

Detailed Noise and Vibration Impact Statement (Clyde)



| | | | |
|--|--|--------------------------|-----------------|
| Project Name: | Sydney Metro West | | |
| Client Name: | Sydney Metro | | |
| Project Address: | Delta will demolish buildings across the following sites: <ol style="list-style-type: none"> 1. Parramatta 2. Clyde 3. Westmead | | |
| Project Description/Scope: | Delta Pty Ltd (Delta) is responsible for the full structural demolition of existing structures including removal of all hazardous materials of the Sydney Metro West Demolition Project. | | |
| Prepared By: (Consulting Engineer) | Name: ██████████ | Signature: ██████████ | Date:25/10/2021 |
| Reviewed By: (Project Manager) | Name: ██████████ | Signature: ██████████ | Date:25/10/2021 |
| Authorised By (Project Director): | Name: ██████████ | Signature: ██████████ | Date:25/10/2021 |

Table of Contents

| | |
|---|----|
| Table of Contents..... | 2 |
| 1 AUTHORISATION AND CONTROL..... | 4 |
| 1.1 Authorisation | 4 |
| 1.2 Distribution | 4 |
| 1.3 Revision..... | 4 |
| 2 INTRODUCTION | 5 |
| 2.1 Purpose | 5 |
| 2.2 Project Description..... | 5 |
| 2.3 Site Overview | 6 |
| 3 REQUIREMENTS..... | 8 |
| 3.1 Sydney Metro Requirements | 8 |
| 3.2 Revised Environmental Mitigation Measures | 10 |
| 4 APPLICABLE CRITERIA | 12 |
| 4.1 Airborne Noise Management Levels..... | 12 |
| 4.1.1 Residential Receivers | 12 |
| 4.1.2 Other Sensitive Land Uses..... | 13 |
| 4.1.3 Commercial and Industrial Premises | 13 |
| 4.2 Ground-borne Noise Management Levels | 14 |
| 4.3 Construction Vibration..... | 14 |
| 4.3.1 General Criteria..... | 14 |
| 4.3.2 Heritage Structures..... | 15 |
| 4.3.3 Warning Levels | 15 |
| 5 NOISE AND VIBRATION ASSESSMENT..... | 16 |
| 5.1 Sensitive Receivers..... | 16 |
| 5.2 Construction Activities and Sources of Noise | 17 |
| 5.3 Airborne Noise Predictions | 17 |
| 5.4 Ground-borne Noise | 18 |
| 5.5 Vibration Predictions | 19 |
| 5.5.1 RTA Depot..... | 20 |
| 5.5.2 Veolia Building | 20 |
| 5.6 Construction Traffic Noise | 20 |
| 5.7 Cumulative Impacts | 20 |
| 5.8 Impact Classification | 20 |
| 6 NOISE AND VIBRATION MANAGEMENT | 22 |
| 6.1 Environmental Monitoring, Auditing & Reporting..... | 22 |
| 6.1.1 Monitoring Locations..... | 22 |
| 6.1.2 Attended Monitoring | 22 |
| 6.1.3 Heritage Listed Structures | 22 |
| 6.1.4 Auditing | 22 |
| 6.1.5 Reporting | 23 |
| 6.1.6 Dilapidation Surveys | 23 |
| 6.2 Mitigation Measures..... | 24 |
| 6.2.1 Standard Mitigation Measures..... | 24 |
| 6.2.2 Site-specific Mitigation Measures..... | 26 |
| 6.2.3 Additional Mitigation Measures..... | 26 |
| 7 SUMMARY | 28 |
| 8 REFERENCES | 29 |

9 APPENDICES.....30

Appendix A - Monitoring Locations and Sensitive Receivers30

Appendix B - Heritage Specialist Advice on Monitoring Methods and Locations31

Appendix C – Consultation Register.....32

1 AUTHORISATION AND CONTROL

1.1 Authorisation

This Plan is endorsed by the AA and ER, and approved by the Secretary. All project personnel are to ensure that their work activities and those of Project Consultants, Contractors and Suppliers are carried out in accordance with the requirements of this Plan.

1.2 Distribution

This Plan is a Controlled Document and must be distributed and revised under the guidance of the Project Manager. People who hold Controlled copies are responsible for maintaining their copies up-to-date.

1.3 Revision

The Project Director will monitor the implementation of this Plan and review the need for change or improvements having due regard to:

- Change in work scope, client comments etc.
- Internal and external audits
- Suggestions and comments from project personnel
- Incidence and frequency of non-conformance
- Necessity for corrective or preventative action
- Legal Update and Requirements
- Review by Delta Groups Management team
- Annual Review

Minor amendments of this plan are endorsed by the ER, or otherwise by the Planning Secretary where amendments are not deemed minor. Changes to the recent revision will be highlighted.

The following table provides a record of amendments made to this document.

| Rev | Date | Description | Page | Developed By | Approved By |
|-----|----------|--|------|--------------|-------------|
| 0 | 25/08/21 | Draft – Issued for comment | All | [REDACTED] | [REDACTED] |
| 1 | 24/09/21 | Updated to address stakeholder review comments | All | [REDACTED] | [REDACTED] |
| 2 | 16/10/21 | Updated to address stakeholder review comments | All | [REDACTED] | [REDACTED] |
| 3 | 25/10/21 | Updated to address stakeholder review comments | All | [REDACTED] | [REDACTED] |

Distribution Register

| Rev No. | Date of Issue | Name of Recipient | Position / Organisation |
|---------|---------------|-------------------|---|
| 0 | 27/08/21 | [REDACTED] | Principal Representative / Sydney Metro |
| 1 | 27/09/21 | [REDACTED] | Principal Representative / Sydney Metro |
| 2 | 16/10/21 | [REDACTED] | Principal Representative / Sydney Metro |
| 3 | 25/10/21 | [REDACTED] | Principal Representative / Sydney Metro |

2 INTRODUCTION

2.1 Purpose

This Detailed Noise and Vibration Impact Statement (DNVIS) has been prepared by Delta Pty Ltd. (Delta) to comply with the requirements of Section 13 of the Sydney Metro Construction Environmental Management Framework (CEMF) and the Sydney Metro West - Concept and Stage 1 Conditions of Approval (SSI 10038). This DNVIS exists as a sub-plan to the Noise and Vibration Management Plan for the project.

The principal issues addressed within this DNVIS include:

- Identification of noise sensitive receivers near to the site;
- Prediction of the level of noise and vibration impact on these sensitive receivers from demolition activities including assessment of predicted compliance with project Noise and Vibration Management Levels;
- Details of the plant and equipment to be used on the site including details of noise mitigation measures to be employed to reduce noise impacts on adjacent noise sensitive receivers.

2.2 Project Description

The Sydney Metro West project is a new 24-kilometre metro line with stations confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street in the Sydney CBD. Refer to Figure 1 for an overview of the alignment.

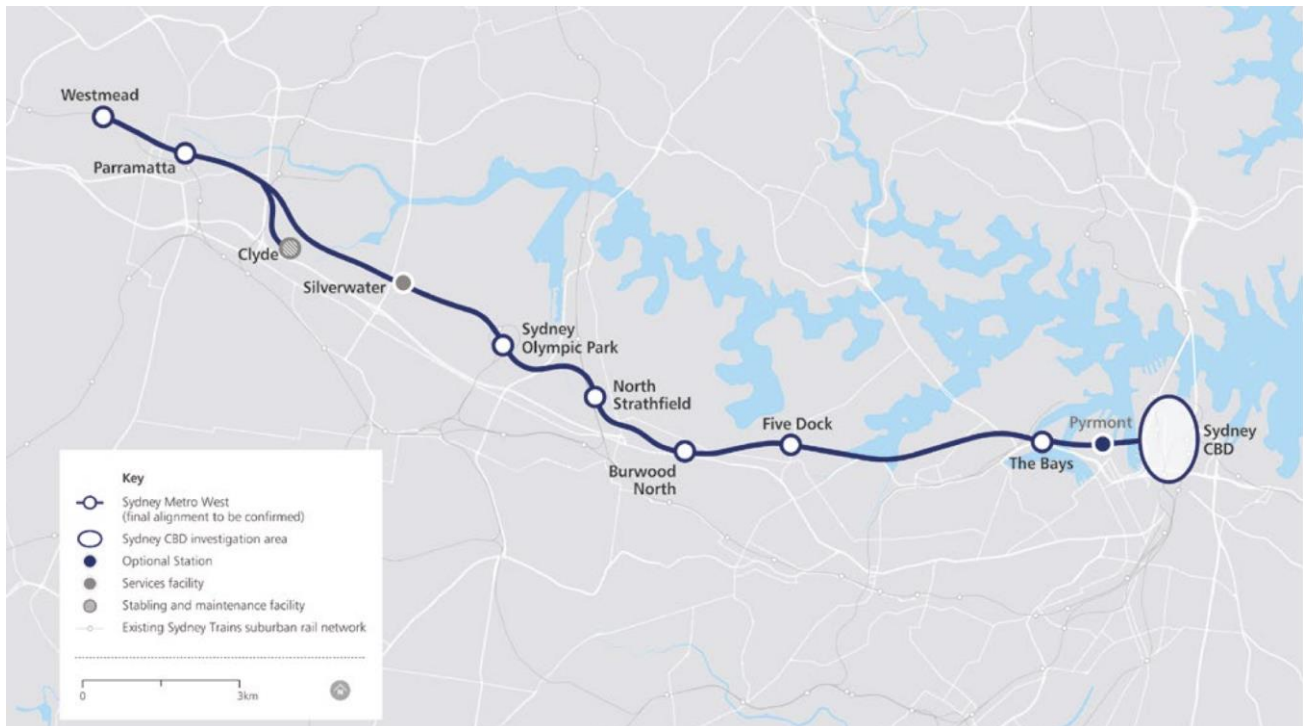


Figure 1: Sydney Metro West Alignment

Source: Sydney Metro West Amendment Report

Delta will be delivering the Westmead Enabling Works package. The scope of work includes site establishment works, service disconnections and relocations, hazardous materials (HAZMAT) removal, internal strip-out of structures, demolition of existing structures and site clearing.

Sydney Metro will advise Delta of the items to be salvaged and the location where the items are to be delivered. Delta will then carry out this work prior to commencement of heavy structural demolition. Storage of items will be offsite at location as advised by Sydney Metro. This will remove any risk of damage as a result of site works.

2.3 Site Overview

The Clyde site is located in the Clyde and Rosehill industrial estate bounded by James Ruse Drive, Western Motorway (the M4), Unwin Street and Shirley Street. Works on the site involve demolition of a number of low-rise industrial buildings. The site will be the future location of a stabling and maintenance facility for the Sydney Metro West line. The worksite applicable to Delta’s scope of works is divided into two distinct areas - North and South - by the Downer asphalt plant off Unwin Street.

Structures to be demolished are highlighted in Figure 2. Note that the structures identified with a green outline will require use of hammers for demolition of concrete columns and footings.

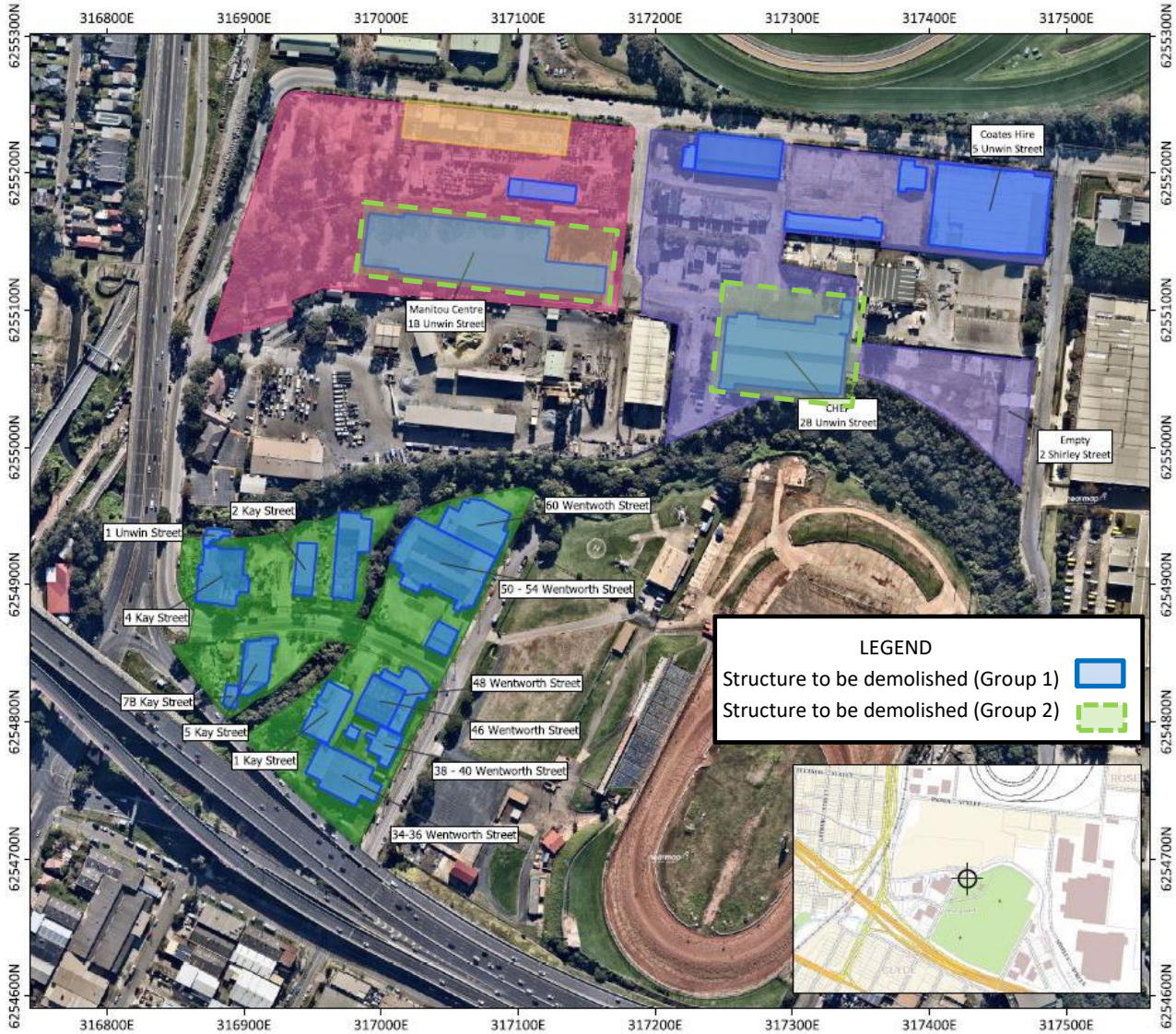
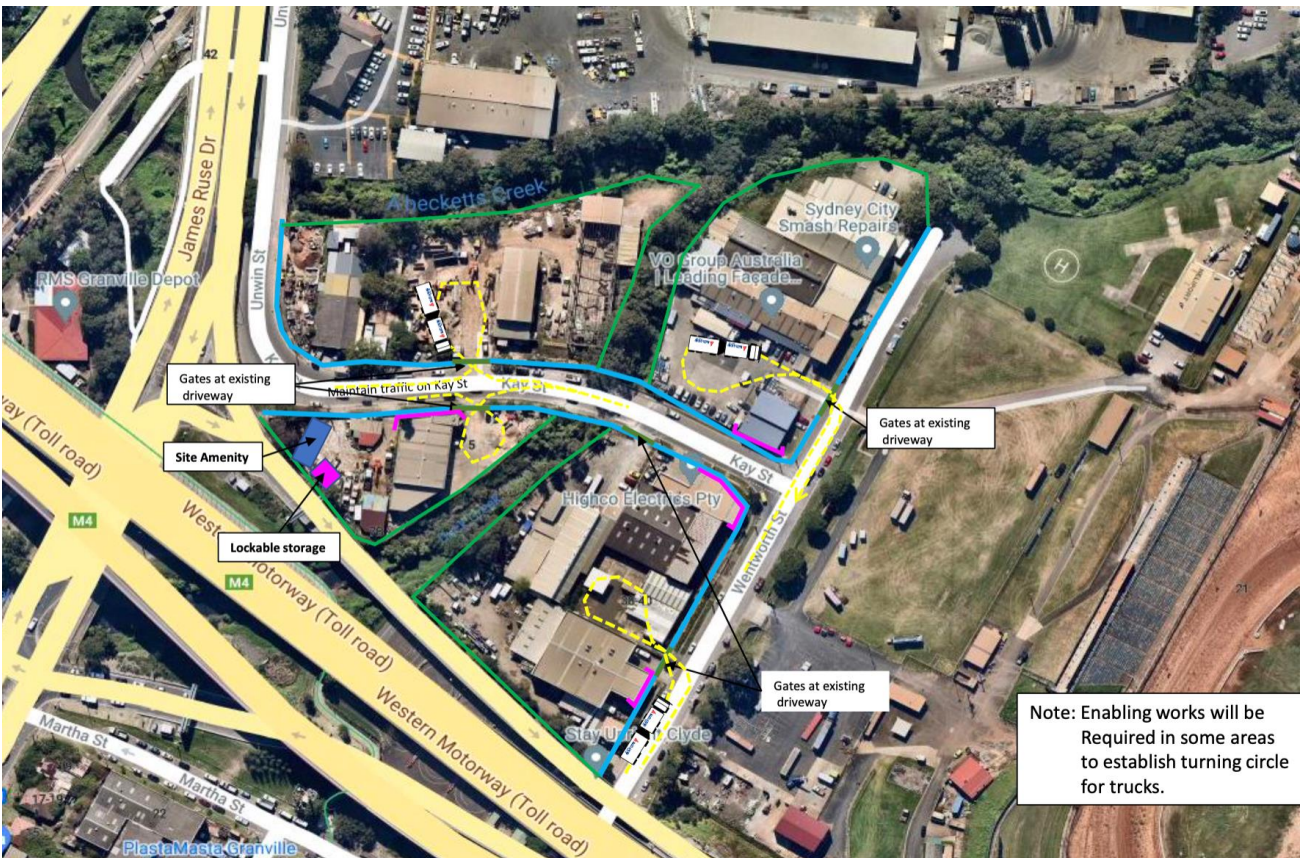


Figure 2: Clyde Site Map

Site layout and access is illustrated in Figure 3 and Figure 4 below.



Figure 3: Clyde Site Layout and Access – North



Note: Enabling works will be Required in some areas to establish turning circle for trucks.

Figure 4: Clyde Site Layout and Access – South

3 REQUIREMENTS

3.1 Sydney Metro Requirements

Requirements for noise and vibration management are provided within Sydney Metro Requirements of Authority Approval (Schedule 20). The relevant noise and vibration requirements addressed by this DNVIS are addressed in Table 1 below.

Table 1: CoA

| CoA | Relevant requirement | Where addressed |
|------|---|-----------------|
| C-A1 | Approval is granted to the 'Concept' as described in Schedule 1 and in Chapter 6 and in Chapter 7 of the Sydney Metro West – Westmead to The Bays and Sydney CBD Environmental Impact Statement dated 15 April 2020, as amended by the following: (a) Sydney Metro West – Westmead to The Bays and Sydney CBD Amendment Report dated 20 November 2020; and (b) Sydney Metro West – Westmead to The Bays and Sydney CBD Submissions Report dated 20 November 2020. | |
| A1 | The Proponent must carry out Stage 1 of the CSSI in accordance with the conditions of this approval and generally in accordance with the: (a) Sydney Metro West – Westmead to The Bays and Sydney CBD Environmental Impact Statement dated 15 April 2020; (b) Sydney Metro West – Westmead to The Bays and Sydney CBD Submissions Report dated 20 November 2020; and (c) Sydney Metro West – Westmead to The Bays and Sydney CBD Amendment Report dated 20 November 2020. | |
| C16 | The Noise and Vibration Construction Monitoring Program and Blasting Construction Monitoring Program must include: (a) noise and vibration monitoring determined in consultation with the AA to confirm the best-achievable construction noise and vibration levels with consideration of all reasonable and feasible mitigation and management measures that will be implemented; (b) for the purposes of (a), noise monitoring must be undertaken during the day, evening and night-time periods and within the first month of work as well as throughout the construction period and cover the range of activities being undertaken at the sites; and (c) a process to undertake real time noise and vibration monitoring. The results of the monitoring must be readily available to the construction team, the Proponent, ER and AA. The Planning Secretary and EPA must be provided with access to the results on request. | |
| C17 | Groundwater Construction Monitoring Program must include: (a) groundwater monitoring networks at each construction excavation site; (b) detail of the location of all monitoring bores with nested sites to monitor both shallow and deep groundwater levels and quality; (c) define the location of saltwater interception monitoring where sentinel groundwater monitoring bores will be installed between the saline sources of the estuary or river and that of the stations or shafts; (d) results from existing monitoring bores; (e) monitoring and gauging of groundwater inflow to the excavations, appropriate trigger action response plan for all predicted groundwater impacts upon each noted neighbouring groundwater system component for each excavation construction site; (f) trigger levels for groundwater quality, salinity and groundwater drawdown in monitoring bores and / or other groundwater users; (g) daily measurement of the amount of water discharged from the water treatment plants; (h) water quality testing of the water discharged from treatment plants; (i) management and mitigation measures and criteria; (j) groundwater inflow to the excavations to enable a full accounting of the groundwater take from the Sydney Basin Central Groundwater Source; and (k) reporting of groundwater gauging at excavations, groundwater monitoring, groundwater trigger events and action responses; and (l) methods for providing the data collected to Sydney Water where discharges are directed to their assets. | |
| C18 | With the exception of any Construction Monitoring Programs expressly nominated by the Planning Secretary to be endorsed by the ER, all Construction Monitoring Programs must be submitted to the Planning Secretary for approval. | |

| CoA | Relevant requirement | Where addressed |
|-----|---|------------------------------|
| C19 | The Construction Monitoring Programs not requiring the Planning Secretary's approval must obtain the endorsement of the ER as being in accordance with the conditions of approval and all undertakings made in the documents listed in Condition A1 of this schedule. Any of these Construction Monitoring Programs must be submitted to the ER for endorsement at least one (1) month before the commencement of construction or where construction is phased no later than one (1) month before the commencement of that phase. | |
| C20 | Any of the Construction Monitoring Programs which require Planning Secretary approval must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one (1) month before the commencement of construction or where construction is phased no later than one (1) month before the commencement of that phase. | |
| C21 | Unless otherwise agreed with the Planning Secretary, construction must not commence until the Planning Secretary has approved, or the ER has endorsed (whichever is applicable), all of the required Construction Monitoring Programs and all relevant baseline data for the specific construction activity has been collected. | |
| C22 | The Construction Monitoring Programs, as approved by the Planning Secretary or the ER has endorsed (whichever is applicable), including any minor amendments approved by the ER, must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary or the ER (whichever is applicable), whichever is the greater. | |
| C23 | The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, ER and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program. Note: Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan. | |
| D34 | A detailed land use survey must be undertaken to confirm sensitive receivers (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration and construction ground-borne noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of work which generates construction noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Noise and Vibration CEMP Sub-plan required under Condition C5 of this schedule. | Section 5.1 |
| D39 | All reasonable and feasible mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration criteria: (a) construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009); (b) vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure); (c) Australian Standard AS 2187.2 - 2006 "Explosives – Storage and Use - Use of Explosives" (for human exposure); (d) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and (e) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage for structurally unsound heritage items). Any work identified as exceeding the noise management levels and/or vibration criteria must be managed in accordance with the Noise and Vibration CEMP Sub-plan. Note: The ICNG identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction Noise Management Level. | Section 4 Section 6.2.1 |
| D40 | All reasonable and feasible mitigation measures must be applied when the following residential ground-borne noise levels are exceeded: (a) evening (6:00 pm to 10:00 pm) — internal LAeq(15 minute): 40 dB(A); and (b) night (10:00 pm to 7:00 am) — internal LAeq(15 minute): 35 dB(A). The mitigation measures must be outlined in the Noise and Vibration CEMP Sub-plan, including in any Out-of-Hours Work Protocol, required by Condition D38 of this schedule. | Section 4.2 Section 6.2.1 |
| D41 | Noise generating work in the vicinity of potentially-affected community, religious, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the NMLs must not be timetabled within sensitive periods, unless | Section 6.2.1 |

| CoA | Relevant requirement | Where addressed |
|-----|--|---|
| | other reasonable arrangements with the affected institutions are made at no cost to the affected institution. | |
| D42 | Industry best practice construction methods must be implemented where reasonably practicable to ensure that noise levels are minimised around sensitive land user(s). Practices must include, but are not limited to: (a) use of regularly serviced low sound power equipment; (b) temporary noise barriers (including the arrangement of plant and equipment) around noisy equipment and activities such as rock hammering and concrete cutting; and (c) use of alternative construction and demolition techniques. | Section 6.2.1 |
| D43 | Detailed Noise and Vibration Impact Statements (DNVIS) must be prepared for any work that may exceed the NMLs, vibration criteria and / or ground-borne noise levels specified in Conditions D39 and D40 of this schedule at any residence outside construction hours identified in Condition D35 of this schedule, or where receivers will be highly noise affected. The DNVIS must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the works. A copy of the DNVIS must be provided to the AA and ER before the commencement of the associated works. The Planning Secretary and the EPA may request a copy (ies) of the DNVIS. | This Plan (Applicable for Parramatta Site) Section 6.2.2 |
| D44 | DNVIS must be prepared for each construction site before construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive land users. | This Plan (Applicable for Parramatta Site) Section 6.2.2 |
| D45 | Owners and occupiers of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before works that generate vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers are to be provided a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. These properties must be identified and considered in the Noise and Vibration CEMP Subplan. | Section 6.2.2 |
| D46 | Vibration testing must be conducted during vibration generating activities that have the potential to impact on Heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures. Such measures must include, but not be limited to, review or modification of excavation techniques. | Section 6.2.1 |
| D47 | The Proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring at Heritage items. | Section 5.5.1 Section 5.5.2 Section 6.1.3 |
| D49 | If a Heritage item is found to be structurally unsound (following inspection) a more conservative cosmetic damage criterion of 2.5 mm/s peak component particle velocity (from DIN 4150) must be applied. | Section 4.3.2 |

3.2 Revised Environmental Mitigation Measures

The list of mitigation measures and performance outcomes presented in Chapter 27 of the Environmental Impact Statement have been revised on the basis of submissions received and additional assessment work carried out. In some cases new measures have been added, while in others, the wording of existing measures has been adjusted. Table 2 provides the REMMs applicable to the scope of this DNVIS.

Table 2: Revised Environmental Mitigation Measures

| Condition | Requirement | Relevant section of this CNVMP |
|-----------|---|--------------------------------|
| NV01 | Further engagement and consultation would be carried out with: <ul style="list-style-type: none"> The affected communities to understand their preferences for mitigation and management measures. 'Other sensitive' receivers such as schools, medical facilities or places of worship to understand periods in which they are more sensitive to impacts. Based on this consultation, appropriate mitigation and management options would be considered and implemented where feasible and reasonable to minimise the impacts. | Section 6.2.1 |

| | | |
|------|---|---|
| NV02 | <p>Alternative construction methodologies and measures that minimise noise and vibration levels during noise intensive works would be investigated and implemented where feasible and reasonable.</p> <p>This would include consideration of:</p> <ul style="list-style-type: none"> • The use of hydraulic concrete shears in lieu of hammers/rock breakers • Sequencing works to shield noise sensitive receivers by retaining building wall elements • Locating demolition load out areas away from the nearby noise sensitive receivers • Providing respite periods for noise intensive works • Minimising structural-borne noise to adjacent buildings <p>including separating the structural connection prior to demolition through saw-cutting and propping, using handheld splitters and pulverisers or hand demolition</p> <ul style="list-style-type: none"> • Installing sound barrier screening to scaffolding facing noise sensitive neighbours • Using portable noise barriers around particularly noisy equipment, such as concrete saws • Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods. | Section 6.2.1 |
| NV03 | <p>Appropriate respite would be provided to affected receivers in accordance with the Sydney Metro Construction Noise and Vibration Standard. This would include consideration of impacts from Stage 1 utility and power supply works when determining appropriate respite periods for affected receivers. When determining appropriate respite, the need to efficiently undertake construction would be balanced against the communities' preferred noise and vibration management approach.</p> | Section 6.2.1 |
| NV04 | <p>The use of noise intensive equipment at construction sites with 'moderate' and 'high' out-of-hours noise management level exceedances would be scheduled for standard construction hours, where feasible and reasonable. Where this is not feasible and reasonable, the works would be undertaken as early as possible in each work shift.</p> | Section 6.2.1 |
| NV05 | <p>Air brake silencers would be used on heavy vehicles that access construction sites multiple times per night or over multiple nights.</p> | Section 6.2.1 |
| NV06 | <p>Perimeter site hoarding would be designed with consideration of on-site heavy vehicle movements with the aim of minimising sleep disturbance impacts.</p> | Section 6.2.1 |
| NV09 | <p>Feasible and reasonable measures would be implemented to minimise ground-borne noise where exceedances are predicted. This may require implementation of less ground-borne noise and less vibration intensive alternative construction methodologies.</p> | Section 6.2.1 |
| NV14 | <p>Further assessment of construction traffic would be completed during detailed design, including consideration of the potential for exceedances of the NSW Road Noise Policy base criteria (where greater than 2 dB increases are predicted). The potential impacts would be managed using the following approaches, where feasible and reasonable:</p> <ul style="list-style-type: none"> • On-site spoil storage capacity would be maximised to reduce the need for truck movements during sensitive times • Vehicle movements would be redirected away from sensitive receiver areas and scheduled during less sensitive times • The speed of vehicles would be limited and the use of engine compression brakes would be avoided • Heavy vehicles would not be permitted to idle near sensitive receivers. | Section 5.6 |
| NV15 | <p>Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed.</p> | Section 6.2.1 and section 5.1 |
| NV16 | <p>Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure.</p> <p>For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.</p> | Section 4.3 Section 6.2.1 |
| NV17 | <p>Condition surveys of buildings and structures near to the tunnel and excavations would be undertaken prior to the commencement of excavation at each site, where</p> | no excavation or tunnelling works are in this scope of works and is therefore not |

| | | |
|------|---|---------------------------|
| | appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist. | applicable to this DNVIS. |
| NV18 | The likelihood of cumulative construction noise impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination would occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible. Specific mitigation strategies would be developed to manage impacts. Depending on the nature of the impact, this could involve adjustments to construction program or activities of Sydney Metro West or of other construction projects. | Section 5.7 |

4 APPLICABLE CRITERIA

4.1 Airborne Noise Management Levels

Noise Management Levels (NMLs) on this site are assessed under the broader requirements of the approval conditions which are consistent with the Sydney Metro Environmental Impact Statement (EIS) and Construction Noise and Vibration Standard (CNVS), and based on the Interim Construction Noise Guideline (ICNG). The NMLs applicable to Delta's scope of works on this site are outlined below.

4.1.1 Residential Receivers

Noise Management levels for residential receivers are defined according to the ICNG noise criteria for residential receivers is reproduced in Table 3.

Table 3: ICNG Noise Criteria for Residential Receivers

| Time of Day | Management Level $L_{Aeq(15\text{ min})}^*$ | How to apply |
|---|--|--|
| Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays / Public Holidays | Noise affected RBL + 10 dB | The noise affected level represents the point above which there may be some community reaction to noise. <ul style="list-style-type: none"> Where the predicted or measured $L_{Aeq(15\text{ min})}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details. |
| | Highly noise affected 75 dB(A) | The highly noise affected level represents the point above which there may be strong community reaction to noise. <ul style="list-style-type: none"> Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ol style="list-style-type: none"> times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times. |
| Outside recommended standard hours | Noise affected RBL + 5 dB | <ul style="list-style-type: none"> A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2. |

*Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Due to COVID-19 lockdown restrictions in place at the time of writing, attending the Clyde site for the purpose of establishing a Rating Background Level (RBL) was not possible. Further, RBL monitoring undertaken during COVID-19 lockdowns would not be considered a true representation of the acoustic environment during normal working conditions. As such, RBL data has been sourced from the project EIS. Unattended noise monitoring was undertaken at one sensitive receiver located in the vicinity of the Clyde metro station construction site between March and July 2019. RBL results and calculated Noise Management Levels are summarised in Table 4.

Table 4: Noise Management Levels for Residential Receivers

| Location | Background Noise (RBL) | | | Noise Management Level | | |
|-------------------------------------|------------------------|---------|-------|---------------------------|---------|-------|
| | L _{A90} | | | L _{Aeq} (15 min) | | |
| | Day | Evening | Night | Day | Evening | Night |
| L05 - 9 A'Beckett Street, Granville | 50 | 49 | 45 | 60 | 54 | 50 |
| L06 - 4B Gray Street, Granville | 52 | 21 | 44 | 62 | 56 | 49 |

(Source: Sydney Metro West Environmental Impact Statement (April, 2020))

4.1.2 Other Sensitive Land Uses

The project specific L_{Aeq}(15minute) NMLs for other non-residential noise sensitive receivers from the ICNG are provided in Table 4.

Table 5: ICNG Noise Criteria for 'Other' Sensitive Receivers

| Land Use | Management Level L _{Aeq} (15 min) (Applied when the land is in use) |
|---|---|
| Classrooms at schools and other education institutions | Internal noise level of 45dB(A) |
| Hospital wards and operating theatres | Internal noise level of 45dB(A) |
| Places of worship | Internal noise level of 45dB(A) |
| Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion) | External noise level of 65dB(A) |
| Passive recreation areas (inc. Rosehill Gardens Stables) (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, e.g. reading, meditation) | External noise level of 60dB(A) |
| Community centres | Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in Australian Standard 2107 – Acoustics – Recommended design sound levels and reverberation times for building interiors for specific uses. |

Other noise-sensitive businesses require separate project specific noise goals. The Interim Construction Noise Guideline recommends that the internal construction noise levels at these premises are determined based on the 'maximum' internal levels presented in AS 2107. These recommended 'maximum' internal noise levels are provided in Table 6.

Table 6: AS2107 Noise Criteria for 'Other' Sensitive Receivers

| Description | Time Period | AS2107 Classification | Recommended 'Maximum' Internal L _{Aeq} (15 min) |
|----------------------|---------------------|--|--|
| Hotel | Daytime and evening | Bars and lounges | 50 |
| | Night-time | Sleeping areas (hotels near major roads) | 40 |
| Cafe | When in use | Coffee bar | 50 |
| Bar/Restaurant | When in use | Bars and lounges / Restaurant | 50 |
| Library | When in use | Reading areas | 45 |
| Recording studio | When in use | Music recording studios | 25 |
| Theatre / Auditorium | When in use | Drama theatres | 30 |

4.1.3 Commercial and Industrial Premises

NMLs for commercial and industrial premises have been set based on the Interim Construction Noise Guidelines. For commercial premises, including offices, retail outlets and small commercial premises an external NML of L_{eq}(15 minute) 70 dB(A) has been adopted. An external NML of L_{eq}(15 minute) 75 dB(A) has been adopted for industrial premises. For both land use types, the external noise levels should be assessed at the most affected occupied point on the premises.

Notwithstanding the above, at no time can noise generated by construction exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of L_{Aeq}(8h), of 85dB(A) for any employee working at a location near the CSSI.

4.1.4 Horse Stables

The owners and operators of the horse stables near the Clyde stabling and maintenance facilities need to be consulted so that potential impacts to horses are appropriately addressed and managed.

4.2 Ground-borne Noise Management Levels

Ground-borne Noise Management Levels for residential receivers are provided in Table 7.

Table 7: ICNG NMLs for Ground-borne Noise

| Land Use | Noise Management Level L_{Aeq} (15 min) |
|-----------------------|---|
| Daytime 7am - 6pm | Internal noise level of 45dB(A) |
| Evening 6pm - 10pm | Internal noise level of 40dB(A) |
| Night-time 10pm - 7am | Internal noise level of 35dB(A) |

4.3 Construction Vibration

4.3.1 General Criteria

Condition D39 of the Conditions of Approval for the project stipulate that vibration from construction activities shall not exceed 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.

British Standard 7385: Part 2 1993 suggests levels of vibration at which ‘cosmetic’, ‘minor’ and ‘major’ damage may occur. This standard is based on data collated from a wide range of national and international sources which collectively saw relatively few cases of damage caused by vibration. BS7385 suggests that vibration levels up to the cosmetic damage level are considered ‘safe’ and have produced no observable damage for particular building types.

For the purposes of this standard, damage includes minor non-structural effects such as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks and separation of partitions or intermediate walls from load bearing walls.

BS7385 is based on peak particle velocity and specifies damage criteria for transient vibration within the range of frequencies usually encountered in buildings, being 4Hz to 250Hz. This criteria is reproduced in Table 8.

Table 8: BS7385: Part 2 Structural Damage Criteria

| Group | Type of Structure | Damage Level | Peak component particle velocity, mm/s | | |
|-------|---|--------------|--|---------------|-----------------|
| | | | 4 Hz - 15 Hz | 15 Hz - 40 Hz | 40 Hz and above |
| 1 | Reinforced or framed structures Industrial and heavy commercial buildings | Cosmetic | 50 (all frequencies) | | |
| | | Minor | 100 (all frequencies) | | |
| | | Major | 200 (all frequencies) | | |
| 2 | Unreinforced or light framed structures Residential or light commercial type buildings | Cosmetic | 15 to 20 | 20 to 50 | 50 |
| | | Minor | 30 to 40 | 40 to 100 | 100 |
| | | Major | 60 to 80 | 80 to 200 | 200 |

Where dynamic loading caused by continuous vibration may result in magnification of vibration through a building structure the guideline values may need to be reduced by up to 50 per cent. Rock breaking, rock hammering and sheet piling activities are considered to have the potential to cause dynamic loading in some structures (eg residences).

For construction activities involving intermittent vibration sources such as rock breakers, piling rigs, vibratory rollers, excavators and the like, the predominant vibration energy occurs at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range). On this basis, and consistent with the guidance from BS7385, the following conservative vibration damage screening levels per receiver type have been adopted for the project:

- Reinforced or framed structures: **25.0 mm/s**
- Unreinforced or light framed structures: **7.5 mm/s**

As per REMM NV16, where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and vibration monitoring shall be carried out to ensure vibration levels remain below appropriate limits for that structure.

4.3.2 Heritage Structures

With regards to heritage items, BS7385 states that “a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive”. Therefore it is reasonable to apply the General Criteria presented in Section 4.3.1 subject to satisfactory assessment of the following:

1. The structural condition of the building (in consultation with a structural engineer where required); and
2. The heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.

Where a heritage item is found to be structurally unsound, a more conservative cosmetic damage criterion of **2.5mm/s** peak component particle velocity must be applied.

4.3.3 Warning Levels

The INFRA Monitoring System proposed for use on this project features a number of real time alerts and alarms that enable instant notification where limits are approached or exceeded. Where vibration-intensive works are planned to occur in close proximity to sensitive receivers, and works are expected to approach the limits for cosmetic damage, monitoring equipment shall be equipped with visual and/or audible alarms that are triggered when the levels of vibration exceed the control criteria presented in Table 9.

Table 9: Operator Warning and Halt Levels

| Structure | Site Control Criteria (PPV in any Orthogonal Direction) | |
|--|---|---------------------|
| | Operator Warning Level | Operator Halt Level |
| Reinforced or framed structures | 20 mm/s | 25 mm/s |
| Unreinforced or light framed structures | 5 mm/s | 7.5 mm/s |
| Heritage structures | 5 mm/s | 7.5 mm/s |
| Heritage structures (Structurally unsound) | 2mm/s | 2.5mm/s |

5 NOISE AND VIBRATION ASSESSMENT

5.1 Sensitive Receivers

Due to COVID-19 lockdown restrictions in place at the time of writing, sensitive receivers were identified in the first instance through a desktop study of information presented in the Sydney Metro EIS. This information was subsequently confirmed using Nearmap and street view information. Sensitive receivers were also cross-checked against the Sydney Metro Small Business Engagement Plan.

Sensitive receivers identified around the Clyde site were numerous. For the purposes of this assessment, like receivers were rationalised into Noise Catchment Areas (NCAs). These are summarised in Table 10 and illustrated in Appendix A - Monitoring Locations and Sensitive Receivers. Structures predicted to exceed the vibration screening criteria for cosmetic damage and those of Heritage classification are also identified in Table 10.

While best endeavours have been made to identify all sensitive receivers, it must be noted that the list of receivers presented may not be exhaustive due to the inability to attend site for 'ground-truthing'. Delta shall seek to confirm the land-use assumptions presented herein as early as practical.

Table 10: Sensitive Receivers

| ID | Receiver | Address | Category | Heritage | Predicted Vibration Exceedance |
|----|----------------------------------|-----------------------------|----------------------------|----------|--------------------------------|
| 1 | NCA01 - Rosehill Gardens Stables | North of Unwin St, Rosehill | Other – Passive Recreation | | |
| 2 | NCA02 - East | Shirley St, Rosehill | Industrial | | |
| 3 | NCA03 - South | Martha St, Clyde | Industrial | | |
| 4 | NCA04 - West | West of James Ruse Dr | Residential | | |
| 5 | Downer Depot Office | 1 Unwin St, Rosehill | Commercial | | |
| 6 | Veolia Building | 2 Unwin St, Rosehill | Commercial | Yes | |
| 7 | RTA Depot | Unwin St, Rosehill | Heritage Structure | Yes | Potential |
| 8 | Hy-tec Concrete Depot | 10 Shirley St, Rosehill | Industrial | | |

5.2 Construction Activities and Sources of Noise

Noise impacts from demolition works are assessed using a scenario-based approach whereby noise-generating machinery and activities are assessed holistically to provide a realistic assessment of overall resulting noise levels. Key construction scenarios on this site include internal strip out and structural demolition. Structural demolition scenarios are divided into 2 groups as illustrated earlier in Figure 2:

1. Group 1 Structures – Steel only structures not requiring hammering
2. Group 2 Structures – Partially concrete structures requiring pulverisers and some hammering

A list of construction scenarios and associated noise sources is presented in Table 11. The nominal Sound Power Levels (SPL) are sourced from equipment specifications and have been assessed for compliance against the Maximum Allowable Plant Sound Power Levels presented in Table 13 of the CNVS. Noise mitigation measures that are incorporated into the noise assessment are also identified in Table 11 below to produce an 'Effective Sound Power Level' for predictions calculations.

Table 11: Construction Scenarios and Noise Sources

| Scenario | Noise Sources | Nominal Sound Power Level (dB) | Attenuation Factor / Penalty (dB) | Effective Sound Power Level (dB) |
|---------------------------------|--|--------------------------------|---|----------------------------------|
| Strip Out | 5T Excavator w/bucket | 93 | -10 ^(I) , -10 ^(H) | 73 |
| | Mustang Bobcats | 110 | -10 ^(I) , -10 ^(H) | 90 |
| | 12T Excavator w/bucket for loadout | 100 | -10 ^(H) | 90 |
| | Truck movements | 105 | -10 ^(H) | 95 |
| Demolition (Group 1 Structures) | 47T Excavator with shears for steel demolition | 106 | -10 ^(H) | 96 |
| | 47T Excavator with grab for loadout | 106 | -10 ^(H) | 96 |
| | 47T Excavator with bucket for loadout | 106 | -10 ^(H) | 96 |
| | Truck movements | 105 | -10 ^(H) | 95 |
| Demolition (Group 2 Structures) | 47T Excavator with pulveriser to demolish slabs | 106 | -10 ^(H) | 96 |
| | 47T Excavator with hammer to demolish columns and in-ground footings | 118 | -10 ^(H) +5 ^(A) | 113 |
| | 47T Excavator with grab/bucket for loadout | 106 | -10 ^(H) | 96 |
| | Truck movements | 105 | -10 ^(H) | 95 |

H) Noise attenuation due to perimeter hoarding

I) Noise attenuation due to operation inside a premises with open windows

A) Noise penalty for annoying or tonal noise characteristics

5.3 Airborne Noise Predictions

Noise levels have been predicted at surrounding sensitive receivers for each construction scenario based on the Effective Sound Power Levels presented in Table 11. Noise sources for each construction scenario have been added together to provide a realistic assessment of the $L_{Aeq(15\text{ minute})}$ noise level by assuming a percentage of the 15-minute interval that each noise source is actively working. To use the Strip Out scenario as an example, during any given 15-minute period, a 5T Excavator may be active for 80% of the period, a Mustang Bobcat may be active for 90% of the period, the 12T Excavator loading trucks for 90% of the period and Truck movements occurring for 30% of the period.

The resulting $L_{Aeq(15\text{ minute})}$ noise levels have been calculated at a representative distance from the works to the nearest sensitive receiver to produce a realistic assessment of likely noise impacts. Predicted noise levels are presented in Table 12.

Table 12: Predicted Noise Levels

| ID | Receiver | Noise Goal dB $L_{Aeq(15\text{ minute})}$ | Predicted Noise Levels dB $L_{Aeq(15\text{ minute})}$ | | |
|----|----------------------------------|--|---|----------------------|----------------------|
| | | | Strip Out | Demolition (Group 1) | Demolition (Group 2) |
| 1 | NCA01 - Rosehill Gardens Stables | 60 | 45 | 47 | 60 |
| 2 | NCA02 - East | 75 | 46 | 51 | 55 |
| 3 | NCA03 - South | 75 | 45 | 50 | 48 |

| | | | | | |
|---|-----------------------|----|----|----|----|
| 4 | NCA04 - West | 60 | 42 | 47 | 55 |
| 5 | Downer Depot Offices | 70 | 48 | 53 | 56 |
| 6 | Veolia Building | 70 | 51 | 56 | 55 |
| 8 | Hy-tec Concrete Depot | 75 | 53 | 58 | 68 |

Based on the predicted noise levels presented in Noise levels have been predicted at surrounding sensitive receivers for each construction scenario based on the Effective Sound Power Levels presented in Table 11 **Error! Reference source not found.** above. Noise sources for each construction scenario have been added together to provide a realistic assessment of the $L_{Aeq(15\text{ minute})}$ noise level by assuming a percentage of the 15-minute interval that each noise source is actively working. To use the Strip Out scenario as an example, during any given 15-minute period, a 5T Excavator may be active for 80% of the period, a Mustang Bobcat may be active for 90% of the period, the 12T Excavator loading trucks for 90% of the period and Truck movements occurring for 30% of the period.

The resulting $L_{Aeq(15\text{ minute})}$ noise levels have been calculated at a representative distance from the works to the nearest sensitive receiver to produce a realistic assessment of likely noise impacts. Predicted noise levels are presented in Table 12.

Table 12, a summary of noise impacts to sensitive receivers for the Clyde site is provided in Table 13 below.

Table 13: Noise Impacts

| ID | Receiver | Impact |
|----|----------------------------------|--|
| 1 | NCA01 - Rosehill Gardens Stables | Compliant with NML for Stables expected for all scenarios. Predicted noise levels for Demolition Group 2 scenario are on the limit of compliance, suggesting possibility of minor exceedance where such works occur at their closest point to the Stables. |
| 2 | NCA02 - East | Compliant with NML for industrial premises for all scenarios |
| 3 | NCA03 - South | Compliant with NML for industrial premises for all scenarios |
| 4 | NCA04 - West | Compliant with NML for residential premises for all scenarios |
| 5 | Downer Depot Offices | Compliant with NML for commercial premises for all scenarios |
| 6 | Veolia Building | Compliant with NML for commercial premises for all scenarios |
| 8 | Hy-tec Concrete Depot | Compliant with NML for industrial premises for all scenarios |

5.4 Ground-borne Noise

As demolition works are not anticipated to involve significant ground excavation, ground-borne noise is expected to be an issue only where sensitive receivers are directly coupled to the works (structure-borne noise). There are no such coupled sensitive receivers for the Clyde site.

5.5 Vibration Predictions

Vibration at the nearest sensitive receivers (adjacent to the building foundation) has been estimated using the formula

$$PPV_{Receiver} = PPV_{Ref} \times \left(\frac{d_{ref}}{d}\right)^{1.5}$$

from the FTA's Guideline "Transit Noise and Vibration Impact Assessment".

Where: $PPV_{Receiver}$ = peak particle velocity at the receiver in mm/s

PPV_{Ref} = peak particle velocity of the source, measured at the reference distance (7.6 m)

d_{ref} = reference distance for the vibration source (7.6 m)

d = horizontal distance from the source to the receiver (m)

The values of PPV_{Ref} are based on a review of current literature and are provided in Table 14 for reference.

Table 14: Reference PPVs

| Equipment | PPV @ 7.6m (mm/s) |
|---|-------------------|
| 2T Excavators | 2.5 |
| 5T Excavators | 2.9 |
| 12T Excavators | 3.3 |
| 20T Excavators w/hammer | 5.1 |
| 47T Excavators w/hammer | 7.6 |
| 12T Excavators w/hydraulic shears/pulverisers | 1.8 |
| 20T Excavators w/hydraulic shears/pulverisers | 2.5 |
| 47T Excavators w/hydraulic shears/pulverisers | 3.3 |
| Mustang Bobcats | 0.3 |
| Powered Hand Tools | 0.2 |
| Trucks | 1.9 |

The predicted levels of vibration at the nearest sensitive receivers are provided in Table 15. Note that:

- these predictions assume that equipment is operating at the nearest point of works to the sensitive receiver and therefore represent **worst-case** scenarios.
- these predictions represent maximum instantaneous levels for the purpose of assessing the likelihood of cosmetic damage and are not applicable for the assessment of human comfort which is measured as vibration dose values.

Table 15: Predicted Ground Vibration

| Equipment | Predicted PPV (mm/s) | | |
|---|----------------------------------|--------------------------|--------------------------------|
| | NCA01 - Rosehill Gardens Stables | Veolia Heritage Building | RTA Depot - Heritage Structure |
| 2T Excavators | 0.1 | 0.5 | 0.2 |
| 5T Excavators | 0.1 | 0.6 | 0.2 |
| 12T Excavators | 0.1 | 0.7 | 0.2 |
| 20T Excavators w/hammer | 0.2 | 1.0 | 0.4 |
| 47T Excavators w/hammer | 0.3 | 1.5 | 0.5 |
| 12T Excavators w/hydraulic shears/pulverisers | 0.1 | 0.4 | 0.1 |
| 20T Excavators w/hydraulic shears/pulverisers | 0.1 | 0.5 | 0.2 |
| 47T Excavators w/hydraulic shears/pulverisers | 0.1 | 0.7 | 0.2 |
| Mustang Bobcats | <0.1 | 0.1 | <0.1 |
| Powered Hand Tools | <0.1 | <0.1 | <0.1 |
| Trucks | 0.1 | 0.4 | 0.1 |

Table 15 indicates that predicted vibration levels are well below the vibration damage screening criteria for the project. Further, considering German Standard DIN 4150 Part 2 which presents human perception thresholds for 'noticeable' and 'easily noticeable' vibration of 1mm/s and 2.2mm/s respectively, vibration from demolition works is, for the most part, not anticipated to be noticeable to sensitive receivers around the site.

5.5.1 RTA Depot

Condition of Approval D49 states that if a Heritage item is found to be structurally unsound (following inspection) a more conservative cosmetic damage criterion of 2.5mm/s peak component particle velocity must be applied. Whilst vibration levels at the RTA Depot are predicted to remain well below this level based on the location of structures to be demolished, it is noted that the RTA Depot is within the site boundary and as such machinery may traverse closer to this structure than vibration predictions have considered. As such, further investigation of the structural condition of this receiver should be undertaken to determine if the more conservative cosmetic damage criterion of 2.5mm/s peak component particle velocity applies.

Pursuant to CoA D47, a heritage specialist shall provide advice regarding vibration monitoring of the RTA Depot.

5.5.2 Veolia Building

The Veolia building is located at a sufficiently large distance from the site resulting in predicted levels of vibration well below the conservative criterion of 2.5mm/s.

5.6 Construction Traffic Noise

Pursuant to REMM NV14, construction traffic noise has been assessed for the Clyde site on the basis of a maximum of 10 heavy vehicle movements per hour. All vehicles shall pull directly into the site on arrival thus avoiding any requirement to idle on local streets. Considering the short exposure duration of sensitive receivers to passing construction vehicles, predicted noise levels did not increase by greater than 2dB above the average noise levels presented in the EIS. As such, no further mitigation measures have been identified as necessary for construction traffic noise.

5.7 Cumulative Impacts

No other major construction works were identified in the vicinity of the site with the potential to cause cumulative impacts to sensitive receivers.

5.8 Impact Classification

As per Section 3.1 of the Sydney Metro CNVS, a subjective classification of the noise & vibration impact has been evaluated for each sensitive receiver and documented as:

- Low Impact
- Moderate Impact
- High Impact

The classifications were determined on a case-by-case basis using the metrics defined in the CNVS, including:

- The location of the works in relation to the NSR's with consideration of the noise attenuation features such as distance to NSR's, noise barriers, attenuation factor of NSR's windows and elements, Topographical features etc.
- The type and sensitivity of the NSR's:
 - Lower impact: e.g. commercial buildings/scattered residential (low density)
 - Moderate impact: eg standard residential (typical density)

- High impact: e.g residential home for elderly/high density unit blocks/persistent complainers/residents deemed to have “construction noise fatigue”, highly sensitive commercial (jewellers, etc.) or health applications e.g. operating theatres, MRI’s, Psychotherapy units, Audio & video production studios etc. and schools/childcare centres.
- Predicted noise and vibration levels and extent of noise exceedance above Noise Management Level
- The type of and intensity of noise emitted from works (ie tonal or impulsive):
 - Lower Impact: No high noise and/or vibration intensive activities
 - Moderate Impact: Short/intermittent high noise and/or vibration intensive activities
 - High Impact: Prolonged high noise and/or vibration intensive activities.
- The duration of any OOHW required.

Site plans illustrating the location and impact classification of sensitive receivers can be found in Appendix A - Monitoring Locations and Sensitive Receivers.

6 NOISE AND VIBRATION MANAGEMENT

6.1 Environmental Monitoring, Auditing & Reporting

Noise and vibration monitoring shall be undertaken using Sigicom INFRA remote-access installations at the nearest representative sensitive receivers around the site. Noise and vibration data will be accessible in real-time through the Infra Net web portal and shall be monitored closely at the start of key activities to confirm levels and refine the prediction model.

6.1.1 Monitoring Locations

Permanent monitoring locations are detailed in Table 16 and illustrated in Appendix A. Note that not all monitoring locations will be active concurrently. Monitors will be relocated as and when required to ensure effective monitoring of active construction areas.

Table 16: Monitoring Locations

| Property | Monitoring Points | | Monitoring Location | Catchment |
|--------------------------------|-------------------|-----------|------------------------------|---------------------------|
| | Noise | Vibration | | |
| Rosehill Garden Stables | 1 | - | Unwin Street, Rosehill | NCA01 & NCA04 |
| 2 Unwin St | 1 | 1 | Western (site facing) facade | NCA02 & heritage property |
| 1 Unwin St | 1 | | Offices | Downer Depot |
| RTA Depot | - | 1 | Foundation of facade | Heritage property |
| TOTAL MONITORING POINTS | 3 | 2 | | |

6.1.2 Attended Monitoring

Attended monitoring may be conducted where data from permanent installations is considered inadequate. For example, where complaints are received, additional monitoring may be conducted at the specific location of complaint. Attended monitoring may also be conducted to establish relationships between levels recorded externally by permanent monitors and those experienced at other locations of interest such as an internal environments.

Operator-attended noise monitoring will be conducted for a minimum of 15 minutes at each location during the demolition works. Where a longer monitoring duration is required, measurements shall be made in consecutive 15-minute periods.

6.1.3 Heritage Listed Structures

Effective monitoring of heritage-listed structures can pose unique challenges where sensitive heritage fabrics are involved. CoA D47 stipulates that a heritage specialist shall provide advice regarding noise and vibration monitoring of heritage-listed structures. Due to COVID-19 lockdown restrictions in place at the time of writing, no site investigations have been possible and therefore no such advice from the heritage specialist could be provided. This document will be updated and the heritage advice provided in Appendix B once this situation changes. It is noted that no works shall proceed before monitoring is implemented in accordance with advice from the heritage specialist.

6.1.4 Auditing

All noise-generating items of plant identified in Table 11 shall have noise audits conducted upon arrival on site, and at 6-month intervals thereafter, to ensure compliance with the Maximum Allowable Plant Sound Power Levels listed in Table 13 of the Sydney Metro Construction Noise and Vibration Standard (CNVS). The following process for plant noise audits shall apply:

- Measurements of Sound Pressure Level (SPL) at 7 m (with plant or equipment stationary) shall be undertaken using procedures that are consistent with the requirements of Australian Standard AS2012 1990 Acoustics Measurement of Airborne Noise Emitted by Earthmoving Machinery and Agricultural Tractors Stationary Test Condition Part 1: Determination of Compliance with Limits for Exterior Noise.
- Measurements of Sound Power Level (SWL) shall be determined using procedures that are consistent with the requirements of International Standard ISO9614-2 1996 Acoustics Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning.
- If measuring the SPL at 7 m of moving plant, compliance measurements would be guided by the requirements of Australian Standard AS2012 1977 Method for Measurement of Airborne Noise From Agricultural Tractors and Earthmoving Machinery.
- For all measurements, the plant or equipment under test would be measured while operating under typical operating conditions. If this is not practical, it may be appropriate to conduct a stationary test at high idle.

- In the case of an exceedance in sound power levels the item of plant would either be replaced, or the advice of an acoustic consultant would be sought to provide suitable mitigation measures, which may include:
 - ensuring all bolts are tightened and no parts are loose
 - cleaning and/or lubricating moving parts
 - replacing old or worn parts
 - implementing additional or upgrading existing muffling devices
 - building enclosures around items of stationary plant (e.g. pumps or generators).
- A register of measured sound power levels for each item of plant would be kept for reference where future noise audits are conducted. The register would be reviewed annually in conjunction with the CNVS and corresponding revisions made to the Sound Power Levels presented in Section 4.3 of the CNVS to represent contemporary plant noise emission levels.

6.1.5 Reporting

Monitoring results shall be compiled into a weekly report for ongoing review and assessment against the criteria presented in Section 4 **Error! Reference source not found.** of this document. Reports shall be forwarded to Delta's Environment Manager and site project manager within one week of being undertaken or at weekly intervals for continuous monitoring. Delta's Environment Manager will manage the wider dissemination of all compliance reports, and such reports shall be made available upon request to all authorised parties. All compliance reports will be stored on Delta's project server for no less than 7 years after project completion. All noise and vibration monitoring results are stored on the Osterman INFRA Net online database for 10 years.

6.1.6 Dilapidation Surveys

Pursuant to Section 6.5 of the CNVS, if demolition works have the potential to cause damage through vibration to nearby public utilities, structures, buildings and their contents, an Existing Condition Inspection of these items shall be undertaken in accordance with AS 4349.1 "Inspection of Buildings". The potential to cause damage is defined as any property at risk of exceeding the cosmetic damage screening criteria presented in Section 4.3 of this document. At the time of writing, no such properties have been identified for the Westmead site.

Notwithstanding the above, whilst vibration levels at the RTA Depot are predicted to remain well below this level based on the location of structures to be demolished, it is noted that the RTA Depot is within the site boundary and as such machinery may traverse closer to this structure than vibration predictions have considered. As such, further investigation of the structural condition of this receiver should be undertaken to determine if the more conservative cosmetic damage criterion of 2.5mm/s peak component particle velocity applies and ensure safe working distances are adhered to.

Prior to conducting the Existing Condition Inspections, the property owners will be advised of the inspection scope and methodology and the process for making a property damage claim. A register shall be maintained of all properties inspected and of any properties where owners refused the inspection offer.

The findings of all dilapidation surveys conducted for each Sydney Metro construction site shall be compiled into a report to be forwarded to the construction contractor and project manager. Follow-up Condition Inspections would be required at the completion of certain major works.

6.2 Mitigation Measures

6.2.1 Standard Mitigation Measures

A range of standard noise and vibration mitigation measures shall be adopted on the site so as to minimise the impact of works on neighbouring sensitive receivers. These are outlined in Table 17.

All reasonable and feasible mitigation measures must be implemented with the aim of achieving the construction noise management levels and vibration criteria defined in CoA D39. Further, all reasonable and feasible mitigation measures must be applied when the residential ground-borne noise levels defined in CoA D40 are exceeded.

Table 17: Noise and Vibration Mitigation Measures

| Action Required | Details |
|--|---|
| Management | |
| Consultation regarding mitigation measures | <p>Further engagement and consultation would be carried out with:</p> <ul style="list-style-type: none"> The affected communities to understand their preferences for mitigation and management measures. 'Other sensitive' receivers such as schools, medical facilities or places of worship to understand periods in which they are more sensitive to impacts. <p>Based on this consultation, appropriate mitigation and management options would be considered and implemented where feasible and reasonable to minimise the impacts.</p> <p>Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed.</p> |
| Consultation regarding scheduling | <p>Noise generating work in the vicinity of potentially-affected community, religious, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the NMLs must not be timetabled within sensitive periods, unless other reasonable arrangements with the affected institutions are made at no cost to the affected institution.</p> <p>Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed.</p> |
| Implement community consultation measures | <ul style="list-style-type: none"> Periodic Notification (monthly letterbox drop) detailing all upcoming construction activities at least 14 days prior to commencement of relevant works Website Project information and construction response telephone line Email distribution list Place Managers Operate in accordance with the Overarching Community Communications Strategy (OCCS) |
| Register of Noise Sensitive Receivers | <p>A register of all noise and vibration sensitive receivers (NSRs) would be kept on site. The register would include the following details for each NSR:</p> <ul style="list-style-type: none"> Address of receiver Category of receiver (e.g. Residential, Commercial etc.) Contact name and phone number |
| Complaints handling | <p>All complaints handling would be in accordance with the Sydney Metro Construction Complaints Management System.</p> |
| Site inductions | <p>All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include:</p> <ul style="list-style-type: none"> All relevant project specific and standard noise and vibration mitigation measures Relevant licence and approval conditions Permissible hours of work Any limitations on high noise generating activities Location of nearest sensitive receivers Construction employee parking areas Designated loading/unloading areas and procedures Site opening/closing times (including deliveries) Environmental incident procedures |
| Behavioural practices | <ul style="list-style-type: none"> 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. No excessive revving of plant and vehicle engines Controlled release of compressed air. Turn off machinery when not in use |
| Monitoring | <p>A noise monitoring program is to be carried out for the duration of the works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions.</p> |
| Attended vibration measurements | <p>Attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity.</p> <p>Where there is potential for exceedances of the criteria further vibration site law investigations would be</p> |

| | |
|---|--|
| | undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the applicable safe-working distances. |
| Construction methodology | Industry best practice construction methods must be implemented where reasonably practicable to ensure that noise levels are minimised around sensitive land user(s). Practices must include, but are not limited to: <ul style="list-style-type: none"> a) use of regularly serviced low sound power equipment; b) temporary noise barriers (including the arrangement of plant and equipment) around noisy equipment and activities such as rock hammering and concrete cutting; and c) use of alternative construction and demolition techniques. |
| Alternative construction and demolition techniques | Alternative construction methodologies and measures that minimise noise and vibration levels during noise intensive works would be investigated and implemented where feasible and reasonable. This would include consideration of: <ul style="list-style-type: none"> • The use of hydraulic concrete shears and pulverisers in lieu of hammers/rock breakers • Sequencing works to shield noise sensitive receivers by retaining building wall elements • Locating demolition load out areas away from the nearby noise sensitive receivers • Providing respite periods for noise intensive works • Minimising structural-borne noise to adjacent buildings including separating the structural connection prior to demolition through saw-cutting and propping, using hand held splitters and pulverisers or hand demolition • Installing sound barrier screening to scaffolding facing noise sensitive neighbours • Using portable noise barriers around particularly noisy equipment, such as concrete saws • Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods. |
| Ground-borne Noise | Feasible and reasonable measures would be implemented to minimise ground-borne noise where exceedances are predicted. This may require implementation of less ground-borne noise and less vibration intensive alternative construction methodologies. |
| Condition surveys | Condition surveys shall be carried out where there is potential to cause damage through vibration to nearby public utilities, structures, buildings and their contents. The potential to cause damage is defined as any property at risk of exceeding the cosmetic damage screening criteria. |
| Structural Assessment | Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed. |
| Scheduling | 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. |
| Scheduling | The use of noise intensive equipment at construction sites with 'moderate' and 'high' out-of-hours noise management level exceedances would be scheduled for standard construction hours, where feasible and reasonable. Where this is not feasible and reasonable, the works would be undertaken as early as possible in each work shift. |
| Construction respite period | High noise and vibration generating activities ¹ may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block ² . ¹ Includes jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling ² Any period during which there is less than a 60 minutes respite between ceasing and recommencing works |
| Source Controls | |
| Equipment selection - General | Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits. |
| Equipment selection – Residential areas | Long term construction site support equipment and machinery would be low noise emitting and suitable for use in residential areas, where feasible and reasonable. Examples include: <ul style="list-style-type: none"> • Low noise water pumps for use in water treatment facilities • Low noise generators and compressors • Low noise air conditioner units for use of amenities buildings. |
| Maximum noise levels | The noise levels of plant and equipment must have operating Sound Power Levels compliant with the criteria in Table 13 of the CNVS. |
| Rental plant and equipment | The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in Table 13 of the CNVS. |
| Plan worksites and activities to minimise noise and vibration | Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. |
| Non-tonal reversing alarms | Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. |

| | |
|---|---|
| Minimise disturbance arising from delivery of goods to construction sites | <ul style="list-style-type: none"> • Loading and unloading of materials/deliveries is to occur as far as possible from NSRs • Select site access points and roads as far as possible away from NSRs • Dedicated loading/unloading areas to be shielded if close to NSRs • Delivery vehicles to be fitted with straps rather than chains for unloading, wherever feasible and reasonable |
| Path Controls | |
| Shield stationary noise sources such as pumps, compressors, fans etc | Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix F of AS 2436: 1981 lists materials suitable for shielding. |
| Shield sensitive receivers from noisy activities | Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when siting plant. |

With regards to **REMM NV05**, on the basis that heavy vehicles will access sites primarily within standard construction hours, the requirement for airbrake silencers to be fitted to heavy vehicles that access construction sites multiple times per night or over multiple nights would be considered as part of an application for Out-of-Hours Works.

With regards to **REMM NV06**, site hoarding has been designed on the basis that heavy vehicles will access sites primarily within standard construction hours. Standard A-Class hoarding with a nominal noise reduction factor of 10db is therefore considered adequate for the purpose of minimising sleep disturbance impacts. Alternative mitigation measures for minimising sleep disturbance impacts would be considered as part of an application for Out-of-Hours Works.

6.2.2 Site-specific Mitigation Measures

Condition of Approval D44 states that specific mitigation measures must be identified through consultation with affected sensitive receivers. Due to COVID-19 lockdown restrictions in place at the time of writing, consultation is still ongoing and shall be added to Appendix C – Consultation Register as it occurs. This section shall be updated as new mitigation measures are identified.

Table 18: Site-specific Noise and Vibration Mitigation Measures

| Action Required | Details |
|-------------------------------|--|
| Per Condition of Approval D45 | Properties at risk of exceeding the screening criteria for cosmetic damage have been identified in Table 10. These receivers must be notified before works that generate vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers are to be provided a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. |
| Per Condition of Approval D46 | Vibration testing must be conducted during vibration generating activities that have the potential to impact on Heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures. Such measures must include, but not be limited to, review or modification of excavation techniques. Heritage properties identified under this requirement are listed in Table 10 and include the RTA Depot building. |

6.2.3 Additional Mitigation Measures

Where exceedance of imposed noise and vibration criteria is predicted even with implementation of the Standard Mitigation Measures presented in **Error! Reference source not found.**, Additional Mitigation Measures (AMMs) shall be implemented to offset noise and vibration impacts. AMMs are summarised in Table 19 below and are applied in accordance with the requirements of Table 16, Table 17 and Table 18 of the CNVS for airborne noise, ground-borne noise and ground-borne vibration impacts, respectively.

Table 19: Additional Mitigation Measures Abbreviations

| Measure | Description | Abbreviation |
|---------|-------------|--------------|
|---------|-------------|--------------|

| | | |
|--------------------------------|--|----|
| Alternative accommodation | Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur unreasonably high impacts over an extended period of time. Alternative accommodation will be determined on a case-by-case basis. | AA |
| Monitoring | Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals, noise or vibration monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal has been exceeded so that additional management measures may be implemented. | M |
| Individual briefings | Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Communications representatives from the contractor would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project. | IB |
| Letter box drops | For each Sydney Metro project, a newsletter is produced and distributed to the local community via letterbox drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage and inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. Each newsletter is graphically designed within a branded template. | LB |
| Project specific respite offer | The purpose of a project specific respite offer is to provide residents subjected to lengthy periods of noise or vibration respite from an ongoing impact. | RO |
| Phone calls and emails | Phone calls and/or emails detailing relevant information would be made to identified/affected stakeholders within 7 days of proposed work. Phone calls and/or emails provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc. | PC |
| Specific notifications | Specific notifications would be letterbox dropped or hand distributed to identified stakeholders no later than 7 days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works. | SN |

Based on the predicted levels of noise and vibration presented in Section 5, Additional Mitigation Measures applicable to the site are outlined below.

Airborne Noise

No AMMs identified on the basis that predicted noise levels do not exceed applicable NMLs at any receiver.

Ground-borne Noise

There is no NML for ground-borne noise during standard hours. Refer to AMMs for ground-borne vibration.

Ground-borne Vibration

No AMMs identified on the basis that predicted vibration levels do not exceed applicable criteria at any receiver.

7 SUMMARY

Broadly speaking, impacts of noise and vibration from demolition works on the Clyde site are expected to be minimal. The nearest sensitive receivers are industrial in nature and exceedances of noise management levels (NMLs) are unlikely to occur even where works occur on the site boundary.

Minor exceedances of NMLs could potentially occur at the nearest stables of the Rosehill Racecourse where noise-intensive works occur close to the northern site boundary however this is unlikely given that there are no structures to be demolished in close proximity to the northern site boundary.

Residential receivers to the west are at such a distance that noise impacts from site are expected to be minor.

Vibration from demolition works is expected to be imperceptible to occupants of the nearest sensitive receivers, though the existence of several heritage structures on and around the site will necessitate monitoring to ensure compliance with the more stringent heritage criteria.

No other major works were identified in the vicinity of the site that would result in cumulative impacts.

8 REFERENCES

Additional guidelines and standards relating to the management of construction noise and vibration from this project include:

- Australian Standard AS/NZS 2107, 2000, Acoustics - Recommended design sound levels and reverberation times for building interiors
- Australian Standard AS2436, 1981, Guide to Noise Control on Construction, Maintenance and Demolition Sites
- British Standard BS 6472, 2008, Evaluation of human exposure to vibration in buildings (1- 80Hz)
- British Standard 7385: Part 2, 1993, Evaluation and measurement of vibration in buildings
- Department of Environment and Climate Change, 2009, Interim Construction Noise Guideline (ICNG)
- Department of Planning, Industry and Environment, 2021, Sydney Metro West - Concept and Stage 1 Conditions of Approval
- Federal Transit Administration, 2006, Transit Noise and Vibration Impact Assessment
- German Standard DIN4150, 1999, Structural vibration Part 3: Effects of vibration on Structures
- NSW Dept. of Environment, Climate Change and Water, 2011, Road Noise Policy
- NSW Environment Protection Authority, 2017, Noise Policy for Industry
- NSW Department of Environment and Conservation, 2006, Assessing vibration: a technical guideline
- Roads and Traffic Authority, 2001, Environmental Noise Management Manual (ENMM)
- Sydney Metro, 2020, Sydney Metro Construction Noise and Vibration Standard
- Sydney Metro, 2020, Sydney Metro West Clyde to The Bays and Sydney CBD – Environmental Impact Statement
- Sydney Metro, 2020, Sydney Metro West Clyde to The Bays and Sydney CBD - Submissions Report

9 APPENDICES

Appendix A - Monitoring Locations and Sensitive Receivers

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Impact Category

- Low Impact
- Moderate Impact
- High Impact
- Demolition Zone

Monitoring Category

- Noise
- Regenerated Noise
- Vibration
- Noise & Vibration

Sensitive Receiver Category

- Commercial
- Residential
- Educational
- Industrial
- Childcare
- Place of worship
- Passive Recreation
- Heritage



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Sydney Metro Demolition - Clyde
Noise and Vibration Sensitive Receivers

Date: 17/09/2021
Created by: MDS
Project No: 0121 023



The contents within this document are based on third party data. The accuracy of the information can not be guaranteed

Appendix B - Heritage Specialist Advice on Monitoring Methods and Locations

To be included once lockdown restrictions enable onsite consultation with heritage consultant.

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Appendix C – Consultation Register

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| DOCUMENT NO. | TITLE | VER | STATUS | NO. | DATE | COMPANY | RAISED BY | REVIEW DOC. NO.* | DOCUMENT REF* | DEED REF* | COMMENTS / RESPONSE | COMMENT CATEGORY* | CLOSED OUT | | | |
|-------------------------------|---|-------|--------|-------------|------------|---------|-----------|-------------------------------|------------------------|-----------|--|-----------------------|------------|--|-----------------------|---|
| SMWSDDS-DLT-CLJ-NA-PLN | Detailed Noise & Vibration Impact | 01.01 | RVW | 01 | 7/09/2021 | SMD | JIEROKLIS | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Figure 1 | N/A | Figure 1 is out of date. There is no longer a proposed Metro Station at Rydalmere. Please use the attached figure instead. | Observation | Y | | | |
| | | | | | | | | | | | | | | | | |
| | | | | 01.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Figure 1 | N/A | Updated | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| | | | | 02 | 8/09/2021 | ACS | DANDERSON | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Generally | N/A | Many of the comments I provided on the Parramatta DNVIS apply equally here. Please review and address those comments here, as required. | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| | | | | 02.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Generally | N/A | This document has been updated in parallel with the Parramatta DNVIS | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| | | | | 03 | 13/09/2021 | HBI | BMCLENNAN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | General | CoA A1 | Please review and incorporate the comment provided on the Parramatta DNVIS in this DNVIS. | Minor Non-Compliance | Y | | | |
| | | | | | | | | | | | | Minor Non-Compliance | Y | | | |
| | | | | 03.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | General | CoA A1 | This document has been updated in parallel with the Parramatta DNVIS | Minor Non-Compliance | Y | | | |
| | | | | | | | | | | | | Minor Non-Compliance | Y | | | |
| | | | | 05 | 15/09/2021 | ACS | DANDERSON | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Table 9 and Appendix A | N/A | The land-use and sensitivity for the Rosehill stables is inconsistent. Table 9 lists it as "other". Appendix A appears to show it as "industrial". The EIS designated it as active recreation (refer EIS 11.3.7). | Minor Non-Compliance | Y | | | |
| | | | | | | | | | | | | Minor Non-Compliance | Y | | | |
| | | | | 05.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Table 9 and Appendix A | N/A | EIS designates stables as passive recreation. Table 9 and Appendices updated. | Minor Non-Compliance | Y | | | |
| | | | | | | | | | | | | Minor Non-Compliance | Y | | | |
| | | | | 06 | 15/09/2021 | ACS | DANDERSON | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Table 11 | N/A | Table 11 appears to assess impacts at Rosehill stables based on residential NMLs, rather than active recreation. | Minor Non-Compliance | Y | | | |
| | | | | | | | | | | | | Minor Non-Compliance | Y | | | |
| | | | | 06.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Table 11 | N/A | Impacts assessed according to passive recreation as indicated in EIS | Minor Non-Compliance | Y | | | |
| | | | | | | | | | | | | Minor Non-Compliance | Y | | | |
| | | | | 07 | 15/09/2021 | ACS | DANDERSON | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Generally | N/A | It would be very helpful to add some comments about which structures, if any, will require higher impact activity like hammering. | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| | | | | 07.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Generally | N/A | See Section 5.2. Assessment is now scenario-based and structures requiring hammering have been identified. | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| SMWSDDS-DLT-CLJ-NA-PLN-000046 | Detailed Noise & Vibration Impact Statement (Clyde) | 02.01 | RVW | 04 | 13/09/2021 | HBI | BMCLENNAN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Consultation | REMM NV15 | Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed. | Actual Non-Compliance | Y | | | |
| | | | | | | | | | | | | | | | | |
| | | | | 04.01 | 27/09/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Consultation | REMM NV15 | See newly added Section 3.2 | Actual Non-Compliance | Y | | | |
| | | | | | | | | | | | | | | | Actual Non-Compliance | Y |
| | | | | 04.01.01 | 4/10/2021 | HBI | BMCLENNAN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Consultation | REMM NV15 | Include Section 5.1 as relevant to this REMM. | Actual Non-Compliance | Y | | | |
| | | | | | | | | | | | | | | | Actual Non-Compliance | Y |
| | | | | 04.01.01.01 | 16/10/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Consultation | REMM NV15 | included section 5.1 as relevant to REMM NV15 | Actual Non-Compliance | Y | | | |
| | | | | | | | | | | | | Actual Non-Compliance | Y | | | |
| | | | | 08 | 4/10/2021 | HBI | BMCLENNAN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | 5.3 6.1.5 6.2.3 | N/A | update document cross references to remove reference errors | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| | | | | 08.01 | 16/10/2021 | DLT | ALUMSDEN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | 5.3 6.1.5 6.2.3 | N/A | removed errors | Observation | Y | | | |
| | | | | | | | | | | | | Observation | Y | | | |
| | | | | 09 | 4/10/2021 | HBI | BMCLENNAN | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Table 1 & 2 | CoA | Please include the following CoA's - C-A1, A1, C16-C23 Make note that while REMM NV17 is applicable to this Phase, no excavation or tunnelling works are in this scope of works and is therefore not applicable to this DNVIS. | Minor Non-Compliance | Y | | | |

| DOCUMENT NO. | TITLE | VER | STATUS | NO. | DATE | COMPANY | RAISED BY | REVIEW DOC. NO.* | DOCUMENT REF* | DEED REF* | COMMENTS / RESPONSE | COMMENT CATEGORY* | CLOSED OUT |
|-------------------------------|---|-------|--------|-----|------|---------|-----------|-------------------------------|---------------|-----------|---------------------|----------------------|------------|
| | | | | | | | | SMWSDDS-DLT-CLJ-NA-PLN-000046 | Table 1 & 2 | CoA | | Minor Non-Compliance | Y |
| SMWSDDS-DLT-CLJ-NA-PLN-000046 | Detailed Noise & Vibration Impact Statement (Clyde) | 00.01 | RVW | | | | | | | | | | |
| SMWSDDS-DLT-CLJ-NA-PLN-000046 | Detailed Noise & Vibration Impact Statement (Clyde) | 03.01 | RVW | | | | | | | | | | |