\pm$	++++	++++	ш	Ш	++++	$\pm\pm\pm$
Section Sect	Location (Down Metro) Zone-14 (Campsie Station)	HV CABLING	SITE SETUP		Ш	Ш	Ш	ш	шШ		${f H}{f H}{f I}$	ШΞ	ш	шШ	Ш	Ш	шШ	шШ	шШ	шШ							шШ				$\coprod\coprod$	шШ	Ш	Ш	шП	$\pm \pm \pm$
Section Sect	Sydney Trains Track Chainage (11.54-11.88) Location (Station)			6		ш	ш																													###
Marche M	Zone-15 & 16 (Campsie Station to Campsie Traction substation)	HV CABLING		4	$\perp \perp \perp$	Ш	ш						4444			+							ш		$\perp \downarrow \downarrow \downarrow$					444						++++
		MAY CARRIED O	JOINTING																																	
March Marc	(Campsie Traction Substation to	III OLLUIG	CABLE INSTALLATION		ш	ш	ш																										ш			##
	Zone-17 - 1,2,3 (Campsie Traction	HV CABLING	SITE SETUP			ĦĦ				TIT						1111			++++											1111	TITI		ĦĦ			+++
March Marc	Sydney Trains Track Chainage (12.06-13.680)			16																																
		HV CABLING	SITE SETUP			ш	ш																													$\pm\pm\pm$
	Sydney Trains Track Chainage (13.680-14.04)		JOINTING	7	-++	ш			++++	++++	++++		+			+++		++++		++++	++++	++++	+++		+++							++++				$+\!+\!+\!+$
	Zone-19- 1&2 (Belmore Station to Lakemba Station)	HV CABLING																																		
Selection of the control of the cont	Sydney Trains Track Chainage (14.04-14.980)			12	-									++++	++++	+++		++++	++++						+++							++++	+++		++++	$+\!+\!+\!+$
Material Content of the content of		HV CABLING	SITE SETUP												##										###								##			###
Material Content of the content of	Sydney Trains Track Chainage (14.980-15.260) Location (Station)		JOINTING	7																																$\pm\pm\pm\pm$
	Park Station)	HV CABLING		- 12					шш	ш						$\bot \bot \bot \bot$			шш				ш		$\bot \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$										шш	$\bot \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$
Mate Ministry Minis	Sydney Trains Track Chainage (15260-15840) Location (Down Metro)		IONTING		+++		+++	++++	++++	++++	++++	+++	++++	++++	++++	+++	++++	++++	++++	++++	++++	++++	+++	+++	+++		++++	++++		-					++++	++++
Ministry		HV CABLING	SITE SETUP CABLE INSTALLATION		-HH				$\overline{}$		+++			++++	\blacksquare			$\overline{+}$	$\overline{+}$	++++	+++				+			-							$\overline{+}$	+
AM MARKARO SA MARKARO	Sydney Trains Track Chainage (15.840-16.20) Location (Station)		JOINTING	- 1		ш	ш																													###
March Marc	Station)	HV CABLING		12	-									++++	++++			++++	++++						+++			+++++		_			+++			+ + + +
MORANIC STATE OF THE PROPERTY	Sydney Trains Track Chainage (1620-16860) Location (Down Metro)		IONTING		Ш	Ш	Ш	$\pm\pm\pm\pm$			$\pm\pm\pm\pm$				Ш	$\pm \pm \pm$							Ш										ш	ш	ш	$\pm\pm\pm$
MORANIC STATE OF THE PROPERTY		HV CABLING	CABLE INSTALLATION	7	НН	HH	HF	++++	++++	++++	++++	НΗ	++++7	++++	$+$ H $\overline{1}$	$+H\overline{1}$	++++	+++7	+++7	++++	+++7	+++	HH	+++7	+++	++++7	+++7	+++7	++++	+++	+++		Ш		+++7	HH
March Marc	Location Station	HV CARLING	JOINTING SITE SETUP		HH	HH	Ħ	+++	+++	++++	+++	HH		+++	+	\pm	+HH	+++		+++		\pm	ĦĦ		##		HH	+		##			#			##
Minimum Mini	Rankstown Station)			12	+++	+++	++	++++	++++	++++	++++	+++	++++	++++	+++	+++	++++	+++	+++	++++	++++	+++	+++	+++	+++	++++	++++	++++	++++	+++	++++	++++	+++	+++	++++	+++
AND	Location (Down Metro) Zona-26 (Rankstream Station)	HV CAN ING				ĦĦ	Ħ		ш	ш	+++					\pm		ш					##				ш			1111	ш		##		ш	##
And Control Co		IIV CABLING	CABLE INSTALLATION	7	HHT	††	ttt	++++	++++	11111	++++		1111	++++	1111	+	++++	++++	++++	++++		+++	$^{\rm HH}$	++++	+++		++++	++++		+++	++++	++++	111	$^{\rm HH}$	++++	+++
Market M	Location (Station) Sydenham Station	11kV Padmount Installati	JOINTING on Delivery	1	H	HH	H	HH	HH	$\Pi\Pi$	HH		$\blacksquare \blacksquare$		+	+	++++		\mathbf{HH}						+H		$\mathbf{H}\mathbf{H}$		$\Pi\Pi\Pi$	$\pm H$	$\Pi\Pi$		Ħ	HH	HH	\blacksquare
All		11kV Padmount Installati		14		HH	H	$\mathbf{H}\mathbf{H}$	Ш	ПΗ	$\Pi\Pi$		++++	$\Pi\Pi$		\blacksquare	++++			ш					+++						шн	$\Pi\Pi$	\blacksquare	HH		\blacksquare
Anthree Fact States 13V Palmont Statistics 24V Palmont Statistics 13V Palmont Statistics 25V Palmo		11kV Padmount Installati		14		ш	Ш	ш	HH	${}^{\rm HH}$	$\mathbf{H}\mathbf{H}$	ш			ш	+									+++					##	ш		##	Ш	ш	##
Services State		11kV Parimoner bus		14	##	ш	Ш	${}^{+++}$	HH	${\rm HH}$	+++	ш	+		ш	$\pm \pm \pm$	+								+			+		##	$_{\rm HH}$	$\Box\Box$	##	Ш	$_{\rm HH}$	##
Ample Statis 1337 Administration Delange 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		TALLY Padrount installati		14		ш	ш					ш			Ш																		##	Ш		411
All relevant minimizes All relevant minimize	and the state of t		Installation	14	ш	ш	ш					ш		曲曲	ш	ш																	##	ш	шш	111
33Y Pelmont Hindrick Control C	Campsie Station	LLKV Padmount Installati		14	Ш	ш	Ш					ш			ш	$\pm \pm \pm$															ш		##	Ш	шш	Ш
33Y Pelmont Initialistic Drivery I States St	Belmore Station	11kV Padmount Installati	on Detivery Installation	14	Ш	ш	Ш	++++	++++	+++	$\pm\pm\pm\pm$	ш	++++	++++	ш	Ш	++++	+++	++++	++++					+++		++++	++++		+++	$\pm\pm\pm\pm$	++++	ш	Ш	ш	Ш
Tablidos Salor Sal	Lakemba Station	11kV Padmount Installati		14	Ш	Ш	Ш	ш	ШΗ	ШΗТ	ш	Ш٦	ШΗ	ШН	Ш₹	шТ	шШТ	ш	шШТ	шшТ					ш	шшТ	шШТ	ш	ш	±Ш₹	шШТ	ш	ш	ш	шН₹	ШŦ
13V Farbourt Institution Chiefer 13V Fa	Wiley Park Station	11kV Padmount Installati		14	H	H	Ħ	+HH	$+\Pi\Pi$	$+\Pi\Pi$	$+\Pi\Pi$	H	4777	+HH	HH	Æ	$+\Pi\Pi\Pi$	+HH	+HH	+HH					+TT	HHH	+HH	+HH	$+\Pi\Pi$	$+\Pi\Pi$	+HH	$+\Pi\Pi$	Ŧ	H	$+\Pi\Pi$	$+\Pi$
SM fahrurt hindred parties and the state of	Punchbowl Station	11kV Padmount Installati	on Delivery Installation	1	H	HH	H	+++	HH	\blacksquare	+++	HH	+H	++++	+	\mathbf{H}	++++	HH	HH	++++					+++	HHH	HH	\blacksquare	HHH	+H	$\mathbf{H}\mathbf{H}$	+++	##	HH	HH	+
	Bankstown Station	21kV Padmount Installati	on Delivery Installation	1		HH	Ħ	+++	Ш	$\Pi\Pi$			++++	HH			++++								+++							$\Pi\Pi$	##	Ш		+
		•																																		

TABLE 5 1-0 SER 000 10 Control AND CONTROL CONTROL AND CONTROL AND

Table C 2: Construction Timetable

Non Posession work				ept				00					nov					dec			jan
Possession work			•	ep.														occ			,
Phase	Aspect	Description of Activity	Mont	h 21	_	_		Month	22	_	_	Mod	nth 23	_	_	,	Aonth	24	_	_	Mo
Zone-0-1,2,3,4 (Sydenham Station) Sydney Trains Track Chainage (4.15-18.800)	HV CABLING	SITE SETUP CABLE INSTALLATION	+	+	Н	+	+	+	H	+	+	Н	+	H	+	Н	+	+	+	Н	+
Location (JP Metro) Zone-1 (Marrickville Station)		JOINTING	#	1	П	#	Ħ	#	Ħ	Ŧ	#	П	#	П	#	Ħ	1	Ħ	t	Ħ	1
Surface Trains Track Chainana (6 M-6-62)	HV CABLING	SITE SETUP CABLE INSTALLATION	$^{+}$	$^{+}$	H	$^{+}$	H	+	H	$^{+}$	+	Н	+	H	$^{+}$	H	+	H	$^{+}$	H	$^{+}$
Location (UP Metro) Zone-2 (Marrickville Station)	HV CABLING	JOINTING SITE SETUP	7	Ŧ	П	7	П	1	П	F	1		1	П	Ŧ	П	Ŧ	Ħ	F	Ħ	Ŧ
Sydney Trains Track Chainage (6.42-6.75)	NV CABLING	CABLE INSTALLATION	±	±	H		H	±	Ħ	±	±	Н	±	Ħ	\pm	Ħ	±	Ħ	±	H	±
Location (Station) Zone-3 (Marrickville Station - Dulwich hill	HV CABLING	JOINTING SITE SETUP	-	F	П	1	Н	_	Н	Ŧ	_		_	Н	_	Н	_	\perp	F	\perp	F
	IIV CHEING		4	+	Ш	4	ш	4	Н	\perp	4		4	Ш	_	ш	_	_	╀	ш	+
Sydney Trains Track Chainage (6.75-4.87) Location (Down Metro) Zone-4 & 5 (Dulwich hill Traction		CABLE INSTALLATION JOINTING	+	+	Н	+	+	+	Н	+	+	Н	+	H	+	Н	+	+	+	Н	+
Zone-4 & 5 (Dulwich hill Traction	HV CABLING	SITE SETUP	Т	Т	П	Т	П	T	П	Т	T		T	П	Т	П	T	Т	Т	П	Т
Substation - Dulwich Hill station) Sydney Trains Track Chainage (6.87-7.75)		CABLE INSTALLATION	1		П	1	П	1	П		1		1		_	П	-	H	F	Н	
Location (Down Metro) Zone-6 (Dulwich hill Station)	HV CABLING	JOINTING SITE SETUP	+	+	Н	+	H	+	H	+	+	Н	+	H	+	Н	+	H	۰	Н	+
Sydney Trains Track Chainage (7.75-8.09)		CABLE INSTALLATION	#	1	П	#	П	_	П	F	_		_	П	-	П	-	\pm	F	н	1
Zone-7 (Dulwich hill Station - Hurlstone	HV CABLING	JOINTING SITE SETUP	+	+	Н	+	H	+	H	+	+	Н	+	H	+	H	+	+	$^{+}$	+	+
oark station) Sydney Trains Track Chainage (8.09-8.66)		CABLE INSTALLATION	+	+	Н	+	H	+	H	+	+	Н	+	H	+	H	+	+	$^{+}$	+	+
Location (Down Metro) Zone-8 (Huristone park station)	HV CABLING	SITE SETUP	7	F	П	Ŧ	П	4	П	F	4		4	П	-	П	-	\blacksquare	F	Н	F
Sydney Trains Track Chainage (8.66-9.03)	HV CABLING	CABLE INSTALLATION	+	t	H	+	Ħ	+	Ħ	+	+	Н	+	Ħ	+	Ħ	+	H	t	H	t
Location (Station)	HV CABLING	JOINTING SITE SETUP	-	-	П	7	Н	+	П	Ŧ	+	Τ	+		-	П	-	\blacksquare	F	Н	-
Zone-9 (Huristone park station - Canterbury Traction substation)	NV CABLING		+	+	Н	4	Ш	4	4	+	4	Н	4	Н	+	Н	+	Н	+	Н	+
Sydney Trains Track Chainage (9.03-9.55) Location (Down Metro) Zone-16&11 (Canterbury Traction		CABLE INSTALLATION JOINTING	$^{+}$	$^{+}$	H	$^{+}$	H	+	H	+	+	Н	+	H	$^{+}$	H	+	H	+	H	$^{+}$
Zone-168:11 (Canterbury Traction substation - Canterbury Station)	HV CABLING	SITE SETUP	Т	Т	П	T	П		П	Т		П		П	Τ	П		П	Т	Π	Т
Sydney Trains Track Chainage (9.55-9.97)		CABLE INSTALLATION JOINTING	1	F	П	1	П	1	П	T	1		1	П	Ŧ	П	T	П	F	П	F
Location (Down Metro) Zone-12 (Canterbury Station)	HV CABLING	SITE SETUP	$^{+}$	$^{+}$	H	$^{+}$	H	+	H	$^{+}$	+	Н	+	H	$^{+}$	H	+	H	$^{+}$	H	$^{+}$
Sydney Trains Track Chainage (9.97-10.30)		CABLE INSTALLATION	1	F	П	1	П	1	П	T	1		1	П	Ŧ	П	T	П	F	П	F
Location (Station) Zone-13 - Sec 1,2 & 3 (Carrierbury Station -	HV CABLING	SITE SETUP	+	+	Н	+	H	+	$^{+}$	+	+	Н	+	H	+	H	+	H	+	H	+
Carronie Station) Sydney Trains Track Chainage (10.30-11.54)		CABLE INSTALLATION	+	+	Н	+	H	+	$^{+}$	+	+	Н	+	H	+	H	+	H	+	H	+
Location (Down Metro)	HV CABLING	IOINTING SITE SETUP	1	Þ	П	#	П	1	П	F	1	П	1	П	1	П	1	П	F	Ħ	Þ
Zone-14 (Campsie Station) Sydney Trains Track Chainage (11.54-11.88)	HV CABLING	CABLE INSTALLATION	1	±	Н	1	Ш	1	ш	±	1	Н	1	Н	\pm	Н	1	ш	±	Н	±
Location (Station) Zone-15 & 16 (Campsie Station to Campsie	HV CABLING	SITE SETUP	+	Ŧ	H	+	+1	-#	HF	+	-#	Н	-#	H	+	H	+	HĒ	╀	H	Ŧ
Traction substation(Sydney Trains Track Chainage (11.88-12.06)		CABLE INSTALLATION	+	+	Н	+	+	+	+	+	+	Н	+	Н	+	$^{++}$	+	H	+	H	+
Location (Station)		JOINTING	1														1		L		
Zone-17 To Zone-21 (Campsie Traction Substation to	HV CABLING	SITE SETUP CABLE INSTALLATION	+	+	Н	+	Н	+	Н	+	+	Н	+	Н	+	Н	+	+	+	Н	+
Bankstown)		JOINTING	1					_			_		_			ш	1				
Zone-17 - 1,2,3 (Campsie Traction substation to Belmore Station)	HV CABLING	SITE SETUP			Ш		Ш		Ш							Ш					
Sydney Trains Track Chainage (12.06-13.680)		CABLE INSTALLATION			Ш		Ш		Ш							Ш					
Location (Down Metro) Zone-18 (Belmore Station)	HV CABLING	JOINTING SITE SETUP	+	+	Н	+	+	+	Н	+	+	Н	+	Н	+	Н	+	+	+	Н	+
Sydney Trains Track Chainage (13.680-14.04)	IIV CHEING	CABLE INSTALLATION	+	t	H	+	Ħ	+	Ħ	$^{+}$	+	Н	+	Ħ	$^{+}$	Ħ	+	H	t	H	t
Location (Station)		IONTING	1			1			ш							ш		1	t		
Zone-19- 1&2 (Belmore Station to Lakemba Station)	HV CABLING	SITE SETUP			Ш				Ш							Ш					
Sydney Trains Track Chainage (14.04-14.980)		CABLE INSTALLATION							П							П					
Location (Down Metro) Zone-20 (Lakernba Station)	HV CABLING	JOINTING SITE SETUP	+	+	Н	+	Н	+	Н	+	+	Н	+	Н	+	Н	+	$^{+}$	+	н	+
Sydney Trains Track Chainage (14.980-15.260)	IIV CHEING	CABLE INSTALLATION	+	t	H	+	Ħ	+	Ħ	$^{+}$	+	Н	+	Ħ	$^{+}$	Ħ	+	H	t	H	t
Location (Station)		IONTING	1			1			ш							ш		1	t		
Zone-21 - 1&2 (Lakemba Station toWiley Park Station)	HV CABLING	SITE SETUP	IJſ	1	LΓ	JĒ	ΔŢ	╝	Цſ	1	╝	L٦	╝	LΓ	╝	LΓ	╝	ЦΓ	1-	LΓ	1
Sydney Trains Track Chainage (15.260-15.840)		CABLE INSTALLATION	I	Γ	П	Ι	П	I	П	Γ	I	П	I	П	I	П	I	П	Γ	П	Γ
Location (Down Metro) Zone-22 (Wiley Park Station)	HV CABLING	JOINTING SITE SETUP	Ŧ	F	П	Ŧ	П	Ŧ	П	F	Ŧ	П	Ŧ	П	Ŧ	П	Ŧ	H	F	H	F
Sydney Trains Track Chainage (15.840-1620)	III CALAG	CABLE INSTALLATION	†	t	Ħ	$^{+}$	Ħ	$^{+}$	Ħ	t	$^{+}$	H	$^{+}$	Ħ	$^{+}$	Ħ	+	H	t	H	t
Location (Station)		JOINTING	#	t		#	Ħ	1	Ħ	1	1	Н	1	Ħ	#	Ħ	#	Ħ	t	Ħ	t
Zone-23 (Wiley Park Station to Punchbowl Station)	HV CABLING	SITE SETUP	Ш	L		1	Ш		Ш	L		L		Ш	1	Ш	Т	Ш	L	Ш	L
Sydney Trains Track Chainage (1620-16.860)		CABLE INSTALLATION	Ι	Γ		Ι	П	Τ	П	Γ	Τ	П	Τ	П	Ι	П	Ι	LΤ	Γ	Ι	Γ
Location (Down Metro) Zone-24 - 1&2 (Punchbowl Station)	HV CABLING	JOINTING SITE SETUP	4	F	H	4	H	+	H	+-	+	Н	+	н	+	H	+	HĒ	F	H	F
Sydney Trains Track Chainage (1620-16860)	III CALAG	CABLE INSTALLATION	†	t	Ħ	$^{+}$	Ħ	$^{+}$	Ħ	t	$^{+}$	H	$^{+}$	Ħ	$^{+}$	Ħ	+	H	t	H	t
Location (Station) Zone-25 - 1&2 (Punchbowl Station to		JOINTING	#	t		#	Ħ	1	ш	t	士	Н	士	Н	#	Ħ	#	Ħ	t	Ħ	t
Zone-25 - 1&2 (Punchbowl Station to Rankstown Station)	HV CABLING	SITE SETUP	Ш	L		1	Ш			L						Ш	Т	Ш	L	Ш	L
Sydney Trains Track Chainage (16.860-18.320)		CABLE INSTALLATION	Ι	Γ		Ι	П	Τ			T				I		Ι	П	Γ	Ι	Γ
Location (Down Metro) Zone-26 (Bankstown Station)	HV CABLING	JOINTING SITE SETUP	4	Ŧ	H	+	+I	-#	н	F	-				F	P	Ŧ	F	Ŧ	H	Ŧ
Sydney Trains Track Chainage (18.32-19.200)		CABLE INSTALLATION	+	t	Ħ	†	Ħ	T	П	Ť	Ť	П	Ť	П	Ť	П	T	Ħ	t	H	t
Location (Station)		JOINTING	1	t		1	Ħ	1	П	£				П	Ť	ш			L	Ħ	t
Sydenham Station	11kV Padmount Installation	Delivery	+	Ŧ	H	+	+1	-#	HF	+	-#	Н	-#	H	+	H	+	HĒ	╀	H	Ŧ
Marrickville Station	11kV Padmount Installation	Delivery	1	t		1	Ħ	1	ш	L	1	Н	1	Н	t	ш	1	Ħ	L	Ħ	t
Dulwich Hill Station	11kV Padmount Installation	Installation Delivery	4	Ŧ	H	4	+I	ų.	HF	+	ų.	Н	ų.	H	+	H	+	ΗĒ	Ŧ	H	Ŧ
		Installation	1	t		1	Ħ	1	ш	L	1	Н	1	Н	t	ш	1	Ħ	L	Ħ	t
Huristone Park Station	11kV Padmount Installation	Delivery Installation	4	Ŧ	H	+	+I	-#	HF	+	-#	Н	-#	H	+	H	+	ΗĒ	Ŧ	H	Ŧ
Canterbury Station	11kV Padmount Installation	Delivery	#	t		1	ш	1	ш	1	1	Н	1	Н	1	П	1	ш	t	Ħ	t
Campsie Station	11kV Padmount Installation	Installation Delivery	4	Ŧ	H	+	+I	-#	HF	+	-#	Н	-#	H	+	H	+	ΗĒ	Ŧ	H	Ŧ
		Installation		±	Ħ	土	Ħ	土	Ħ	±	土	Ħ	土	Ħ	士	Ħ	±	Ħ	t	Ħ	±
Belmore Station	11kV Padmount Installation	Delivery Installation	Ŧ	F	H	Ŧ	ΗĪ	F	ΗŦ	Æ	F	Н	F	H	£	ΗŦ	F	ΗF	F	ΗĪ	F
Lakemba Station	11kV Padmount Installation	Delivery	1	t		1	ш	1	ш	L	1	Н	1	Н	t	ш	1	Ħ	L	Ħ	t
Wiley Park Station	11kV Padmount Installation	Installation Delivery	Ŧ	F	П	Ŧ	П	Ŧ	П	F	Ŧ	П	Ŧ	П	Ŧ	П	Ŧ	H	F	H	F
		Installation	$^{+}$	$^{+}$	H	$^{+}$	H	+	H	$^{+}$	+	Н	+	H	$^{+}$	H	+	H	$^{+}$	H	$^{+}$
Punchbowl Station	11kV Padmount Installation	Delivery	#	Ŧ	П	#	Ħ	1	H	Ŧ	1	П	1	П	#	Ħ	+	Ħ	t	Ħ	Ŧ
Sankstown Station	11kV Padmount Installation	Installation Delivery	+	$^{+}$	H	+	H	+	H	$^{+}$	+	Н	+	H	$^{+}$	H	+	H	$^{+}$	H	$^{+}$
		Installation	1	L		1	П	1	П	L	1		1	П	I	П			L	П	L

Table C1-2: Construction Timetable/ Activities/ Equipment

						Plant/ Equipment	Day	Evening		nd Power Level lel, dB(A)	(Lw re: 1pW) in Noise			
Activity/ Work Area	Details	Indicative timing/ duration	Modelling ID	Gatewave Area ID	Plant/ Equipment	(as provided by client)	7am - 6pm	6pm - 10pm	10pm - 7am		Penalty	L _{Amax}	- High noise plant	Vibration intensive plant	Notes
raction Substation Civil Works							•			Acq	,	Alliax			
nabling works Dulwich Hill TSS	Contamination Assesment	2 days	DH-T	Area 132 13/ 137 135	Drill Ria Excavator w bucket (10-15t)	Borehole driller 15ton Excavator	1 1			106 103	-	116 108	-	X	Typical 'T' assumed SWL 106 High impact 'H' assumed SWL 118
			DH-H	400, 401, 402, 403	Water cart	water cart	i			104	-	107	-	-	riigiriiipact ir assumed 5442 110
Canterbury TSS	Existing services survey	7 days	CB-T CB-H	Area 1, 118, 120, 417	Generator Vacuum truck	13Kva Generator Vacuum Truck	1 1			94 107	-	96 111	-	-	
Campsie TSS	Existing services survey	7 days	CP-T	Area 99, 101, 103, 104		Wacker packer	1			108	-	110	-	X	
		2.1	CP-H	412, 413, 414, 415, 416		Dump Truck	1			106	-	111	-	-	
Lakemba TSS	Clearing and Grubbing (including tree cutting)	3 day	LK-T LK-H	Area 2, 81, 93 406, 407, 408	Chainsaw Mulcher	ChainSaw Wood Chipper	1			116 120	5	120 124	HN	-	
Punchbowl TSS			PB-T	Area 3, 596, 61	Delivery truck	Delivery truck	1			106	-	111	-	-	
			PB-H	404, 405	Grass cutter - front mower (Husqvarna P 525D) Excavator w bucket (10-15t)	Grass Cutter	1 1			105	-	108 108	-	-	
	Site Amenities Installation	1 day			Mobile crane (20t-250t)	55 ton crane	1			104	-	108	-	-	
	Water and sewer connection	2 days			Delivery truck Excavator w bucket (10-15t)	Delivery truck 15ton Excavator	3			106 103	-	111 108	-	-	
	water and sewer connection	2 days			Dump truck	Dump truck	2			106	-	111	-	-	
Typical 'T' assumed SWL 106	Perimeter Barrier and fence installation	2 days			Delivery truck	delivery truck water cart	4			106	-	111 107	-	-	
High impact 118	Access road and ground preparation	3 days			Water cart Delivery truck	delivery truck	4			104	-	111	-	-	
					Water cart	water cart	1			104	-	107	-	-	
					Hand tools (Power) Excavator w bucket (10-15t)	power tools 10ton Excavator	5			107	-	118 108	-	-	
					Concrete Agi	Concrete truck	2			108	-	111	-	-	
	Stains to Transmission Dala	d days			Dump truck	Dump truck	1			106	-	111	-	-	
	Stairs to Transmission Pole (Campsie TSS only)	4 days			Delivery truck Concrete Aqi	Delivery truck Concrete truck	1			106 108	-	111	-	-	
	,,				Concrete pump	Concrete pump	5			103	-	107	-	-	
					Drill Rig	Excavator 15T with Auger	1			106 99	-	116 102	-	X	
					Telehander / Franna crane (20t) Concrete Agi	Franna 25T Concrete truck	2			108	-	111	-	-	
General		duration of works	Included in all	All TSS aareas	Excavator w bucket (10-15t)	15ton Excavator with auger	1			103	-	108	-	-	
			Typical		Concrete Agi Concrete pump	Concrete Truck Concrete Pump	2			108	-	111 107	-	-	
					Delivery truck	Delivery truck	4			106	-	111	-	-	
NU	000		DD T	A 2 FOC C1	Telehander / Franna crane (20t)	15ton Franna Crane	1			99	-	102	-	-	D 11 1700 1
Piling	Piling pad preparation	4 days 4 days	PB-T PB-H	Area 3, 596, 61 404, 405	Excavator w bucket (10-15t) Vibratory Roller (7T Smooth Drum)	15ton Excavator 5 ton roller compactor	1			103 112	-	108 120	HN	- X	Punchbowl TSS only
		4 days		10 1, 103	Dump truck	dump truck	3			106	-	111	-	-	
	Boreholed pile	10 days			Drill Rig	Drill Rig	1			106	-	116	-	X	Punchbowl TSS only
		10 days 10 days			Excavator w bucket (10-15t) Delivery truck	15ton Excavator Delivery truck	1 2			103	-	108 111	-	-	
		10 days			Concrete Agi	Concrete Truck	2			108	-	111	-		
		10 days			Concrete pump	Concrete Pump	1			103	-	107	-	-	
Excavation	Excavation to design level	20 days	DH-T; DH-H CB-T; CB-H	All TSS aareas	Excavator w bucket (25t) Excavators with hammers (35-45T)	20-30 Ton Excavator Hydraulic Hammer	2			103 118	- 5	108 123	- HN	- X	Canterbury TSS,
			CP-T; CP-H		Rock Saw attachment on a medium sized excav-		1			113	5	116	HN	X	other substations if required
			LK-T; LK-H PB-T; PB-H		Water cart	Water Cart	1			104	-	107	-	-	
			PB-1; PB-H		Dump truck Delivery truck	Dump truck Delivery truck	5			106 106	-	111	-	-	
					Backhoe Loader 8T	BackHoe	1			100	-	104	-	-	
CCD and Designate installation	CSR	4 days	Т	All TSS aareas	Excavators with hammers (12T)	Ston Hydraulic Vibratory Hammer	1			115	5	120	HN	X	May be required for temporary works
CSR and Drainage installation	CSR	20 days	'	All 133 daleds	Delivery truck Hand tools (Power)	Delivery truck power tools	5			106 107	-	111 118	-	-	
					Telehander / Franna crane (20t)	5 ton telehandler	1			99	-	102	-	-	
Earthing		10 days	Т	All TSS aareas	Drill Riq Pump	Borehole driller water pump	1 1			106	-	116 107	-	X	
Backfill		10 days	Т	All TSS aareas	Dump truck	Dump truck	4			106	-	111	-	-	
					Excavator w bucket (25t)	20 ton Excavator	1			103	-	108	-	-	
					Feed hopper conveyor drive unit Compactor / Wacker packer	Soil Slinger Vibratory Plate compactor	1 2			97 108	-	100 110	-	- X	as an option
					Roller (2t)	1-3 ton roller compactor	1			106	5	110	HN	X	
RP works		48 days	T H	All TSS aareas	Delivery truck	Delivery truck	2 10			106 108	-	111	-	-	M/
					Concrete Agi Hand tools (Power)	Concrete truck Hand power tools	5			108	-	111 118	-	-	Worst case scenario.
					Concrete vibrator	Vibrator	2			97	-	100	-	-	
					Concrete pump	20-25m Concrete Pump	1 1			103 121	5	107 129	- HN	- V	
					Concrete / road / rail saw Welding tools /oxy	Concrete Saw Welding machine	1			102	-	105	-	X -	
					EWP	EWP (scissor lift)	1			95	-	98	-	-	
					Hand tools (Hammer Drill Hilti 75) Hand tools (Nail Gun)	Nail quns	2			107	-	110 116	-	-	
					Generator	25 Kva Generator	1			94	-	96	-	-	
					Compressor	Compressor	1			102	-	103	-	-	
					Handtool - circular saw Telehander / Franna crane (20t)	Circular Saw 5 ton telehandler	1 1			112	-	119	HN	-	
Asphalt		3 days	Т	All TSS aareas	Truck - Asphalt	Asphalt truck	5			103	-	111	-	-	
					Asphalt layer	Paver machine	1 1			105	- 5	111	LINI	- X	
Perimeter Fence Installation		5 days	Т	All TSS aareas	Roller (2t) Delivery truck	1-3 ton roller compactor Delivery truck	5			106 106	-	110 111	HN -	- X	
					Excavator with auger (5t)	Auger	1			102	-	106	-	X	
					Concrete Agi Concrete Agi	Concrete truck Concrete mixer	1			108 108	-	111	-	-	
					Hand tools (Power)	Power tools	4			107		118	-	-	
açade Installation		10 days	T	All TSS aareas	Mobile crane (20t-250t)	80ton Mobile Crane	1 10			104	-	108	-	-	
					Delivery truck EWP	Delivery truck EWP (scissor lift)	10			106 95	-	111 98	-	-	
					Hand tools (Hammer Drill Hilti 75)	hammerdrills	2			107	-	110	-	-	
				All TCC	Hand tools (Power)	power tools	5			107	-	118	-	-	
nabling works Modular Building Installation	Tree trimming	3 days	T H	All TSS aareas	Chainsaw Mulcher	ChainSaw Wood Chipper	1 1			116 120	5 5	120 124	HN	-	
			"		Delivery truck	Wood Chipper Delivery truck	2			106	-	111	HIN -	-	
	Lowering of cables	3 days			EWP	EWP (scissor lift)	1			95	-	98	-	-	
					Hand tools (Power)	power tools	4			107	-	118 111	-	-	
andscape		10 days	Т	All TSS aareas	Tipper truck Excavator with auger (5t)	bucket truck Auger	1			102	-	106	-	X	

Table C1-2: Construction Timetable/ Activities/ Equipment

						Plant/ Equipment	Day	Evening	Night	Sound Power I Model, dB(A)	evel (Lw re: 1pV	V) in Noise			
ctivity/ Work Area	Details	Indicative timing/ duration	Modelling ID	Gatewave Area ID	Plant/ Equipment	(as provided by client)	7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}	— High noise plant	Vibration intensive plant	Notes
action Substation (TSS) Installation Works	rs I														
ELECTRICAL WORKS	Cable tray install/ lighting install	Dulwich Hill - May 2021 - Aug 2021	Т	All TSS aareas	Hand tools	Hand tools				103	T -	111	_	-	
trical Install	lightning protection install	Canterbury - May 2021 - Aug 2021			EWP	EWP				95	-	98	-	-	
	Earth Grid install	Campsie - May 2021 - Dec 2021			Drill Rig	Small drill rig				106	-	116	-	X	
	Cable installation	Lakemba -TBC			Winch - trailer mounted 5T	Winch				95	-	100	-	-	
		Punchbowl - TBC			EWP	EWP				95	-	98	-	-	
					Telehander / Franna crane (20t)	Franna				99	-	102	-	-	
action Substation (TSS) Possession Works	5				, ,										
Modular Buildings Installation and transformer	Delivery of components to site	2 day	T	All TSS aareas	Delivery truck	Over sized Trailers			2	106	-	111	-	-	
ý .					Delivery truck	Prime mover			2	106	-	111	_	-	
					Light vehicles / traffic control utes	Light Vehicle			2	89	-	100	-	-	
	Crane Set-Up and demobisation	2 day			Crane (400T Mobile Telescopic Crane)	500-700 ton Crane	1	1	1	103	-	106	-	-	
		,			Telehander / Franna crane (20t)	15ton Franna Crane	1	1	1	99	-	102	-	-	
					Telehander / Franna crane (20t)	5 ton telehandler	1	1	1	99	-	102	-	-	
					Delivery truck	Semi trailer	3	3	3	106	-	111	-	-	
					Light vehicles / traffic control utes	Light Vehicle	3	3	3	89	-	100	-	-	
					Hand tools (Power)	power tools	4	4	4	107	-	118	-	-	
					Lighting tower	Lighting tower	6	6	6	99		102	_	-	
					Generator	25 Kva Generator	2	2	2	94	-	96	_	-	
	Drop of Sydney trains power lines	1 day			EWP	EWP	2	2	2	95	-	98	_	_	
	prop or sydney dams power lines				Delivery truck	delivery truck	1	1	1	106	-	111	-	-	
					Telehander / Franna crane (20t)	15ton Franna Crane	1	1	1	99	-	102	_	_	
					Hand tools (Power)	power tools	1	1	1	107	-	118		-	
					Light vehicles / traffic control utes	Light vehicle	2	2	2	89		100			
	Installation of modular buildings and transformer	1 day			Crane (400T Mobile Telescopic Crane)	500-700 ton Crane	1	1	1	103	-	106		_	
	installation of modular buildings and transformer	1 day			Lighting tower	Lighting tower	6	6	6	99	-	100			
					Generator	25 Kva Generator	1	1	1	94	-	96		-	
						power tools	5	-	5	107	-	118			
					Hand tools (Power) Light vehicles / traffic control utes	Light Vehicle	3	3	3	89	-	100	-	-	for 5 days
ULX exploration	Non-destructive excavation for ULX route exploration	1 day	т	All TSS aareas			1	3	3	107	-	111	-	-	IOI 3 days
OLA exploration	Non-destructive excavation for OLA route exploration	i day	' '	All 133 daleds	Vacuum truck Delivery truck	Vacuum truck delivery truck	1			106	-	111	-	-	
					Telehander / Franna crane (20t)	5 ton telehandler	1			99	-	102	-	-	1 day
						Light Vehicle	1			99	-	102	-	-	I day
ULX construction		2 days	т	All TSS aareas	Light vehicles / traffic control utes		1	1	1	103		100	-	-	1 for 1 day
JLX construction		2 uays	h h	All 133 ddleds	Excavator w bucket (10-15t)	10ton excavator	-	-	-	118	5		HN	- X	
			н		Excavators with hammers (35-45T)	Hydraulic hammer	2	2	2	106		123 111			3 for 2 days
					Delivery truck	delivery truck	1		1		-		-	-	46.41
					Dump truck	rail dump truck				106	-	111	-	-	1 for 1 day
					Generator	13Kva Generator	1 5	1	1 5	94 107	-	96	-	-	
		2 4	-	All TCC	Hand tools (Power)	power tools	5	5	5		-	118	-	-	
age Batter Chute construction		2 days		All TSS aareas	Excavator w bucket (10-15t)	10ton excavator	1	1	1	103	-	108	-	-	f1-
					Delivery truck	delivery truck	3	3	3	106	-	111		-	for spoil remova
					Dump truck	rail dump truck	1	1	1	106 94	-	111 96	-	-	1 for 1 day
					Generator	13Kva Generator	-	-	-				-	-	
					Hand tools (Power)	power tools	5	5	5	107	-	118	-	-	3 for 1 day
					Concrete Agi	Concrete Pump	2	2	2	108	-	111	-	-	3 for 1 day
		2 days	_	All TCC ages	Concrete pump						-		-	-	1 for 1 day
mission Pole installation		2 days		All TSS aareas	Excavator w bucket (10-15t)	15ton excavator with Auger	1	1		103	-	108	-	-	
					Delivery truck	Oversized delivery truck		1		106	-	111	-	-	
					Mobile crane (20t-250t)	50ton crane	1	1		104	-	108	-	-	
					Concrete Agi	Concrete truck	1			108	-	111	-	-	
					Concrete rigi										
		2 days		All TCC											
vation in danger zone		2 days	Ţ	All TSS aareas	Excavator w bucket (10-15t)	15ton Excavator	2	2	2	103		108	-		
avation in danger zone		2 days	T H	All TSS aareas		15ton Excavator Hydraulic hammer Dump truck	2 2	2 2	2 2	103 118 106	- 5	108 123 111	- HN	- X	

Table C.2: Construction Timetable

RENZO TONIN ASSOCIATES

SW Traction Substation Civil Works

Non Posession work Possession work			DEC		jan		fel	b		mar		apr			may		jun		jul		aug	3	se	pt		oct		nov		dic	j	an		feb
Phase	Aspect	Description of Activity	Month 1		Mont	th 2	Mo	onth 3		Month 4		Mon	th 5	1	Month 6		Month 7		Month 8	3	Month 9	9	Month	10	Moi	nth 11	Mo	onth 12		Month 13	N	1onth 14		Month 15
Traction Substation Civil Works												, ,																						
	ENABLING WORKS	Contamination Assessment			+++	+++	\Box	$\vdash\vdash\vdash$	+++	+++		+++		+	+			+++			+		+++		\Box	+++		$\sqcup\sqcup\sqcup$			+++	+++		+++
		Existing services survey Clearing and Grubbing (including tree cutting)			+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+			+		++++	+	+++	+++	+++		+++				+++	++++	+++	+++	+++
		Site Amenities Installation	-		+++	+++	+++		+++	+++	+++	+++	+++	+	+			+			+		+++	+++	\vdash	+++	+++	\Box			++++	+++	+++	+++
		Water and sewer connection										+++																						+++
		Perimeter Barrier and fence installation																																
		Access road and ground preparation										$\perp \perp \perp$			\perp																		$\perp \downarrow \downarrow \downarrow$	$\perp \perp \perp$
	General	Day to Day activities	+++	++																												+++	+++	+++
	Excavation CSR and Drainage installation	Excavation to design level	+++								+++	+++	+++	+++	+			+		+++	+	+++	+++	\vdash	\vdash	+++	+++	++++	+H			+++	+++	+++
	Earthing			+++	+++	+++						+++	+++	+	+			+			+		+++	+++	\vdash	+++	+++	\Box			++++	+++	+++	+++
	Backfill				+								+++																					+++
	FRP works																																	
DULWICH HILL TSS	Asphalt																																	
	Perimeter Fence Installation			\bot	+++	+++				+++	+++	+++	\perp	+++				\bot			-					\perp						\perp		+++
	Façade Installation	Tree trimming	+++	+++	+++	+++	+++	\vdash	+++	+++	+++	+++	+++	+++	+			+++	+++	+++	+	+++	+++	\vdash	+++	+++		++++	-	+++	++++	+++	+++	+++
	Enabling works Modular Building Installation	Lowering of cables	+++	+++	+++	+++	+++		+++	+++	+++	+++	+++	+	+			+			+		+++	+++	\vdash	+++	+++	\Box			++++	+++	+++	+++
	Landscape		$\pm \pm \pm$	\pm	$\pm\pm\pm$	\pm	ttt		ttt	+	+++	+		\pm	111			\pm			111					\pm					1111	\pm	$\pm \pm \pm$	+++
	Modular Buildings Installation and transformer	Delivery of components to site																																
		Crane Set-Up and demob		$\perp \downarrow \downarrow \downarrow$	$\perp \perp \downarrow$					$\bot \bot \bot$		$\bot \bot \bot$		\bot	\bot							\perp				$\perp \downarrow \downarrow \downarrow$							$\perp \downarrow \downarrow \downarrow$	$\perp \perp \perp$
		Drop of Sydney trains power lines		+++	+++	+++		\vdash	+++	+++		+++	+++	+++	+		+	_		+++	-	+++	+++		$-\!+\!-\!+$	+++	+	+++			+++	+++		+++
	ULX exploration	Installation of modular buildings and transformer	+++	+++	+++	+++	+++	\vdash	+++	+++	++	\vdash	+++	+++	+			+		+++	+	+++	+++	\vdash	$\vdash\vdash\vdash\vdash$	+++	+++	++++	+H		++++	+++	+++	+++
	ULX construction	+	+++	+++	+++	+++	+++	++	+++	+++	 		+++	+++	+	+++	- - - 		+++	+++	+	+++	+++			+++	+++	+++		+++		+++	+++	+++
	Drainage Batter Chute construction						шТ	шт	шт		╜╹		\pm		\perp	шП	$\perp \vdash \vdash$			шН		\pm		шТ				╙						
	Transmission Pole installation		\Box							$\Box\Box$								Щ			Щ							ШП				Ш		
	ENABLING WORKS	Contamination Assesment			$+ + \downarrow$	+++	+++	\Box	$\sqcup \sqcup \sqcup$	++	++1	+ + +	+ $+$ $+$	+	$+$ \square	+++1	+ $+$ $+$ $+$	+ $+$ $+$ $+$ $+$	$oxed{\Box}$	+++1	$+$ \square	+	+++	++-	$\sqcup \sqcup \sqcup$	+	+++	++1	$\sqcup \sqcup \bot$	$-\!\!\!\perp\!\!\!\perp\!\!\!\perp\!\!\!\perp$	+++1	+++	++	+++
		Existing services survey Clearing and Grubbing (including tree cutting)				+++	+++	$\vdash\vdash\vdash$	++	+++	+++	+++	++	+++	+	+++		+++	+++	+++	++	+++	+++	 	$\vdash\vdash\vdash$	+++	+++	+++	\vdash	+++	+++	+++	+++	+++
		Site Amenities Installation	+++			+++	+++	 	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	 	+++	+++	+++	+++	 		+++	+++	 	 	+++	++++	+++	+++	++++
		Water and sewer connection	+++		 	+++	 	 		 	+++	+++	+++	+++	+++	 	 	+++		 	+++	+++	 	 		+++	+++	 	 		 	+++	+++	
		Perimeter Barrier and fence installation							ш			ш		ш																				
		Access road and ground preparation																																
	General	Day to Day activities				+++																									+++	+++		+++
	Excavation CSR and Drainage installation	Excavation to design level		+++						+++		+++	+++	+++	+	-		+++	\vdash	++++	+++	+++	+++	+++	++++	+++		++++			++++	+++	+++	+++
	Earthing		-	+++	+++	+++						+++	+++	$\pm\pm\pm$	+			+		++++	+	+++	+++	 	+++	+++		+++			++++	+++	+++	+++
	Backfill																																	+++
CANTERBURY TSS	FRP works																																	ш
GARTERISON 133	Asphalt			$\bot\bot\bot$	+++	+++				+++		+++	+++	+	+			\bot		\perp		\perp	\perp		\Box	$\perp \downarrow \downarrow \downarrow$		$\sqcup \sqcup \sqcup$				+++	\bot	+++
	Perimeter Fence Installation Façade Installation		+++	+++	+++	+++	+++	\vdash	+++	+++	+++	+++	+++	+++	+			+++		++++		+++	+++	\vdash	$\vdash\vdash\vdash\vdash$	+++		++++		+++	+++	+++	+++	+++
	Enabling works Modular Building Installation	Tree trimming		+++	+++	+++	+++	\vdash	+++	+++	+++	+++	+++	+	+			+				+++	+++	\vdash	+++	+++				+++	++++	+++	+++	+++
	Enabling works would building installation	Lowering of cables																																+++
	Landscape																																	ш
	Modular Buildings Installation and transformer	Delivery of components to site		$\bot\bot\bot$	+++	+++				+++		+++	+++	+	+		\bot	\bot		\perp			\perp		\Box	$\perp \downarrow \downarrow \downarrow$		$\sqcup \sqcup \sqcup$				+++	\bot	+++
		Crane Set-Up and demob Drop of Sydney trains power lines	+++	+++	+++	+++		++-	+++	+++		+++	+++	+++	+	-		+++	\vdash	++++	+++	_	+++	+++	++++	+++		++++			++++	+++	+++	+++
		Installation of modular buildings and transformer			+++					+++		+++																						+++
	ULX exploration	<u> </u>																																+++
	ULX construction																																	
	Excavation in danger zone	Controller than Assessment		+++	+++	+++				+++			\bot	+			-			\rightarrow			+++									111		+++
	ENABLING WORKS	Contamination Assesment Existing services survey			+++	+++			+++	+++	+++	+++	+++	+++	+		+++	+++		++++		+++	+++	+++		+++		++++						+++
		Clearing and Grubbing (including tree cutting)			$\pm\pm\pm$	\pm	ttt		ttt	+	+++	+		\pm	111			\pm			111					\pm					1111	\pm	$\pm \pm \pm$	+
		Site Amenities Installation																																$\Box\Box$
		Water and sewer connection					-																											
		Perimeter Barrier and fence installation Access road and ground preparation			-	+++		\vdash	+++	+++	+++	+++	+++	+++	+			+++		+++		+++	+++	$\sqcup \sqcup \sqcup$		+++		++++	-				+++	
	General	Day to Day activities	+++																															+++
	Excavation	Excavation to design level																																+++
	CSR and Drainage installation																																	
	Earthing																																	
	Backfill				-	+++	+++	$\vdash\vdash\vdash$	+++	+++								+			+		+++		\Box	+++		$\sqcup\sqcup\sqcup$				+++		++++
CAMPSIE TSS	FRP works Asphalt		+++	+++		+++	+++	+++	+++	+++	+++							+		++++	+	+++	+++			+++				+++	++++	+++	+++	+++
	Perimeter Fence Installation		$\pm \pm \pm$	\pm	$\pm\pm\pm$	\pm	ttt		ttt	+	+++	+		\pm	111			\pm			111					\pm					1111	\pm	$\pm \pm \pm$	+++
	Façade Installation																																	
	Enabling works Modular Building Installation	Tree trimming		$\perp \downarrow \downarrow \downarrow$	$\perp \perp \downarrow$					$\bot \bot \bot$		$\bot \bot \bot$		\bot	\bot							\perp				$\perp \downarrow \downarrow \downarrow$							\perp	$\perp \perp \perp$
	1	Lowering of cables	+++	+++	+++	+++		\vdash	+++	+++		+++	+++	+++	+					+++	-	+++	+++		$-\!\!+\!\!-\!\!\!+\!\!\!+$	+++	+	+++			+++	+++		+++
	Landscape Modular Buildings Installation and transformer	Delivery of components to site		+++	+++	+++	+++		+++	+++	+++	+++	+++	+++	-		+				+		+++								++++			+++
	modelar Sanamas instanction and dansformer	Crane Set-Up and demob	\pm	$\pm \pm \pm$	\pm	$\pm\pm\pm$	ttt	H	ttt	$\pm\pm\pm$	+++	+		\pm	\pm			1			\pm	\pm				\pm		ttt				\pm	$\pm \pm \pm$	+++
		Drop of Sydney trains power lines																																
		Installation of modular buildings and transformer																																
	ULX exploration			+++	+++	+++	+++	$\vdash\vdash\vdash$	+++	+++				+	+			+			+		+++		\Box	+++		$\sqcup\sqcup\sqcup$			+++	+++		+++
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LAKEMBA TSS	Backfill FRP works	+					+++	++-	+++	+++	+++	++	+++	+++	+++		+++	+++	+++							+++	+++	 	+++	+++	+++	+++	+++	+++
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Non Posession work			DEC		jan			feb			mar		a	pr		ma	ıy		jun			jul			aug	:	ept		О	ct		nov			dic		jan			feb
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Phase	Aspect	Description of Activity	Month 1		Mont	th 2		Month 3			Month 4		М	lonth 5		Mor	nth 6		Month	7		Month :	3		Month 9	Mor	th 10		Mont	h 11		Month 12	.2	N	lonth 13		Mor	nth 14		Month 15
	Enabling works Modular Building Installation	Tree trimming			TIT				ТТ	ПП	TT	TT		TTT	\top			TTT		ПП	\top	TIT	TI	ПП		ПП	TI	ПП	TT	Т	П	Π	\top				\Box		Π	
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Punchbowl Traction Substation	Traction Substation	Traction Substation - Electrical Works								1 1 1																						46667								

APPENDIX D Detailed predicted noise levels

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

APPENDIX E Additional noise mitigation

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

APPENDIX F Minimum working distances

