NOISE AND VIBRATION MANAGEMENT PLAN

Errant and Hostile Vehicle Mitigation Treatments for the Southwest Metro Project

SMC-22-0722

MR-EHVMT-EE-02

AMENDMENTS			
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Rev A	29/04/2024	Update per client review comments	29/04/2024
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AUTHORISATION			
Name	**Position**	**Signature**	**Date**
Justin Skinner	Project Manager		

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1 INTRODUCTION

1.1 Context and Scope of this Sub-plan

This Noise and Vibration Management Plan (NVMP or Plan) covers strategies, systems and procedures to ensure the Construction of Errant and Hostile Vehicle Mitigation Treatments for the Southwest Metro Project (hereafter known as the 'Project') meets the environmental obligations and targets for the construction activities as set out in the Contract. This NVMP forms part of the Construction Environmental Management Plan (CEMP) and is an integral part of the Martinus Management System (MMS) and activities that are anticipated to occur during the construction phase of the Project.

This NVMP has been prepared to address requirements of the State Significant Infrastructure (SSI) 8256 Conditions of Approval (CoA), the Revised Environmental Mitigation Measures (REMM), the Project's Submissions and Preferred Infrastructure Report (SPIR) and the Sydney Metro Construction Environmental Management Framework (CEMF).

This NVMP describes how Martinus proposes to manage noise and vibration during the construction of the Project. Operational management measures do not fall within the scope of this Plan and therefore are not included.

This NVMP and relevant Construction Noise and Vibration Impact Statements (CNVIS) form part of the suite of construction noise and vibration documents aiming to achieve the above objectives. The NVMP:

- Applies the Sydney Metro Construction Noise and Vibration Strategy (CNVS, 2016) during the construction phase of the Project;
- Applies the SSI 8256 CoA for the Project;
- Applies the principles of the NSW EPA Interim Construction Noise Guideline (ICNG, 2009); and
- Considers the interaction of known Conditions of Approval and any applicable Environmental Protection Licence (EPL) 12208 conditions (for works carried out under a rail possession).

This NVMP summarises the requirements from the documents listed above and explains how they are to be applied in practice for the proposed station works.

The NVMP shares the main objectives of the ICNG Section 1.3, a portion of which is presented below:

"The main objectives of the Guideline are to:

- promote a clear understanding of ways to identify and minimise noise from construction works
- focus on applying all 'feasible' and 'reasonable' work practices to minimise construction noise impacts
- encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours
- streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage
- provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts."

The NVMP:

- Identifies sensitive receivers and noise and vibration management levels applying at each potentially affected receiver;
- Identifies and clarifies applicable project-specific construction noise and vibration management requirements under the CoA, Sydney Metro's CNVS and any EPL which may apply;
- Identifies the key noise and / or vibration generating construction activities;
- Identifies and recommends feasible and reasonable construction noise and vibration mitigation measures (both engineering and management controls);
- Clarifies the requirements of Sydney Metro's City and Southwest Out of Hours Works Strategy/Protocol;
- Clarifies the requirements for all necessary noise and vibration monitoring;
- References applicable Sydney Metro communications strategies and requirements for responding to and effectively addressing any community noise complaints relating to construction noise and / or vibration;
- Outlines the requirements for maintaining records for noise and vibration monitoring and for community enquiries and complaints.

This NVMP does not mitigate and manage impacts from other aspects outside the discipline of acoustics (i.e. ground movement or subsidence). In terms of vibration, only the direct effect of vibration on buildings is considered within this NVMP. This approach corresponds to, and is consistent with, the appropriate standards referenced in this NVMP. The indirect effects on the building structure due to ground movement, the movement of loose objects within buildings and the possibility of damage to sensitive equipment, are not within the scope of this NVMP. Where detailed knowledge of the quality of soil or ground movement is required, expert advice should be obtained from a geotechnical engineer or equivalent qualified discipline.

1.2 Project Background

The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement (EIS) (GHD/AECOM September 2017) assessed the noise and vibration impacts of construction within Chapter 12 (Construction noise and vibration). The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR revised the scope of the Sydenham to Bankstown Upgrade project and updated construction noise and vibration assessment was included in SPIR Appendix E.

This NVMP addresses the Construction of Errant and Hostile Vehicle Mitigation Treatments for the Southwest Metro Project. Please refer to Section 1 of the CEMP for the Project Description.

1.3 NVMP and Supporting Documents

This NVMP has been developed to inform the assessment of works to be carried out by Martinus. A Construction Noise and Vibration Impact Statement (CNVIS) will be prepared to assess the potential noise and vibration impacts of the works. Sydney Metro has provided indicative works stages, locations, and plant for assessment. In accordance with the CoA, the CNVIS and NVMP can be updated at any time to reflect

the detailed design, development of construction methods, and coordination with other contractors / projects in the areas to manage cumulative impacts.

If Martinus proposes to carry out any works activity which is not covered in the CNVIS, and if that activity is predicted to exceed CNVIS noise predictions, be in a different location, or be noticeably different in noise character to the assumed activities for the associated works stage, then additional assessment will be included in the CNVIS (as an updated document or addendum report) prior to commencement of those different works.

Martinus can refer to the NVMP and CNVIS to consider ways to mitigate impacts from the proposed works, through plant selection and / or screening, and scheduling of noisy activities to less noise-sensitive periods when possible.

Martinus will also prepare works plans and out of hours works (OOHW) applications in accordance with the Sydney Metro City and Southwest Out of Hours Works Strategy/Protocol (SM-17-00005396) which has been prepared to satisfy CoA E25 and REMM NVC16, which describe in more detail the plant and activities to be scheduled. These will build on the findings of the CNVIS but be broken down further when plant selection is confirmed and sequencing and location of activities is clear, allowing impacts to be managed appropriately.

The NVMP and CNVIS are part of a suite of construction noise and vibration management documents and have an interrelationship with other documents, as outlined below:

- Site Environment Plans or Environmental Control Maps identify nearby residential and other noise-sensitive receivers and Noise Catchment Areas. These are progressively updated to incorporate physical noise management measures identified in the CNVIS, such as solid hoarding;
- The Heritage Management Plan prepared for the Project, given the potential for vibration intensive works to be carried out at heritage-listed railway stations;
- The Construction Traffic Management Plan (CTMP) prepared for the Project; and
- The Sydney Metro City and Southwest Overarching Community Communications Strategy (OCCS) (SM-17-00083972). The OCCS describes the procedures and processes for community notification, consultation and complaints management.

1.4 Consultation

CoA C3(a) and CoA C8(a) require that the NVMP and Noise and Vibration Monitoring Program be prepared in consultation with the relevant Council. As such the following stakeholders will be consulted in developing this Plan:

- Canterbury-Bankstown Council
- Inner West Council

A summary of the consultation is provided in Table 1 and in Appendix D.

Table 1: Consultation carried out in the development of this Plan (TO BE COMPLETED)

CoA	Agency Consultation	Requirements and date submitted	Key issues raised	Response	NVMP Section Reference
C6	Department of Planning, Housing and Infrastructure (DPHI)				
C3(a) C8(a)	Canterbury-Bankstown Council	Requirement: Review and comment on this NVMP Date submitted: 12/07/2024	Provide council with details of the complaint management system and a direct contact in order for community concerns to be documented and forwarded onto the ARA for investigation and action.	Community Manager contact details and complaints management procedure for the project have been shared with CBC.	N/A
C3(a) C8(a)	Inner West Council	Requirement: Review and comment on this NVMP Date submitted: 12/07/2024	While the developments are likely to have amenity impacts, the measures presented in Section 8 of the report will minimise the impacts to sensitive receivers	Noted.	N/A
			In addition to the provided six-monthly Construction Monitoring Reports, we also request that a report outlining the complaints being received and the actions taken as a result be provided.	Martinus will provide a report summarising the complaints received and the actions taken as a result.	Section 9.5

2 OBJECTIVES AND TARGETS

This NVMP provides the basis for the management of construction noise and vibration in order to minimise the risk of impact during works. The objectives and targets of noise and vibration management and mitigation targets are presented in Table 1.

Table 2: Noise and vibration objectives and targets

Objective	Target
Minimise unreasonable noise and vibration impacts on residents and businesses	Mitigation and management measures adopted in accordance with Section 8. Aim is to achieve Noise and Vibration Management Levels where feasible and reasonable, and apply Additional Mitigation Measures for residual excess noise in accordance with Section 8.12
Avoid structural damage to buildings or heritage items as a result of construction vibration	Predicted and/or measured vibration levels from construction activities all meet agreed vibration criteria (refer Section 6.7)
Undertake active community consultation	Community consultation and management provided in accordance with the Sydney Metro Overarching Community Consultation Strategy (OCCS) and with notification provided in accordance with Section 8 and the Additional Mitigation Measures Matrix (Section 8.12)
Maintain positive, cooperative relationships with schools, childcare centres, local residents and building owners.	Community consultation and management provided in accordance with the Sydney Metro Community Consultation Strategy (CCS) and in accordance with Section 8.5

These objectives conform to Sydney Metro objectives as described in the Construction Environmental Management Framework.

3 ENVIRONMENTAL REQUIREMENTS

This NVMP addresses applicable requirements within the following documents:

- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Conditions of Approval SSI-8256*, determined 12 December 2018;
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement,* September 2017;
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report*, June 2018;
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Bankstown Modification Report,* May 2020;
- The Sydney Metro *Sydenham to Bankstown Staging Report* (2020);
- Sydney Metro *Construction Environmental Management Framework v3.2* (2017); and
- Sydney Trains Environment Protection Licence 12208.

3.1 Legislation, Standards, Policies and Guidelines

Martinus ensures compliance with all relevant legislation and aims to employ best practice environmental management procedures for the construction of the Project. Table 3 below details the legislation and planning instruments considered during development of this Plan.

Table 3: Relevant legislation, standards, policies and guidelines

Type	Items
Legislation and regulations	• Environmental Planning and Assessment Act 1979 • Protection of the Environment Operations Act 1997 (POEO Act) • Protection of the Environment Operations (Noise Control) Regulation 2008
Standards	• British Standard BS6472-2008, Evaluation of human exposure to vibration in buildings (1-80Hz) • British Standard BS7385.2-1993, Evaluation and measurement of vibration in buildings • German Standard DIN4150-2016, Structural vibration Part 3: Effects of vibration on Structures • Australian Standard AS2436:2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites • Australian Standard AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors • Australian Standard AS/NZS ISO 3100:2009 Risk Management – Principals and Guidelines

Policies and guidelines	• Sydney Metro City & Southwest Construction Noise and Vibration Strategy (Sydney Metro CNVS, 2016) • Sydney Metro City and Southwest Out-of-Hours Works Strategy/Protocol (Sydney Metro OOHWP, 2019) • Interim Construction Noise Guideline (ICNG) (DECC 2009a) • Assessing Vibration: a technical guideline (DECC 2006) • NSW Road Noise Policy (RNP) (DECCW 2011) • Noise Policy for Industry (NSW EPA 2017). • NSW EPA Assessing Vibration – a Technical Guideline (AVTG, 2006 – for human exposure) • NSW EPA Approved methods for measurements and analysis of environmental noise (NSW EPA 2022)

3.2 Conditions of Approval

This NVMP has been developed to satisfy the requirements of CoAs C1 and C3. The CoAs and REMMs relevant to this NVMP are listed in Appendix A. In accordance with CoA C4, the relevant requirements of the CEMF have also been included. Appendix A also provides a cross reference to demonstrate where the CoA, REMM or CEMF requirement is addressed in this NVMP or other management documents.

In the Assessment Report for Sydney Metro City and Southwest – Sydenham to Bankstown Upgrade, the Department of Planning and Environment (DPE) considers that the EIS has adequately assessed noise and vibration issues and that they can generally be managed through the CoAs, REMMs and CEMF requirements in Appendix A. Therefore, no further assessment of noise and vibration impacts has been undertaken for this NVMP.

Martinus will adhere to conditions identified within environmental licences, permits and approvals and these requirements will be reflected in this NVMP.

3.3 Environmental Protection Licence

Due to the nature of the works, construction of the Project does not qualify as a scheduled activity. Therefore, Martinus is not required to obtain an EPL for the Construction of the Project.

In the case Martinus applies for an EPL for the Project, then this is administered by the EPA and may have different or additional noise and vibration management conditions to the CoAs. In this case, the Project's NVMP and relevant CNVISs will be updated to incorporate the requirements of the EPL.

For the Project's activities that are carried out as part of a rail possession of the Sydney Trains operational heavy rail network, the Sydney Trains EPL 12208 will apply. The works will be managed in accordance with the railway track maintenance clauses presented in the table in Appendix A.

3.4 Roles and Responsibilities

The roles and responsibilities for each of the nominated Project Team representatives with respect to noise and vibration management are as follows in Table 4.

Table 4: Roles and Responsibilities

Role	Responsibility
Project Director (Project Leader)	• Ensure that sufficient resources are allocated for the implementation of this NVMP; • Ensure all appropriate noise and vibration mitigation measures are implemented; • Authorise cessation of Construction activities on-site if exceedances are identified, in accordance with this NVMP; and • Authorise all monitoring reports and any revisions to this NVMP.
Site Foreman (Site Superintendent)	• Oversee the overall implementation of this NVMP; • Ensure all appropriate noise and vibration mitigation measures are implemented; • Ensure works occur within standard construction hours unless the appropriate out of hours works approval is in place; and • Manage deliveries to mitigate noise impacts.
Project Environmental Manager	• Oversee the implementation of this NVMP; • Consider and advise senior management on compliance obligations; • Ensure that the outcomes of compliance monitoring / incident reporting are systematically evaluated as part of ongoing management of construction activities; • Ensure all appropriate noise and vibration mitigation measures are implemented; • Where standard mitigation measures are deemed insufficient, undertake reasonable steps to manage adverse impacts and implement all additional measures; • Authorise cessation of Construction activities on-site if exceedances are identified, in accordance with this NVMP; and • Ensure Construction activity records/ monitoring records/incident reports are kept and maintained on-site.
Communication and Stakeholder Relations Manager	• Leadership and management of the Communications, Stakeholder and Community Relations Team; • Build and maintain effective working relationship with Sydney Metro's representative and Stakeholder and Community Liaison team; • Develops and oversees the implementation of the Contract Specific Community Communication Strategy and Sub-plans;

	• Responsible for a stakeholder and community relations induction and training program for all personnel involved in the performance of the Project; • Approves the Communications, Stakeholder and Community Relations team roles, role descriptions and responsibilities; • Ensures the Contract Specific Community Communications Strategy and key activities are integrated into the project schedule; • Attends the Sydney Metro led Communications Management Control Group and reports on activities, strategies and issues; • Attends the monthly Project Management Review Group meeting to discuss project status and issues; • Issues and crisis management; • Manages media issues and acts as media spokesperson for the Project (subject to media protocols); • Required to be on call 24 hours based on the team rotation; and • Liaise directly with the Independent Environment Representative as required and where appropriate to facilitate any environmental management requirements, including those identified within the Planning Approvals.
Community Place Manager	• Build and maintain effective working relationship with community, businesses, and stakeholders; • Support the successful delivery of the Contract Specific Community Communication's Strategy and requirements; • Implementation of the Contract Specific Community Communications Strategy and any relevant Sub-plans. • Establish effective working relationships with local stakeholder to support the effective delivery of the Project; • Required to be on call 24 hours based on the team rotation to respond to enquiries and complaints; • Review, approve and oversee the development and distribution of all notification, newsletter, social media, photography, and other communication material; and • Maintain the Consultation Manager database and generate reports as required.
Site personnel and Subcontractors	• Understand and implement mitigation as required in the NVMP and any additional required measures identified during Construction; and • Participate in (or conduct if authorised) relevant training to implement the requirements of this NVMP.

Martinus' Noise and Vibration Monitoring Personnel **(incl. Acoustic Consultants)**	• Responsible for carrying out noise and vibration monitoring to support the contractor and in accordance with the construction noise and vibration monitoring plan. Also responsible for updating the CNVIS as required; • Undertake relevant training where required, to implement this NVMP; • Ensure regular maintenance and calibration of monitoring equipment; and • Ensure all relevant monitoring quality/control assurance procedures are effectively implemented.
Independent Environmental Representative	• Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; • Consider and inform the Planning Secretary on matters specified in the terms of this approval; • Consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; • Review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); • Regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; • As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; • Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and • Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and

	decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI.

It is noted that the site team, including Martinus' Environmental Manager, Environmental Coordinator, Construction Manager and Site Foreman/Site Superintendent (roles outlined in Section 3.3 of the CEMP) will attend site inspections with the ER upon request.

The ER may request information relating to noise and vibration management from Martinus, the primary contact being the Environmental Manager.

4 EXISTING ENVIRONMENT AND SENSITIVE RECEIVERS

4.1 Existing Environment

The proposed Errant and Hostile Vehicle Mitigation Treatments are to be carried out along the Southwest Metro corridor. The Southwest corridor is located in predominantly suburban residential areas with mixed use near the stations, including commercial, residential, childcare and medical consulting rooms.

For residential receivers, construction noise targets are set relative to existing background noise levels in the local area. For other receiver types, noise and vibration targets are often set to recommended levels consistent with the guidance in the ICNG.

Nearby sensitive receivers have been divided into noise catchment areas (NCA). The defined NCAs are consistent with those defined in the EIS for the Sydney Metro City & Southwest Sydenham to Bankstown project.

Background noise monitoring locations from the EIS are summarised in Table 5. Note that the background noise monitoring results use to establish noise targets in NCA 01 and NCA 02 were reported incorrectly-within the SSI 8256 Environmental Impact Station (EIS). There were discrepancies between the values used for each NCA in different tables of the report, which led to uncertainty with which results were correct. Results from different monitoring locations, that did not have the discrepancies, were used. These new monitoring locations were equally as appropriate or better for representing each NCA. Detailed maps of each NCA can be found in Appendix B of this NVMP.

Table 5: Background noise monitoring

NCA	Reference Monitoring ID	Area	Day RBL 7am-6pm	Evening RBL 6pm-10pm	Night RBL 10pm-7am
NCA 01	B.02	Marrickville	38	38	33
NCA 02	B.03	Marrickville	38	38	33
NCA 03	B.06	Hurlstone Park	38	38	34
NCA 04	B.07	Hurlstone Park	40	40	35
NCA 05	B.09	Canterbury	36	36	32
NCA 06	B.10	Campsie	45	42	35
NCA 07	B.13	Belmore	41	41	35
NCA 08	B.14	Lakemba	47	47	41
NCA 09	B.16	Lakemba	44	44	36
NCA 10	B.19	Punchbowl	47	47	41
NCA 11	B.20	Bankstown	47	47	39
NCA 12	B.22	Bankstown	54	51	42
NCA 13	B.23	Bankstown	42	42	39

4.2 Sensitive Receivers

The Project has the potential to impact nearby receivers that may be sensitive to noise and vibration. The type of receivers that may be impacted by the Project are outlined below and in Appendix B.

- Commercial
- Educational
- Industrial
- Mixed residential/commercial
- Residential
- Place of Worship
- Medical facilities
- Other sensitive receivers such as Public Buildings

Detailed Land Use Survey maps were prepared in accordance with CoA E18 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 as a result of the Project, refer Appendix B.

Additional detailed land use surveys will be undertaken to confirm any changes in sensitive land user(s) as the construction program progresses. Any changes to the receiver types resulting from additional surveys will be included in Appendix B.

4.3 Heritage Properties

The Sydney Metro Construction Noise and Vibration Standard (CNVS) states that heritage buildings and structures should be assessed according to the cosmetic damage screening criteria and should not be assumed to be more sensitive to vibration unless found to be structurally unsound. The locations of heritage-listed buildings and the EIS assessment of vibration impacts are as follows:

- Marrickville Railway Station
- Dulwich Hill Railway Station
- Hurlstone Park Railway Station
- Canterbury Railway Station
- Campsie Railway Station
- Belmore Railway Station
- Lakemba Railway Station
- Wiley Park Railway Station
- Punchbowl Railway Station
- Bankstown Railway Station

The Project's Heritage Management Plan contains further information about the identified heritage items.

In accordance with REMM NVC4, where vibration screening levels are predicted to be exceeded at heritage items, condition assessments which consider the specific heritage values of the structure will be undertaken by Martinus in consultation with a heritage specialist.

5 ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS

5.1 Proposed Construction Works

The likely works scenarios, locations, plant, duration, and equipment sound power levels will be presented in the detailed works plan tables in the CNVIS (Section 7.2).

Construction works associated with the Project are expected to run from August 2024. As construction works will occur in the Sydney Trains operational rail corridor or station precincts, they will mostly take place during rail possessions overnight, on weekends, and in some cases over extended periods of more than one week.

The main plant and equipment expected to be used for construction include bobcats, compressors, concrete pumps, concrete trucks / agitators, diamond saws, excavators, franna crane, generators, hand tools, mobile cranes (50 tonnes), piling rigs (bored), rollers (non-vibratory), scissor lifts, semi-trailers, trucks, water tankers and welding equipment.

Indicative work site areas are shown in Appendix C.

Table 6: Proposed Construction Works

Activity	Details	Indicative Time Frame	Plant
Ancillary facilities - site establishment	Martinus does not intend on establishing any new Ancillary Facilities for EHVMT. In the event that a new ancillary facility is required to be established, this subplan would be revised.		
Ancillary facility - operation	Martinus will look to utilise existing Ancillary Facilities established throughout and adjacent to the southwest corridor. Provisions on using these facilities will be added in future revisions of this plan.	August 2024 – September 2025	Light Vehicles, Watercart, Streetsweeper, Franna crane , Delivery trucks, Handtool – powered, Excavator 21-25T with bucket
Anti-throw screens and anti-vehicle bollards installation	Martinus will be installing anti-throw screens and anti-vehicle bollards across all 15 bridges that	August 2024 – September 2025	Mobile crane 100 (to mobilise larger cranes) Mobile crane, EWP, Lighting tower, Vacuum Truck, Asphalt miller, Asphalt Paver, Kerb

	intersect the southwest corridor. (Reference to detailed design document to be provided once finalised).		machine, Road Saw, Line removing truck, Concrete Agitator, Concrete pump, Franna crane, Generator, Excavator 21-25T with bucket, Excavator 21-25T with rockhammer, Smooth drum roller , Backhoe, Delivery trucks, Handtool – powered, EWP
Safety improvements	Martinus will be installing anti-vehicle safety mitigation fencing along the southwest corridor from Sydenham to Bankstown. (Reference to detailed design document to be provided once finalised).	August 2024 – September 2025	Franna crane, EWP, Handtool – powered, Backhoe, Welding equipment

5.1.1 Potential Impacts

Refer to Appendix C of the CEMP for the risk assessment prepared for this Project.

When assessing and managing noise and vibration due to construction activities, the following general considerations apply:

- Airborne noise levels generated by the works, and how audible or intrusive they are at noise-sensitive receivers (both internal and external noise level may need to be assessed);
- Ground-borne or structure-borne noise, which is related to vibration energy being transferred through the ground and / or structures and being re-radiated as audible sound. Typically ground-borne noise is assessed inside buildings, while structure-borne noise may be a consideration inside buildings as well as externally (for example, if a structure radiates sound which is audible in the open environment, such as structure-radiated noise from a bridge or viaduct); and
- Ground borne or structural vibration, which is transmitted through the ground and / or structures. Humans can feel vibration at relatively low levels, and human comfort is an important consideration for the management of ground-borne vibration. At much higher levels, vibration can be associated with damage to structures, and even minor cosmetic damage such as development of cracks is to be avoided where possible. Other potentially vibration-sensitive items include highly vibration-sensitive equipment such as medical imaging equipment, or underground services such as buried pipes.

6 CONSTRUCTION NOISE AND VIBRATION OBJECTIVES

6.1 Construction Hours

The CoAs acknowledge the need to carry out works outside standard construction hours.

CoA E19 defines standard Sydenham to Bankstown hours of work as:

- Monday to Friday 7am to 6pm and Saturdays 8am to 6pm;

Exceptions for highly noise intensive work (refer Section 6.4) are in accordance with E24:

- 8am to 6pm Monday to Friday and 8am to 1pm Saturday.

In accordance with CoA E20, notwithstanding CoA E19 and E24, work may be undertaken outside the hours specified in the following circumstances:

- For the delivery of materials required by the NSW Police Force or other authority for safety reasons; or
- Where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or
- Where different construction hours are permitted or required under an EPL in force in respect of the Project; or
- Work approved under an Out of Hours Works Protocol for work not subject to an EPL as required by CoA E25; or
- Construction that causes $L_{Aeq(15minute)}$ noise levels:
    - No more than 5dB(A) above the rating background level at any residence in accordance with the ICNG, and
    - No more than the 'Noise affected' noise management levels specified in Table 3 of the ICNG at other sensitive land uses, and
    - Continuous or impulsive vibration values, measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.2 of AVTG, and
    - Intermittent vibration values measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.4 of AVTG.
- Where a negotiated agreement has been reached with a substantial majority of sensitive receivers who are within the vicinity of and may be potential affected by the particular Construction, and the NML and/or limit for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Planning Secretary at least one week before the commencement of activities.

In accordance with CoA E21, on becoming aware of the need for emergency work in accordance with Condition E20(b), Martinus must notify the ER and the EPA (if a EPL applies) of the need for that work. Martinus must use best endeavours to notify all noise and/or vibration affected sensitive receivers of the likely impact and duration of those works.

This Project does require evening and night work throughout the construction program, particularly to reduce impacts on the operational Sydney Trains railway along the Sydenham to Bankstown route. The Sydney Trains EPL 12208 applies to works carried out under a rail possession.

EPL12208 Condition O13.1 adopts the EPA ICNG standard work hours on Saturdays (8am to 1pm). Out of hours works applications must be prepared and approved for Saturday 1pm to 6pm work if carried out under EPL 12208 under a rail possession, but not if the work is carried out outside a rail possession and in accordance with CoA E19.

E19 states that works must not be undertaken on Sundays or Public Holidays, however this would not apply for weekend works or extended periods carried out under rail possessions when EPL 12208 would apply. The CoA E24 restriction on highly noise intensive work (as outlined in Section 6.4) does not apply to works under a possession although reasonable and feasible efforts are to be made to conduct highly noise-intensive works during less sensitive periods where possible.

Any works planned to occur outside standard work hours must be assessed and approved in advance in accordance with Sydney Metro's approved City and Southwest Out of Hours Works Strategy/Protocol.

For works conducted outside standard construction hours, the following time periods are considered in order of least noise-sensitive to most noise-sensitive for typical residential receivers:

- Saturday afternoon 1pm to 6pm – least noise-sensitive
- Sunday day 8am to 6pm
- Monday to Sunday evening 6pm to 10pm
- Monday to Sunday night before midnight 10pm to midnight
- Monday to Friday early morning "shoulder period" 6am to 7am
- Monday to Sunday night after midnight 10pm to 6am Monday to Friday, or 10pm to 8am Saturday and Sunday – most noise sensitive

These priorities are generally represented in the CoAs and EPL clauses which relate to restrictions on high impact works.

The break-down of noise-sensitive periods is a useful tool for planning out of hours works using Sydney Metro's City and Southwest Out of Hours Works Strategy/Protocol. Noise impacts can be effectively managed by determining the most practical sequence of events which can also limit noisier activities to less noise-sensitive times.

6.2 General Construction Noise and Vibration Criteria

The Sydney Metro CNVS is applied for deriving construction noise and vibration management levels for Sydney Metro projects.

The primary reference for managing noise and vibration from construction and maintenance is the ICNG. Where specific receiver types are not explicitly assigned an NML in the ICNG, Sydney Metro has derived NMLs with reference to Australian Standard *AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors* and Vibration Management Levels (VMLs) in accordance with relevant guidelines and standards. Refer to Section 3.1 for a list of guidelines and standards referenced in the CNVS.

6.3 Airborne Construction Noise

The three primary noise metrics used to describe construction noise emissions in the modelling and assessments are:

$L_{A1(1minute)}$ The typical 'maximum noise level for an event', used in the assessment of potential sleep disturbance during night-time periods. Alternatively, assessment may be conducted using the L_{Amax} or maximum noise level

$L_{Aeq(15minute)}$ The 'energy average noise level' evaluated over a 15-minute period. This parameter is used to assess the potential construction noise impacts.

$L_{Aeq(15/9hr)}$ The 'energy average noise level' evaluated over a 15-hour Day (7am to 10pm) or 9-hour Night (10pm to 7am) period. This parameter is used to assess the potential construction noise impacts from road traffic noise.

$L_{A90(11/4/9hr)}$ The 'background noise level' in the absence of construction activities. This parameter represents the average minimum noise level during the 11-hour 7am to 6pm daytime, 4-hour 6pm to 10pm evening and 9-hour 10pm to 7am night-time periods respectively. The $L_{Aeq(15minute)}$ construction noise management levels are based on the L_{A90} background noise levels.

The subscript 'A' indicates that the noise levels are filtered to approximate normal human hearing characteristics (A weighted).

6.3.1 Residential Receivers

Table 7 sets out the ICNG airborne NML for residential receivers and how they are to be applied. The noise management levels are based on the RBL in each relevant assessment period. RBL is the overall single-figure background noise level derived from measurements in each relevant assessment period (as defined in the EPA "Noise Policy for Industry" dated October 2017).

Sydney Metro recognises that there are periods during the night (10pm to 7am) when ambient noise is elevated, such as from traffic during the 10pm to midnight and 6am to 7am shoulder periods. Residents may be less sensitive to noise at these times due to the ambient noise providing more effective masking than during the quietest; midnight to 6am night-time period.

Noise management levels are external noise levels from construction activity and apply at the property boundary that is most exposed to construction noise. 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.

Table 7: How noise management levels at residences are derived (external)

Time of Day	Management Level $L_{Aeq(15minute)}$	How to Apply
Recommended standard hours: Monday to Friday 7.00 am to 6.00 pm Saturday 8.00 am to 1.00 pm	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent would apply all feasible and reasonable work practices to minimise noise.

Time of Day	Management Level $L_{Aeq(15minute)}$	How to Apply
No work on Sundays or public holidays	Highly noise affected 75 dB	The highly noise affected level represents the point above which there may be strong community reaction to noise. It is not considered a Noise Management Level, where respite would be considered.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent would apply all feasible and reasonable work practices to meet the noise affected level.

For residential receivers, the external NMLs can be revised as follows:

- Where a building has been constructed or modified to meet the Infrastructure SEPP, and it can be demonstrated or reasonably assumed that the windows are fixed or kept closed, a 20dB noise reduction may be considered. Therefore, the external NML be increased by 10dB. Sydney Metro and the ER must endorse the application of this revision prior to implementation.
- Higher levels of attenuation may be adopted, if agreed with Sydney Metro and the ER, if site inspections by a qualified acoustic consultant have determined that windows and facades of individual buildings provide a higher level of sound attenuation than 20dB and if it can be demonstrated or reasonably assumed that the windows are fixed or kept closed. In that case, the external NMLs can be increased by more than 10dB, depending on the acoustic consultant's receiver-specific building envelope attenuation advice.

Residential receivers may have been provided with property treatment, for example, as part of the NSW government roll out of aircraft, road noise or freight rail noise abatement programs, or due to pro-active construction noise management (including as a consequence of Condition E32 for this project). In these cases, the noise benefit achieved by the property treatment can be considered in the assessment of construction airborne noise impacts at these individual receivers. It is the Contractor's responsibility to determine if specific receivers have benefitted from property treatments. Sydney Metro must approve of any modifications to the external residential noise trigger levels for considering Additional Mitigation Measures (refer to Section 8.12).

Based on the background noise levels measured by SLR for the EIS, the applicable airborne NMLs are as presented in Table 8.

Table 8: Project specific residential NMLs

NCA	Day 7am-6pm		Evening 6pm-10pm		Night 10pm-7am	
	RBL dBA	NML dBA $L_{Aeq15min}$	RBL dBA	NML dBA $L_{Aeq15min}$	RBL dBA	NML dBA $L_{Aeq15min}$
NCA 01 – Marrickville **(10 Leofrene Avenue, Marrickville 2204)**	38	48	38	43	33	38

NCA	Day 7am-6pm		Evening 6pm-10pm		Night 10pm-7am	
	RBL dBA	NML dBA $L_{Aeq15min}$	RBL dBA	NML dBA $L_{Aeq15min}$	RBL dBA	NML dBA $L_{Aeq15min}$
NCA 02 – Marrickville (18 Randall Street, Marrickville 2204)	38	48	38	43	33	38
NCA 03 Hurlstone Park (3 Commons Street Hurlstone Park, Hurlstone Park Station)	38	48	38	43	34	39
NCA 04 – Hurlstone Park (9 Canberra Street, Hurlstone Park 2193)	40	50	40	45	35	40
NCA 05 – Canterbury (5 South Parade, Canterbury 2193)	36	46	36	41	32	37
NCA 06 – Campsie (34 North Parade, Campsie 2194)	45	55	42	47	35	40
NCA 07 – Belmore (10 Acacia Street, Belmore 2192)	41	51	41	46	35	40
NCA 08 – Lakemba (17 The Boulevarde, Lakemba 2195)	47	57	47	52	41	46
NCA 09 – Lakemba (66 Railway Parade, Lakemba 2195)	44	54	44	49	36	41
NCA 10 – Punchbowl (42 Urunga Parade, Punchbowl 2196)	47	57	47	52	41	46
NCA 11 – Bankstown	47	57	47	52	39	44

NCA	Day 7am-6pm		Evening 6pm-10pm		Night 10pm-7am	
	RBL dBA	NML dBA $L_{Aeq15min}$	RBL dBA	NML dBA $L_{Aeq15min}$	RBL dBA	NML dBA $L_{Aeq15min}$
(90 South Terrace, Bankstown 2200)						
NCA 12 – Bankstown (258 South Terrace, Bankstown 2200)	54	64	51	56	42	47
NCA 13 – Bankstown (17 Weigand Avenue, Bankstown 2200)	42	52	42	47	39	44

It is noted that the daytime and evening NML is less than, or similar to, the existing ambient noise level in many of the receiver locations near the station worksites. This is not unexpected, but it does mean that any noise monitoring method would need to consider whether the construction noise can be measured above the ambient noise.

6.3.2 Other Sensitive Receivers

Table 9 presents airborne NML for non-residential noise-sensitive land uses. The NML apply only when the property is being used, for example classrooms during school hours (including before- and after school activities). Internal noise levels are to be assessed at the centre of the occupied room. External noise levels are to be assessed at the most-affected point within 50 m of the area boundary.

Table 9: NMLs at non-residential sensitive land uses

Land Use	NML $L_{Aeq(15min)}$	Where NML applies	Referenced from:	Assumed facade loss (conservative)[1]	External equivalent NML - $L_{Aeq(15min)}$
Studio building (music recording studio)	25 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	45 dB(A)
Studio building (film or television studio)	30 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	50 dB(A)
Cinema space, theatre, auditorium	35 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	55 dB(A)

Land Use	NML $L_{Aeq(15min)}$	Where NML applies	Referenced from:	Assumed facade loss (conservative)[1]	External equivalent NML - $L_{Aeq(15min)}$
Hotel (Sleeping areas: Hotels near major roads)	40 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	60 dB(A)
Classrooms at schools and other educational institutions	45 dB(A)	Internal noise level	ICNG	10 dB(A)	55 dB(A)
Childcare centre (sleeping areas)	40 dB(A)	Internal noise level	AAAC - guideline for Child Care Centre Acoustic Assessment	10 dB(A)	50 dB(A)
Hospital wards and operating theatres	45 dB(A)	Internal noise level	ICNG	20 dB(A)	65 dB(A)
Places of worship	45 dB(A)	Internal noise level	ICNG	10 dB(A)	55 dB(A)
Library (reading areas)	45 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	65 dB(A)
Hotel (bars and lounges)	50 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	70 dB(A)
Community centres – Municipal Buildings	50 dB(A)	Internal noise level	AS2107 'maximum'	10 dB(A)	60 dB(A)
Restaurant, bar (Bars and lounges/ Restaurant)	50 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	70 dB(A)

Land Use	NML $L_{Aeq(15min)}$	Where NML applies	Referenced from:	Assumed facade loss (conservative)[1]	External equivalent NML - $L_{Aeq(15min)}$
Passive recreation (e.g. area used for reading, meditation)	60 dB(A)	External noise level	ICNG	-	60 dB(A)
Active recreation (e.g. sports fields)	65 dB(A)	External noise level	ICNG	-	65 dB(A)
Commercial premises (including offices and retail outlets)	70 dB(A)	External noise level	ICNG	-	70 dB(A)
Industrial premises	75 dB(A)	External noise level	ICNG	-	75 dB(A)
Notes: 1) These assumed façade losses are conservative and can be revised following site inspections by a qualified acoustic consultant.					

6.4 High Impact Noise

High impact noise can be defined in two ways in the context of Sydenham to Bankstown works.

The ICNG defines “highly noise affected” (HNA) levels as exceeding 75dB(A) at residential receivers during daytime hours. Where predicted noise levels exceed the HNA level, all reasonable and feasible mitigation measures are to be applied to the works, with expected impacts to be communicated with affect receivers, adhering to any proposed respite periods.

In practice, this already occurs as Sydney Metro aims to meet the lower NML where reasonable and feasible. Residual impacts that cannot be eliminated through engineering controls are managed through timing of works and application of Additional Mitigation Measures (refer Section 8.11).

REMM NVC10 requires high noise and vibration generating activities including ballast tamping may only be carried out in continuous blocks, not exceeding 3 hours each, with minimum respite periods of one hour between each block and these works. CoA E24 also imposes additional restrictions on the timing of “Highly Noise Intensive Works” when these works result in an exceedance of the applicable Noise Management Level at the same receiver.

There is no definition in the CoA SSI 8256 for “Highly Noise Intensive Works” mentioned in Condition E24. Sydney Metro has adopted the following definition for “Highly Noise Intensive Works”, based upon definitions within CoA issued by NSW Department of Planning, Housing and Infrastructure (DPHI) for other

SSI projects. For the purpose of this NVMP, Highly Noise Intensive Works are construction activities which are defined as annoying under the ICNG, these include:

- Use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work;
- Grinding metal, concrete or masonry;
- Rock drilling
- Line drilling;
- Vibratory rolling;
- Rail tamping and regulating;
- Bitumen milling or profiling;
- Jackhammering, rock hammering or rock breaking; and
- Impact piling.

For the Project works, the following plant and activities have therefore been identified as being potentially used and therefore subject to timing restrictions in accordance with CoA E24:

- Road or concrete / diamond saw;
- Jackhammer.

Restrictions on timing of highly noise intensive or high noise impact generating works are summarised in Table 10 below.

Table 10: Restrictions on highly noise intensive works

	Conditions apply if the predicted noise exceeds the NML[1]		
	CoA E24	**EPL 12208**	**REMM NVC6**
Precedence	Except as permitted by an EPL	During rail possessions, EPL12208 applies	CoA and EPL override REMM if they are more onerous
Timing – general restrictions	**Must** only be undertaken: (a) between the hours of 8:00 am to 6:00 pm Monday to Friday; (b) between the hours of 8:00 am to 1:00 pm Saturday	O13.2 The licensee may undertake maintenance activities outside of the hours specified in Condition O13.1: a) to provide safe and reliable train services or a safe working environment; […] c) for the delivery of oversized plant or structures that require special arrangements or authorisation to be lawfully transported along public roads.	Noise intensive plant would not be used during the night-time period (10pm to 7am) unless: • during a weekend rail possession or shut down • a requirement of a road authority, emergency services or Sydney Coordination Office requires works to be undertaken during this period. *Interpretation*: CoA E24 restrictions on Saturday and Sunday works must be

	Conditions apply if the predicted noise exceeds the NML[1]		
	CoA E24	**EPL 12208**	**REMM NVC6**
			observed, unless there is a weekend rail possession or shutdown, when EPL12208 applies.
Respite	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. For the purposes of this condition, 'continuous' includes any period during which there is less than a one (1) hour respite between ceasing and recommencing any of the work that are the subject of this condition. *Interpretation*: other works can take place during the 1-hour "respite" time.	No specific requirements.	
Assessment and Notification	Assessment and notification in accordance with Sydney Metro's CNVS and CCS.	O13.4 Where maintenance activities are undertaken, including outside of the hours specified in Condition O13.1, noise impacts must be managed in accordance with the recommendations in the Interim Construction Noise Guideline (DECCW, 2009), as updated from time to time. The licensee is required to: a) identify noise sensitive receivers that may be affected; b) identify hours of work for the proposed activities; c) identify noise impacts at noise sensitive receivers;	

	Conditions apply if the predicted noise exceeds the NML[1]		
	CoA E24	**EPL 12208**	**REMM NVC6**
		d) select and apply reasonable and feasible work practices to minimise noise impacts; and *Interpretation*: Assessment requirements are in line with the CNVS and this NVMP / CNVIS.	
Notification	Assessment and notification in accordance with Sydney Metro's CNVS and CCS.	O13.4 e) notify the identified noise sensitive receivers **at least 5 days prior** to the commencement of maintenance activities undertaken outside of the hours specified in Condition O13.1, except where the licensee first becomes aware of the need to undertake those maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the maintenance activities. *Interpretation*: Notification requirements similar to CNVS apart from timing – assume that 7 days' notice is required per the CNVS to be consistent with other Sydney Metro works.	
Note: 1) The applicable NML is the highly noise affected NML defined in Table 2 of the ICNG.			

6.5 Sleep Disturbance

At residential receivers, the ICNG and the RNP require an assessment of sleep disturbance for noise occurring at night (10pm to 7am). Sydney Metro's CNVS adopts the following approach for assessing sleep disturbance:

- External sleep disturbance screening level of L_{Amax} > RBL + 15 dB

- External sleep awakening level of 65 dB L_{Amax} (assuming open windows).

If the Sleep Disturbance screening level is not exceeded, then no further review of sleep disturbance is required. If the screening level is exceeded, then the L_{Amax} level is to be compared with the external equivalent Sleep Awakening Level (65dBL_{Amax}).

If the Sleep Awakening Level is exceeded, then sleep disturbance is to be reviewed in more detail. This may include consideration of whether windows are open or can be kept closed. If windows can be kept closed, then the External sleep awakening criterion is at least 75 dBL_{Amax} because it is based on an internal Sleep Awakening noise level of 55 dBL_{Amax} and a conservative building façade loss of 20 dB.

The aim of sleep disturbance assessments is to determine appropriate mitigation measures. Mitigation measures may involve the use of quieter equipment, relocating equipment, using screens, or changing the timing of the work to a less noise-sensitive time. Refer to Section 8.

6.6 Construction Traffic Noise

When trucks and other vehicles are operating within the boundaries of the various construction sites, road vehicle noise contributions are included in the overall predicted $L_{Aeq(15minute)}$ construction site noise emissions.

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. More detail is provided in the Sydney Metro CNVS.

In addition to the Sleep Disturbance criteria provided in Section 6.5, the RNP refers to Practice Note 3 of the Environment Noise Management Manual (ENMM) for specific impacts from road traffic. The ENMM recommends an evaluation of the number and distribution of night-time pass by events where:

- Construction-related truck event L_{Afmax} – General ambient $L_{Aeq(1hour)}$ > 15 dB, and
- Construction-related truck event L_{Afmax} > 65 dB L_{Amax} (assuming an open window).

The ICNG does not provide specific guidance in relation to acceptable noise levels associated with construction traffic. For assessment purposes, guidance is taken from the RNP, which suggests feasible and reasonable noise mitigation measures should be considered where:

- The road traffic noise levels are predicted to increase by more than 2 dB as a result of construction traffic, and
- The resultant road traffic noise level, including construction traffic, exceeds the following road traffic noise criteria in the RNP:
    - 60 dB $L_{Aeq(15hour)}$ day and 55 dB $L_{Aeq(9hour)}$ night for existing sub-arterial roads.
    - 55 dB $L_{Aeq(1hour)}$ day and 50 dB $L_{Aeq(1hour)}$ night for existing local roads.

In addition, night-time road traffic noise due to intermittent maximum noise events, such as truck passby events, should be assessed against the sleep assessment criteria summarised above.

6.7 Building Damage Vibration Goals

Most commonly specified 'safe' structural vibration limits are designed to minimise the risk of threshold or cosmetic surface cracks and are set well below the levels that have potential to cause damage to the main structure.

Sources of vibration that are considered include demolition, excavation, piling, ground treatments (e.g. compaction), construction equipment and road traffic.

Details about the derivation and application of Sydney Metro construction vibration criteria to protect structures are presented in the Sydney Metro CNVS.

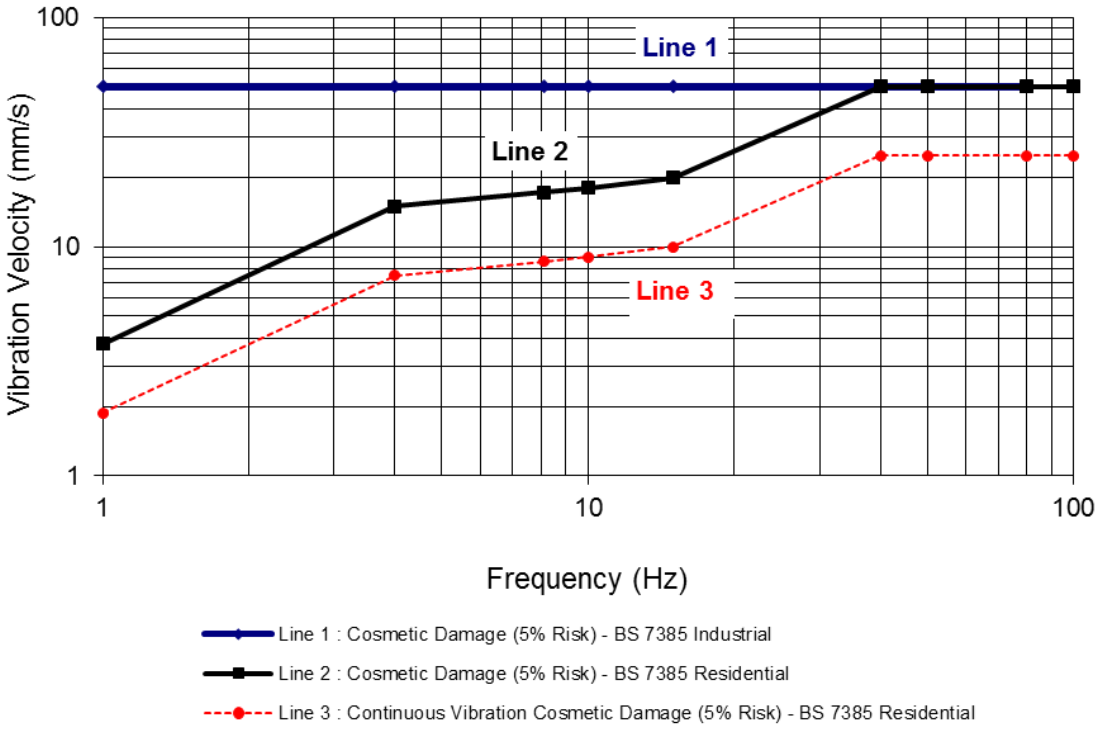
The British Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in Table 11 and graphically in Figure 1. These vibration goals are applicable to relevant structures, building elements or facades with the potential of being affected by vibration impacts.

Table 11: Transient vibration guide values – Minimal risk of cosmetic damage

Line	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Figure 1: Graph of Transient Vibration Guide Values for Cosmetic Damage



The Standard goes on to state that the vibration values given in Table 11 are less than half of vibration magnitudes at which minor damage is possible, and less than a quarter of the vibration magnitudes at which major damage to a building structure may occur.

It is noteworthy that extra to the guide values nominated in Table 11, the standard states that:

"Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK."

Also that:

"A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive."

The Standard states that the guide values in Table 11 relate predominantly to transient vibration which does not give rise to resonant responses in structures and low-rise buildings.

Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table 11 may need to be reduced by up to 50%.

Most construction activities involving intermittent vibration sources such as rock breakers, vibratory rollers, excavators and the like, produce predominant vibration energy at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range), and have the potential to cause dynamic loading in some structures (e.g. residences). On this basis, a conservative vibration damage screening level per receiver type adopts 50% of the values in Table 11 as listed below:

- Reinforced or framed structures: 25.0 mm/s ppv
- Unreinforced or light framed structures: 7.5 mm/s ppv
- Heritage structures (screening criterion): 2.5 mm/s ppv

As noted in BS 7385, heritage buildings and structures should not be assumed to be more sensitive to vibration, unless structurally unsound. A conservative vibration damage screening level (peak component particle velocity) for heritage buildings/structures can be set to 2.5 mm/s (the more stringent criterion in the German Standard DIN 4150-2016 Structural Vibration Part 3: Effects of Vibration on Structures). This screening level will allow potentially impacted heritage structures to be identified. If a heritage structure is predicted to be exposed to vibration levels above the conservative vibration screening level of 2.5mm/s, further investigation would be undertaken to determine whether the structure is structurally unsound. Where a heritage building/structure is deemed to be sensitive to vibration impacts (i.e. structurally unsound), the more stringent DIN 4150-2016 Group 3 guideline values can be applied. Otherwise, structural damage vibration limits based on BS 7385 can be applied.

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 vibration objectives.

6.8 Human Comfort Vibration Goals

For vibration, EPA Construction Noise Guideline refers to the EPA Vibration Guideline for assessment of human comfort.

The construction noise and vibration management levels adopted by Sydney Metro represent applicable standards and guidelines. It is important to acknowledge that individual receivers respond to noise and

vibration differently. During implementation phase, active community engagement plays a role in understanding individual perception and sensitivity.

The NSW EPA "Assessing Vibration: a technical guideline" dated February 2006 (AVTG) recommends the use of BS 6472-1992 for the purpose of assessing vibration in relation to human comfort.

Vibration dose values are considered appropriate for the assessment of non-continuous vibration sources associated with construction. The vibration dose value depends on both the level and duration of the short-duration vibration event, as well as the number of events occurring during the daytime or night-time period.

The levels highlighted in **bold** in Table 12 below are used in Sydney Metro projects as the Vibration Management Level.

Table 12: Vibration Dose Value (VDV) Ranges which might result in various probabilities of adverse comment within residential buildings, from BS6472-1992

Place and Time	Low Probability of Adverse Comment ($m/s^{1.75}$)	Adverse Comment Possible ($m/s^{1.75}$)	Adverse Comment Probable ($m/s^{1.75}$)
Residential buildings 16 hr day	0.2 to **0.4**	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 hr night	0.1 to **0.2**	0.2 to 0.4	0.4 to 0.8

Note: For offices / schools and workshops, multiplying factors of 2 and 4 respectively would be applied to the above vibration dose value ranges for a 16 hr day, ie 0.8 $m/s^{1.75}$ for offices, educational institutions and places of worship, and 1.6 $m/s^{1.75}$ for workshops.

To assess the potential for vibration impact on human comfort, an initial screening test will be done based on peak velocity units, as this metric is also used for the cosmetic building damage vibration assessment. This screening test is a conservative approach since it is based on the continuous vibration velocity criteria (i.e. vibration that continues uninterrupted for a defined assessment period) whilst construction works are mostly intermittent. The initial screening test for vibration disturbance to building occupants, based on the peak particle velocity (ppv, mm/s) are presented in Table 13. If the predicted vibration exceeds the initial screening test, the total estimated Vibration Dose Value (i.e. eVDV) will be determined based on the level and duration of the vibration event causing exceedance.

Table 13: Construction vibration disturbance to building occupants – initial screening test

Place and Time	Peak particle velocity (mm/s) – maximum
Residential buildings 16 hr day	0.56
Residential buildings 8 hr night	0.40
Offices, when in use	1.10
Workshops, when in use	2.20

6.9 Vibration Affecting Sensitive Equipment

Some scientific equipment (e.g. electron microscopes and microelectronics manufacturing equipment) can require more stringent objectives than those applicable to human comfort.

No facilities in the vicinity of the proposed station works have been identified as having vibration-sensitive medical or scientific equipment. The following information is provided for reference in case a receiver with vibration-sensitive equipment is identified in future.

Where it has been identified that vibration sensitive scientific and/or medical instruments are likely to be in use inside the premises of an identified vibration sensitive receiver, objectives for the satisfactory operation of the instrument would be sourced from manufacturer's data. Where manufacturer's data is not available, generic vibration criterion (VC) curves as published by the Society of Photo-Optical Instrumentation Engineers (Colin G. Gordon – 28 September 1999) may be adopted as vibration goals. These generic VC curves are presented in Sydney Metro's CNVS.

The generic VC curves are considered to be conservative. It is beneficial for the project to carry out baseline vibration measurements are carried out at the building where vibration-sensitive equipment is located. If the ambient vibration already exceeds the VC curves, without affecting the equipment operation, then the site-specific sensitive equipment vibration criteria may be reviewed. If the site-specific equipment criteria are reviewed, any changes (ie increased levels compared with VC curves) would need to be agreed with the occupant / users of the equipment.

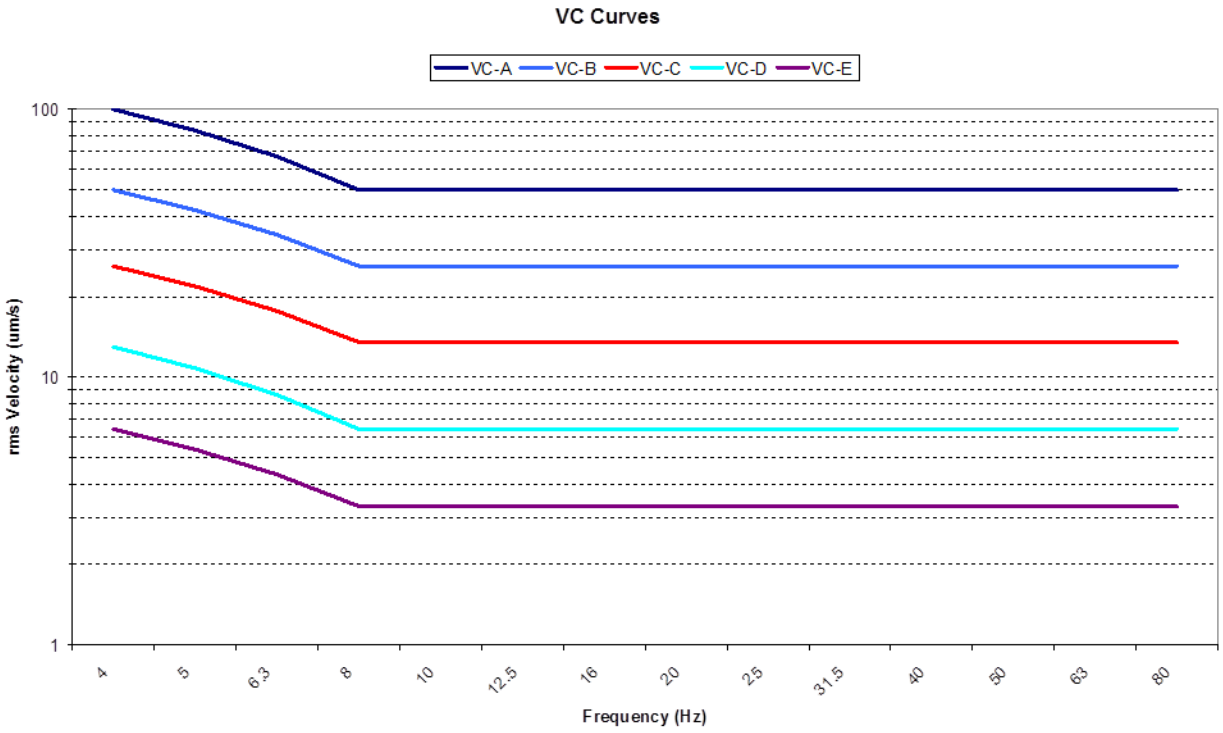
Table 14: Application and Interpretation of generic Vibration Criterion (VC) curves

Criterion Curve	Max Level (µm/sec, rms)[1]	Detail Size (microns)[2]	Description of Use
VC-A	50	8	Adequate in most instances for optical microscopes to 400X, microbalances, optical balances, proximity and projection aligners, etc.
VC-B	25	3	An appropriate standard for optical microscopes to 1000X, inspection and lithography equipment (including steppers) to 3 micron line widths.
VC-C	12.5	1	A good standard for most lithography and inspection equipment to 1 micron detail size.
VC-D	6	0.3	Suitable in most instances for the most demanding equipment including electron microscopes (TEMs and SEMs) and E-Beam systems, operating to the limits of their capability.
VC-E	3	0.1	A difficult criterion to achieve in most instances. Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems and other systems requiring extraordinary dynamic stability.

Note 1: As measured in one-third octave bands of frequency over the frequency range 8 to 100 Hz.

Note 2: The detail size refers to the line widths for microelectronics fabrication, the particle (cell) size for medical and pharmaceutical research, etc. The values given take into account the observation requirements of many items depend upon the detail size of the process.

Figure 2: Vibration Criterion (VC) Curves



6.10 Vibration Affecting Buried Utilities And Services

Where structures and utilities are encountered which may be considered to be particularly sensitive to vibration, a vibration goal which is more stringent than structural damage goals presented in Section 6.7 may need to be adopted.

Examples of such structures and utilities include:

- Tunnels
- Gas pipelines
- Fibre optic cables

Specific vibration goals would be determined on a case-by-case basis, as the construction of these structures and utilities vary considerably. An acoustic consultant would be engaged by the construction contractor and would liaise with the structure or utility's owner in order to determine acceptable vibration levels.

The British Standard BS 7385-2:1993 'Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration' notes that structures below ground are known to sustain higher levels of vibration and are very resistant to damage unless in very poor condition (British Standard BS 7385-2:1993, p5). Further guidance is taken from the German Standard DIN 4150: Part 3-1999.02

'Structural vibration in buildings – Effects on Structures'. Section 5.3 of DIN 4150: Part 3 sets out guideline values for vibration velocity to be used when evaluating the effects of vibration on buried pipework.

Table 15 presents the initial reference guideline for utilities and other buried pipework to evaluate the effects of short-term vibration impact, for this Sydney Metro NVMP.

If buried services are encountered for the proposed works, the Contractor must consult with the owner of the services to ensure that they agree with the vibration limit set for the works. An acoustic consultant and structural specialist may need to be involved in the consultation and review process.

Table 15: Transient vibration guide values for buried services – minimal risk of cosmetic damage (BS7385) – peak component particle velocity

Pipe material	Guideline values for vibration velocity measured on the pipe[1]
Steel (including welded pipes)	100 mm/s
Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80 mm/s
Masonry, plastic	50 mm/s
[1] Rockbreaking / hammering and sheet piling activities have the potential to cause dynamic loading in some structures and it may therefore be appropriate to reduce the transient values by 50%	

6.11 Ground-Borne Noise

The ICNG nominates ground-borne NML for residences during evening and night only. The internal noise levels are to be assessed at the centre of the most-affected habitable room. Under the ICNG, these ground borne noise management levels only require consideration of mitigation when ground-borne noise levels are higher than airborne noise levels.

Sydney Metro recognises that ground borne noise from some activities, for example by underground works such as tunnelling, can affect residential receivers during the day, and also other sensitive receivers. The following ground-borne noise levels incorporate the ICNG residential evening and night time noise management levels, and add other receiver types and times for Sydney Metro projects:

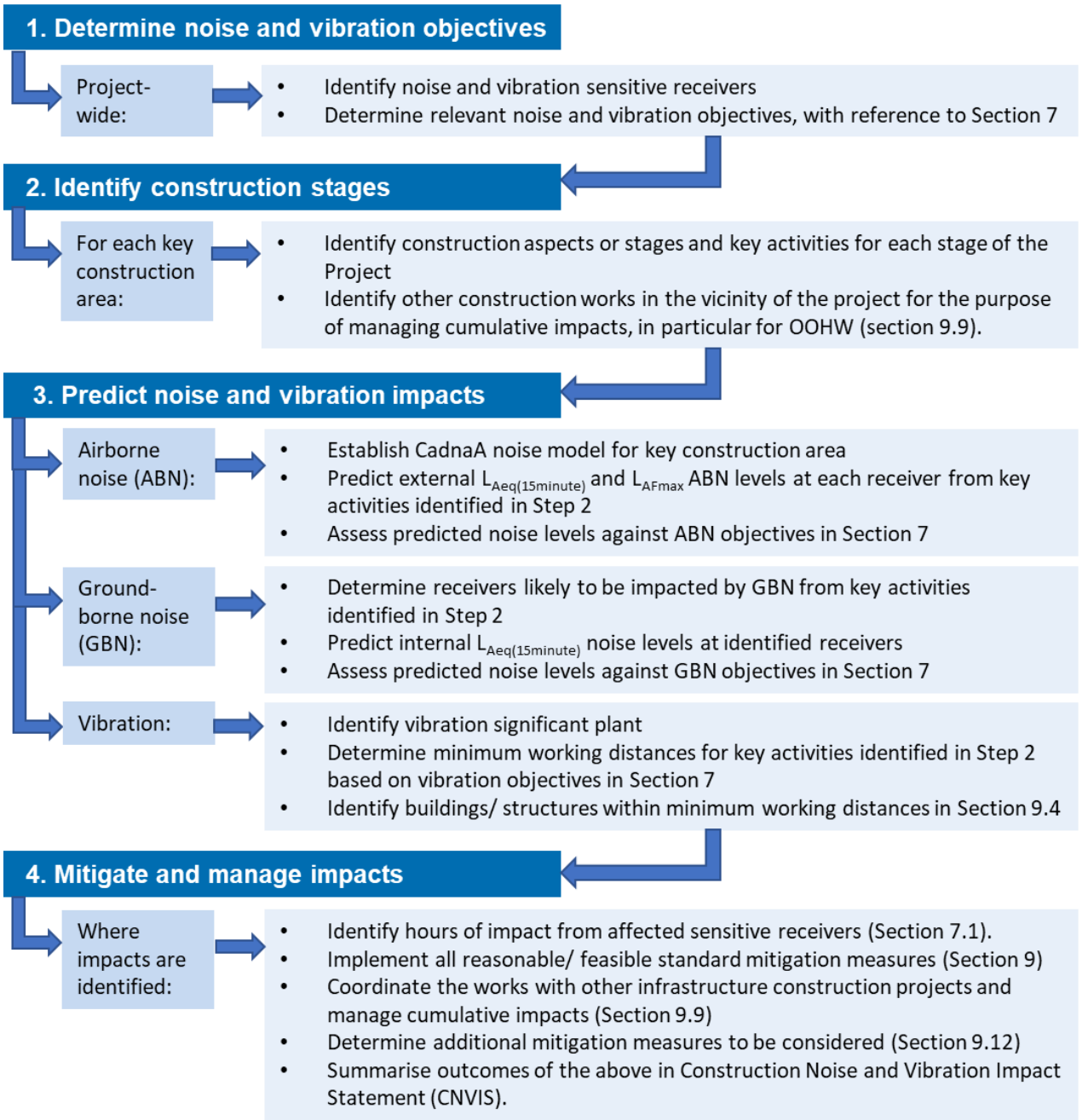
- Day (7.00 am to 6.00pm)
  Internal Residential: 45 dB LAeq(15minute)
  Internal Commercial: 50 dB LAeq(15minute)
- Evening (6.00 pm to 10.00pm)
  Internal Residential: 40 dB LAeq(15minute)
  Internal Commercial (if in use during Evening hours): 50 dB LAeq(15minute)
- Night-time (10.00 pm to 7.00 am)
  Internal Residential: 35 dB LAeq(15minute)
  Internal Commercial: typically not occupied, therefore not applicable

7 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

7.1 Method For Evaluation and Assessment of Impacts

The process of assessment of construction noise and vibration impacts is detailed in Figure 3. This process will form the basis of the assessments that will be prepared prior to construction works commencement. Where significant new/additional activities and/or significant changes to site layout or construction methodology are proposed, additional assessment as per this section will be undertaken. Site-specific or activity-specific noise assessments will be prepared to assess all construction activities and ancillary facilities for the Project.

Figure 3: Process for assessing and managing construction noise and vibration



7.2 Construction Noise and Vibration Impact Statements (CNVIS)

The Construction Noise and Vibration Impact Statements (CNVIS) will be a key site management tool providing clear instructions for managing each construction worksite. Each CNVIS will be prepared before any works that result in noise and vibration impacts commence at the relevant construction worksite. The CNVIS will be progressively prepared for the construction phase to identify noise and vibration impact predictions and applicable management measures. Any construction work identified in the CNVIS as exceeding the noise management levels and/ or vibration criteria established in Section 6 must be managed in accordance with this NVMP.

All CNVIS will be prepared by an appropriately qualified and experienced acoustic consultant.

Each CNVIS would set out the mitigation and management measures required for the construction stage, through consultation with affected sensitive receivers. They will address:

- Scope of work covered by CNVIS
- Justification for OOHW (where required)
- Nearest noise and vibration sensitive receivers, based on the land use survey
- Construction noise and vibration objectives
- Construction noise and vibration impact assessment
- Mitigation options and preferred management measures and
- Noise and vibration monitoring requirements.

Construction noise and vibration impacts associated with a construction worksite would be assessed by identifying the construction activities for each worksite and stage of the Project, including likely plant and equipment. Construction noise and vibration from the activities would be predicted and assessed against the noise and vibration criteria to identify the risk of impact. Where there is a risk of impact, all reasonable and feasible noise and vibration management measures would be recommended to reduce or manage the impacts as much as practicable.

Physical noise mitigation measures such as noise barriers and acoustic enclosures around fixed plant will be outlined in the CNVIS. Furthermore, specific management measures such as a staging of works, respite periods and community notification will also be summarised, and implemented.

The CNVIS will identify the sensitive receivers that Martinus is required to notify regarding upcoming works. This notification will include the likely noise and vibration impacts during the assessed works, the duration of impact and any additional mitigation (e.g. respite periods) that may be required to manage noise and vibration impacts.

Monitored noise and vibration levels will be verified against the predictions made in the relevant CNVIS. This will allow for ongoing review and where necessary, update of the predictive model and a feedback mechanism to construction planning will ensure ongoing noise and vibration risks are identified and managed appropriately.

A detailed CNVIS will be prepared under the NVMP including all construction works described in Section 5 of this NVMP and Section 1 of the CEMP.

7.3 Gatewave Noise And Vibration Management Tool

A 3D construction noise and vibration management tool (GATEWAVE, www.gatewave.com.au) has been developed specifically for the Project. This software will 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 to be assessed and managed in accordance with CoA E26.

GATEWAVE incorporates ground elevation contours, building heights, the built environment and atmospheric conditions to predict construction noise in accordance with the International Standard ISO 9613-2:2024 implementing quality standard ISO 17534-1:2015. All noise and vibration receivers identified by the land use survey are integrated into GATEWAVE where the land use will be maintained and kept up to date on a progressive basis.

The Project environment team would use GATEWAVE to manage construction noise and vibration impact by defining specific work areas/activities as construction progresses and identifying:

- Sensitive receivers where predicted noise levels are above the NMLs so that, where there are residual impacts even after all feasible and reasonable mitigation measures have been adopted, mitigation and management measures can be applied in accordance with this NVMP
- Buildings/structures within minimum working distances established for cosmetic damage and human annoyance so that appropriate mitigation and management measures can be applied in accordance with this NVMP.

Noise and vibration monitoring data would be collected throughout the delivery of the Project. This feedback loop would ensure the prediction tool is verified and adjusted as required to ensure accuracy across the Project.

GATEWAVE generates a noise and vibration assessment that will be used to support OOHW applications.

8 NOISE AND VIBRATION MANAGEMENT AND MITIGATION

8.1 Site Noise Mitigation Measures

This section sets out the standard or minimum construction noise and vibration mitigation measures to be implemented on all Sydney Metro projects.

The standard mitigation measures presented in Section 8 shall be applied by default in order to minimise the potential noise and vibration impacts at the surrounding Noise Sensitive Receivers. The aim is to meet the NML and VML where feasible and reasonable in accordance with CoA E29.

Construction hours would be in accordance with the Project's CoA and the EPL (refer Section 6.1).

Avoiding the coincidence of noisy plant working simultaneously close together and adjacent to sensitive receivers will result in reduced noise emissions. Note that clustering noisy plant can present opportunities for effective implementation noise screening, therefore this control needs to be considered on a case by case basis (refer Section 8.3).

Where feasible and reasonable, locate plant to maximise the offset distance and / or maximise screening between noisy plant items and nearby noise sensitive receivers.

Loading and unloading of materials/deliveries is to occur as far as possible from noise sensitive receivers. Provide shielding if close to noise-sensitive receivers.

Select site access points and roads as far as possible away from noise sensitive receivers. Ensure that construction-related road traffic adheres to applicable rules and requirements including speed limits and muffler performance. Staff using access gates are required to adhere to neighbour-friendly work practices such as quiet operation of gates and locks, and minimising idling.

Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.

In accordance with REMM NVC11, ongoing noise and / or vibration monitoring would be undertaken during construction at sensitive receivers during critical periods (ie times when noise emissions are expected to be at their highest) to identify and assist in managing high risk noise events (refer Section 9).

The following table outlines the management and mitigation measures that will be undertaken as far as practicable during construction to mitigate the potential impacts associated with noise and vibration.

Table 16: Noise and Vibration Management Measures

Management and Mitigation Measures	Responsibilities
Training will be provided to all Martinus contractors and subcontractors on noise and vibration management and mitigation measures through the project induction, Toolbox Talks, prestart meetings and targeted training as required. This will include approved working hours, locations of sensitive receptors, and Out of Hours Work (OOHW) approval process.	Project Manager Environment Team
Locate mobile and fixed plant (e.g., generators), and go lines as far as practicable away from the nearest potential receptors.	Supervisor
Consider alternative low noise/vibration construction methodologies where practical when working within close proximity to sensitive receivers.	Project Manager

Operation hours: Where possible and practicable noisy activities (e.g. use of mobile plant, saw cutting, hydraulic hammering) will align with standard work hours.	Supervisor
Any works outside of standard working house will be in accordance with Out of Hours Work Approval. If required, monitoring shall be undertaken to verify compliance with obligations and noise modelling (if applicable).	Environment Team
Where it is necessary for noise and vibration generating activities to occur outside standard daytime working hours, potentially impacted receptors will be notified at least once week in advance of the activities. The notification will include, the time, date and duration of the scheduled construction and maintenance activities, reasons for construction and maintenance activities being carried out, access routes for workers and equipment, nature of construction and maintenance activities being undertaken.	Project Manager
Noise and vibration monitoring will be undertaken to validate modelling and confirm work is within the allowable limits as required. Where noise monitoring identifies noise impact occurring at a sensitive receptor, additional mitigation measures such as screening, barriers, bunds, alternative machinery will be employed where necessary.	Environmental Team
Regularly service vehicles, plant and equipment such that noise emissions comply with manufacturer's specifications.	All Project Personnel
Plant and equipment will be switched off when not required. Machines that might have intermittent use will be shut down between work periods or will be throttled down to a minimum.	All Project Personnel
All machinery and plant will be used in accordance with manufacturer's specifications. Equipment will be sited away from noise sensitive areas.	All Project Personnel
Piling activities will be confined to general work hours where practicable. If piling is to occur on a Sunday or Public holiday, notification for out of hours work and approval will be required.	Project Manager Supervisor
Acoustic covers will be used on engines where available.	Supervisors

8.2 Source Noise Control Strategies

The following source noise control strategies are presented as examples of ways that selecting alternative methods and adapting plant can reduce noise at source:

- Engines and exhausts are typically the dominant noise sources on mobile plant such as cranes, graders, excavators, heavy vehicles, etc. Residential grade mufflers are to be fitted on all mobile plant used on Sydney Metro construction projects.
- The noise levels of plant and equipment items are to be considered in Martinus' procurement and rental decisions and in any case cannot be used on site unless compliant with the criteria.

- Regular inspection and maintenance of all plant and machinery used for the Project by Martinus, will assist in minimising noise emissions, including the reporting of the results.
- Regular compliance checks on the noise emissions of all plant and machinery used for the Project would indicate whether noise emissions from plant items were higher than predicted. This also identifies defective silencing equipment on the items of plant.
- Martinus will also ensure that air brake silencers are correctly installed and fully operational for any heavy vehicle that approaches and uses any of the Project's construction or compound sites.
- Non-tonal reversing alarms will be used for all mobile plant operating on the Project. Consideration will be given to fitting non-tonal vertical movement alarms for plant such as cherry pickers. It is noted that OH&S requirements must also be fully satisfied.
- Martinus will minimise the use of high noise generating equipment such as diamond or concrete saws and hydraulic breaker / tamping, and limit to less sensitive times (refer also Section 6.4).
- Martinus will use bored piling methods where feasible, instead of impact or driven piling methods. Implement low noise methods for removing spoil from the auger, use of spoil removal accessories, or rotating the auger in one direction only to avoid the impact noise due to back-and-forth rotation (if spoil type is suited to this method of removal).
- Martinus will use electric pumps instead of diaphragm air pumps.
- Martinus will use electric equipment instead of diesel such as electric chainsaws and generators where possible.
- Martinus will use "silent" lighting towers and generators where feasible to minimise continuous noise.
- Martinus will use pulverisers instead of conventional concrete breaking methods for demolition where possible
- Delivery vehicles are to be fitted with straps rather than chains for unloading, wherever feasible and reasonable.
- Tray-back utility vehicles are to have resilient mat or carpet to minimise impact noise.

8.3 Noise Barrier Control Strategies

Temporary noise barriers are recommended between the noise sources and nearby potentially affected noise sensitive receivers, wherever feasible. Typically, 5 dB to 10 dB attenuation can be achieved with a well-constructed solid ply hoarding or mass-loaded vinyl noise curtain such as Echobarrier, Flexshield Sonic Quilt or Acoustica AcoustiFlex SQ products.

Stationary noise sources such as generators will be enclosed or shielded where practicable.

Localised noisy activities such as concrete saws and jackhammers will be used inside temporary noise screens, whilst ensuring that the occupational health and safety of workers is maintained. Note that it may be preferable in some cases to carry out the noisy activities more quickly, without erecting temporary noise curtains, to avoid the activity extending into more noise-sensitive evening or night-time periods. The use of noise curtains for high noise activities will be considered on a case-by-case basis to ensure that the Project requirements for limiting the timing of such works are met (refer to Section 6.4).

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 situating plant.

Solid hoarding for the services building worksites have been considered in accordance with CoA A21. This is unlikely to be necessary as the temporary site buildings themselves provide shielding for adjacent receivers.

Acoustic enclosures or sheds are not considered to be a reasonable option for the Project works. However temporary structures can be considered for equipment used regularly on site, such as pumps and generators.

CoA E32 requires that early implementation of any operational noise mitigation measures which can be installed during construction phase. As there are no potential locations of operational noise mitigation measures near the Project's worksites, E32 is not relevant to the works covered by this NVMP.

8.4 Vibration Control Strategies

Vibration-minimising methods are to be selected where feasible and reasonable.

Martinus will select the plant and equipment which generates the lowest vibration levels while still being capable of effectively carrying out the work. In some cases this may require longer durations which may be a necessary outcome of ensuring that no damage occurs due to the works.

Examples relevant to the Project's works are:

- Smooth drum roller preferred, or else pad foot roller, instead of vibratory roller
- Diamond / concrete saw to cut surface to remove in pieces, instead of jackhammer

The pattern of vibration radiation is very different to the pattern of airborne noise radiation and is very site specific. 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.

Recommended minimum working distances presented in the following sections provide a conservative screening method for indicating buildings and structures where there is a risk of vibration impact. Vibration monitoring would be carried out to confirm the minimum working distances at specific sites, where vibration significant plant is required to operate within or near the recommended minimum working distances.

8.4.1 Human Exposure Minimum Working Distances

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 construction works, nearby receivers may be able to feel vibration when vibration-generating equipment is being utilised. For this reason it is appropriate to identify properties where there is a probability of adverse comment so that impacts can be managed.

Recommended minimum working distances for typical vibration intensive construction equipment for human comfort (response) are shown in Table 17. These recommended distances relate to continuous vibration and are presented as a guide only. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels occurring over shorter time periods are allowed (see Section 6.8).

Table 17: Recommended minimum working distances (m) – human comfort (response)

Vibration significant plant item	Critical area	Residence (Day)	Residence (Night)	Office	Workshop
Concrete saw	15	10	10	5	5
Excavator (tracked) ≤ 5t + hydraulic hammer	25	20	20	15	10
Excavator (tracked) ≤ 15t + hydraulic hammer	30	20	25	15	10
Excavator (tracked) ≤ 35t + hydraulic hammer	40	25	30	20	15
Percussive drill (small)	20	10	15	5	5
Piling rig – bored (rock)	20	15	15	10	10
Piling rig – bored (soft ground)	10	10	10	5	5
Piling rig - vibratory driven	305	170	225	100	55
Pneumatic hammer (jackhammer)	25	15	20	10	5
Terrain leveller	30	15	20	5	5
Vibratory roller (11t) padfoot - High vibration	120	70	90	40	25
Vibratory roller (11t) padfoot - Low vibration	110	60	80	35	20

Vibratory roller (13t) smooth drum - High vibration	105	55	75	30	15
Vibratory roller (13t) smooth drum - Low vibration	75	40	55	20	10
Wacker packer	20	10	15	5	5

8.4.2 Buildings And Structures Minimum Working Distance

Recommended minimum working distances to reduce the risk of cosmetic damage to buildings or structures from typical vibration intensive construction equipment are presented in Table 18. These are aimed at reducing the risk of cosmetic damage (as per BS 7385:1993 and DIN 4150-3:2016) and are based on the vibration screening criteria set in Section 6.7.

Unlike noise, vibration cannot be readily predicted. The minimum working distances below are indicative and will vary depending on the plant item, building types and foundations and local geotechnical conditions. Vibration monitoring would be carried out to confirm the site-specific minimum working distances for this Project.

Table 18: Recommended minimum working distances (m) – cosmetic damage

Vibration significant plant item	Reinforced or frame structures (BS7385)[2]	Unreinforced or light framed structures (BS7385)[2]	Structurally unsound heritage structures (DIN 4150-3)[3]
Concrete/ road saw	5	5	5
Excavator (tracked) ≤ 15t + hydraulic hammer	5	5	10
Excavator (tracked) ≤ 35t + hydraulic hammer	5	10	10
Excavator (tracked) ≤ 50t + hydraulic hammer	5	10	20
Drill Rig	5	5	10
Pneumatic hammer (jackhammer)	5	5	5
Piling rig – bored (rock)	5	5	5
Piling rig – bored (soft ground)	5	5	5

Piling rig - impact hammer (high)	15	30	65
Piling rig - impact hammer (typical)	10	15	35
Piling rig - vibratory driven	10	20	50
Terrain leveller	5	5	5
Vibratory roller ≤ 25t padfoot	5	10	20
Vibratory roller ≤ 13t smooth drum - High vibration	5	5	15
Vibratory roller ≤ 13t smooth drum - Low vibration	5	5	10
Wacker packer	5	5	5

Notes:

1. Minimum working distances are in 5m increments only to account for the intrinsic uncertainty of this screening method

2. Minimum working distance based on vibration screening criterion which reduced the cosmetic damage levels set by BS7385 by 50% due to potential dynamic magnification.

3. A building condition inspection should determine whether a heritage item is structurally unsound.

8.4.3 Vibration Monitoring Procedures

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. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific minimum working distances for that vibration generating activity.

REMMS NVC3 and NVC4 require a more detailed assessment of structures located within the site-specific Minimum Working Distances presented in Section 8.4.2. The purpose of the more detailed assessment is to determine the appropriate vibration limits for the potentially affected structure, and to identify sensitive heritage fabric in any heritage-listed structure.

For vibration measurements to monitor risks of damage to structures, in accordance with the CNVS Appendix, the transducer mounting plates would be installed at the base of the building or structure, at the location closest to the construction works. The monitoring locations would be on a stiff part of the building or structure (at the foundations) on the side of the structure adjacent to the subject construction works.

- If the vibration-generating works are to be conducted inside the minimum working distances, first establish whether an alternative method can be used to reduce vibration. For example, reducing the size of a vibratory roller will typically reduce the impact zone.

- If the final works method is still within the applicable minimum working distance, carry out attended vibration monitoring at the commencement of vibration-generating works to establish the local site law for vibration propagation, and to re-assess whether levels are expected to exceed applicable vibration criteria. Start the vibration-generating works at as large a distance as possible from the sensitive structure, and move closer with caution while taking attended vibration measurements.
- If the attended noise monitoring determines that vibration levels may exceed the site screening level, install a vibration logger which is capable of sending automated SMS messages to the Site Manager when Alert levels are exceeded. The monitoring is to be carried out with appropriate equipment so as to provide results that are readily comparable to the preliminary survey and relevant criteria (i.e. PPV).
- If the Alert level is exceeded, the Site Manager is to monitor the works and vibration levels to ensure that the Alarm level is not exceeded. An exceedance of the "Amber alert" (i.e. 70% of the vibration criteria) will not require the excavation activities to cease, but rather alert the Construction Manager to proceed with caution at a reduced force or load.
- If the "Red alert" (i.e. 100% of the vibration criteria) is approached or exceeded, the Site Manager is to stop all nearby construction works immediately and reassess methods. Examples of measures to manage vibration on site include using smaller hammer attachments on excavators, or using concrete saws to introduce a structural disconnection and thereby reduce vibration transmission.
- If the "Red alert" is exceeded, the frequency content of the measured vibration and peak component particle velocity (pcpv) levels will be assessed by a suitably qualified specialist and compared against the applicable Standards to determine whether the vibration levels comply with the Standard (based on the frequency content of the vibration signal). A suitably qualified specialist must endorse the conclusions of such an investigation.
- If the "Red alert" is exceeded, once works are approved to continue, attended structural damage vibration monitoring must be carried out by a suitably qualified specialist. This monitoring would provide direct feedback to the operators and appropriate modification of construction techniques.
- If the "Red alert" is exceeded, a condition survey is to be conducted of the structure or item, in consultation with the Structural and Acoustic Engineers (as required).

For vibration monitoring of construction works at structures/building, double-sided sticky tape (compliant with the requirements of ISO 5348-2021) will be used to temporarily attach the vibration monitor (if required) at locations specified by the acoustic engineer/consultant to capture the relevant working plant to verify if established working distances are adequate to avoid cosmetic damage to the structure/building.

8.5 Community Consultation and Management

The benefits of good and clear communications are often under-estimated. In practice it is one of the most important aspects of noise and vibration management.

Pro-active community engagement assists in:

- Building stakeholder support for, and understanding of, the Sydney Metro project;
- Understanding the community and supporting their objectives (be it residential, commercial, education, or other);
- Minimising, where possible, project impacts on stakeholders and the community; and

- Ensuring stakeholders and the community fully understand that activities to be undertaken by the contractors, their objectives, benefits, potential impacts and expected outcomes.

Sydney Metro's Overarching Communications Consultation Strategy (OCCS) describes the requirements for community engagement during various stages of the project. The OCCS includes time frames for responding to complaints, record-keeping, and provision of up-to-date and accurate information.

A Business Management Plan has also been prepared for the Project.

Requirements for community engagement includes, for example:

- Notification (including targeted letterbox drops, doorknocks and email) of any planned works that may disturb local residents and businesses (such as noisy activities, access changes and night work);
- Community signage to advise of work that may affect transport (such as road closures, changes to pedestrian routes and changes to bus stops);
- Community contact facilities including via the Sydney Metro website (sydneymetro.info), community email address and 24-hour toll-free community information line; and
- Regular updates to the Sydney Metro website (sydneymetro.info) including uploading notifications and providing community contact details; and
- Individual briefings as required by the CNVS as part of implementation of Additional Mitigation Measures by Place Managers (refer Section 8.12).

Martinus is responsible for providing the Place Manager with as much information as is required to effectively inform the community of upcoming works and potential impacts.

As Martinus develops works plans, the timing and duration and location of the works will be known in more detail. This important step of assessing impacts in finer detail enables Martinus to better understand what mitigation methods are available, review the works plans, and then update the residual impact predictions after application of mitigation.

Noise predictions, including CNVIS prepared in accordance with CoA E27 are to be as accurate as possible to assist project managers and contractors plan ahead to manage and mitigate the impacts of their activities, and this includes the provision of appropriate community measures.

The residual impact predictions are then provided to the Communications Manager or Place Manager to assist with their role in:

- Preparing works notices or information – such as a description of the works and what to expect, and timing plus location of the works;
- Applying management measures where predicted noise levels exceed trigger levels described in the Sydney Metro CNVS, to provide Specific Notification to affected individuals, and offer Respite, or Alternative Accommodation;
- Engaging with receivers as required to negotiate suitable respite periods, for example rest times in affected Child Care Centres;
- Informing the community of the times of planned high-noise works.

CoA E23 requires that the Proponent identify appropriate respite periods for out-of-hours work in consultation with the community at each affected location on a regular basis. This consultation must include provision of:

(a) A schedule of likely out-of-hours work for a period no less than two (2) months;
(b) The potential work / activities proposed and the location and duration of the work;

(c) The noise characteristics (such as hammering, perceptible vibration), and the likely noise levels of the work; and
(d) Likely mitigation and management measures to be applied, including the selection of lower-noise and –vibration equipment, use of screening or noise curtains, and timing of noisy works.

If Emergency works are required, Martinus must also "use best endeavours to notify all noise and / or vibration affected receivers of the likely impact and duration" of Emergency works in accordance with CoA E20.

A register of noise and vibration sensitive receivers is to be kept on site and in Sydney Metro's records. The register will include the following details for all known noise and vibration sensitive receivers within 300m of the worksite:

- Address of receiver
- Category or receiver (eg residential, child care, etc)
- Contact name and number if known

Records of consultation and agreements relating to respite periods will be retained by Martinus in the noise and vibration sensitive receiver register. In accordance with CoA E23, records of agreed respite periods, timing restrictions and alternate arrangements will be kept on file by Martinus and be provided to the Planning Secretary or the EPA, upon request.

It is noted that the sensitive times for non-residential receivers might not align with typical sensitive periods for residential receivers. In accordance with CoA E28, Martinus will carry out community consultation with community, religious or educational institutions to identify their noise sensitive periods, prior to works commencing which generate noise levels above the NMLs at these locations. Works which generate noise levels above the NMLs at these locations will not be programmed within sensitive periods, where feasible. Where it is not feasible to plan works outside noise-sensitive periods, Martinus will consult with the affected receiver(s) to determine if alternate arrangements can be made, at no cost to the affected institution.

Martinus is required to consider the impact of noise and vibration on the amenity of businesses in the preparation of the Business Management Plan. The Business Management Plan will consider the potential noise and vibration impacts on businesses, particularly for works during standard business hours, which typically align with the least noise-sensitive periods for residential receivers.

The Sydney Metro Place Manager is responsible for maintaining updated records of the local community and receiver type. If Martinus learns that a receiver is incorrectly or incompletely categorised, then they must inform the Sydney Metro Place Manager to follow up and update the receiver records. For example, if a receiver is categorised as "commercial" but is found to have a shop-top residence, then Sydney Metro will need to update the records to apply both "commercial" and "residential" to the same address.

Complaints and enquiries relating to noise and vibration management will be managed in accordance with the Sydney Metro Overarching Community Communication Strategy (OCCS) and Section 3.7 of the CEMP.

8.6 Standard Construction Hours and Out-Of-Hours Work

As explained in Section 6.1, CoA E19 defines Sydenham to Bankstown standard construction hours as 7am to 6pm Monday to Friday, and 8am to 6pm Saturday.

CoA E24 requires that "highly noise intensive works" (refer Section 6.4) are only carried out between 8am and 6pm Monday to Friday and 8am to 1pm Saturday, and with the provision of respite periods such that work must only be undertaken in continuous blocks not exceeding three hours each with a minimum

respite period of not less than one hour between each block. The only exception to this Condition is if "highly noise intensive works" are carried out under an EPL, i.e. during a rail possession when Sydney Trains' EPL 12208 applies (refer Section 6.4).

CoA E20 permits works outside the hours specified in E19, to allow for:

(a) Delivery of materials required by the NSW Police Force of other authority for safety reasons;
(b) Emergency requirements to avoid injury or loss of life, to avoid damage or loss of property or environmental harm;
(c) Where an EPL permits different hours of work (applicable when works are carried out under a rail possession);
(d) Where works has been approved under an Out-of-Hours Work Protocol (refer Appendix C for a copy of the approved Out-of-Hours Work Application to be used for obtaining approval for out-of-hours work);
(e) When applicable NMLs and VMLs are met; or
(f) Where a negotiated agreement has been reached with the substantial majority of nearby sensitive receivers – this condition is unlikely to be required for the Project's works, as the scheduled work periods including rail possessions (when EPL 12208 will apply) consider rail operations as well as community impacts, and are unlikely to be substantially modified due to Sydney Trains' requirements to maintain an operational railway.

24-hour, 7-days a week work is not expected for the Project's works. However, if such work were required it would be carried out under a longer term rail possession, when EPL 12208 would apply.

E22 notes that out of hours work may be required to avoid high safety risk to construction personnel or members of the public, or if the proponent has received advice in writing that:

- Carrying out the activities could result in a high risk to road network / utility operational performance or integrity – written advice from the relevant road authority or utility service operator;
- A road occupancy licence (ROL) is required and the ROL will not be issued for the activities during the standard Sydenham to Bankstown approved work hours – written advice from TfNSW Management Centre or other road authority; or
- A rail possession is required – advice from Sydney Trains or ARTC (in locations near the shared freight rail corridor).

Condition E22 states that the conditions listed above are either regulated by an EPL (for example, under Sydney Trains' EPL 12208 during a rail possession), or through Sydney Metro's Out-of-Hours Work Strategy/Protocol. E22 also states that other out-of-hours works can be undertaken with the approval of an EPL (such as EPL 12208 during a rail possession), or through Sydney Metro's Out-of-Hours Works Strategy/Protocol for work not subject to an EPL. Refer to Appendix A for a list of EPL 12208 Clauses that relate to construction noise and vibration for the Project.

Conditions E20, E22, E23 and E25 all refer to Sydney Metro's Out-of-Hours Work Strategy/Protocol.

E25 describes the requirements of the Protocol, including approvals processes. Sydney Metro has prepared a Chatswood to Bankstown document which addresses the requirements of the CNVS and the respective approval conditions for the Chatswood to Sydenham and Sydenham to Bankstown Sydney Metro projects. Both the Sydney Metro City and Southwest Out-of-Hours Work Strategy/Protocol and the approved OCCS describe Planning Secretary, EPA and community notification requirements for out-of-hours work, in accordance with E25.

The Out-of-Hours Work Application is a requirement of the Sydney Metro City and Southwest Out-of-Hours Work Strategy/Protocol. A copy of the OOHW Application is provided in Appendix C. This Application

includes both qualitative and quantitative construction noise and vibration assessment components, and allows Martinus to demonstrate how construction noise and vibration impacts are to be minimised for the proposed out-of-hours work. The mitigation methods include equipment selection and location, and timing of works.

The REMM NVC7 and NVC8 also consider timing of activities to provide respite periods for non-residential sensitive receivers, and management of construction-related traffic as follows:

- When working adjacent to schools, medical facilities and childcare centres, particularly noisy activities would be scheduled outside normal working hours, where feasible and reasonable.
- When working adjacent to churches and places of worship particularly noisy activities would be scheduled outside services, where feasible and reasonable.

This is in line with CoA E23, which requires consultation with affected communities. The specific requirements of E23 are described in Section 8.5.

REMM NVC5 also considers timing of construction-related traffic as follows:

- Where feasible and reasonable heavy vehicle movements would be limited to daytime hours.
- The implementation of procedures to maximise the night-time onsite spoil storage capacity where spoil is produced between the hours of 10.00 pm and 7.00 am.
- The arrival and departure times of construction-related vehicles is to be included in the out-of-hours works applications as part of the assessment of noise impacts from construction-related traffic.

8.7 Site Environment Induction and Training

In accordance with NVC2, all employees, contractors and subcontractors are to receive an environmental induction. The site induction would include the following as a minimum:

- All relevant project specific and standard noise and vibration mitigation measures;
- Relevant licence and approval conditions;
- Permissible hours of work;
- Site opening/closing times (including deliveries);
- Any limitations on high noise generating activities;
- Location of nearest sensitive receivers;
- Designated loading/unloading areas and procedures; and
- Environmental incident reporting and management procedures

A site plan is required to illustrate the location of sensitive receivers, parking and loading areas, and plant and equipment to be used around the site.

8.8 Neighbour Friendly Behaviour

All staff and workers associated with Sydney Metro projects must implement neighbour-friendly behaviour.

The site induction will include the following standard requirements for all staff working on Sydney Metro projects:

- No swearing or unnecessary shouting or use of loud stereos/radios;
- No dropping of materials from height, throwing of metal items and slamming of doors;
- No excessive revving of plant and vehicle engines;
- Power down plant when not in use;
- Switch off vehicles when stopped for more than 5 minutes or when parked, including near access gates;
- Controlled release of compressed air in heavy vehicles.

All community engagement would be in accordance with the Sydney Metro OCCS.

If staff are approached by members of the public, they are to engage with courtesy and respect, but direct all queries and complaints to the central Sydney Metro information and complaints website, email address or phone service (refer Section 8.5).

8.9 Cumulative Impacts Management

The term Cumulative Impacts relates to two or more projects occurring around the same time, affecting the same receivers.

In the context of Sydenham to Bankstown project, this occurs when there is an overlap in time and the works are conducted around the same time. This may result in an overall increase in noise levels when works are carried out close to one another, at the same time. It may also result in a lack of “quiet times” or respite periods, when two project packages carry out work in the same location over the same few months but on different days or nights.

Cumulative impacts may result in receivers requiring additional consideration of mitigation and management than if they had been exposed to a single package of work.

Where projects are expected to be carried out in the same area and within a similar time frame, clustering some construction activities may result in reduced durations of noise exposure and may also allow for effective implementation of mitigation of all the works (eg install noise curtains around the shared worksites).

When reviewing out-of-hours works applications for individual works activities, cumulative impact considerations for other projects or contractors working in the area focus on:

- Considering noise levels from concurrent works activities, to ensure that appropriate mitigation measures are considered and implemented; and
- Coordinating respite periods or “quiet times” to ensure that receivers experience quiet periods, free from noisy work (may be one or two hours per night, or three nights per week, for example).

Martinus will coordinate their works with other Sydney Metro contractors, as well as external parties such as local Councils, Roads and Maritime Services and Sydney Trains, Utilities services (refer Section 8.10), other infrastructure projects and urban renewal projects.

It is useful to understand other contractors’ respite requirements and where feasible adhere to the same respite periods. A common example is where one contractor’s EPL restricts concrete sawing to before midnight, while another has no timing restrictions on concrete saws.

If it is not feasible to adhere to the same restrictions, and if it is not a compliance issue, it may be necessary for the concrete sawing (in this example) to take place outside of the other contractors’ permitted hours.

In this case it would be essential to inform the local receivers of the planned works, and explain why the timing restrictions they may expect does not need to be observed by this particular contractor.

The Out-of-Hours Works Application includes a requirement to identify concurrent works in the area, and to demonstrate efforts to manage cumulative impacts.

It is Martinus' responsibility to determine concurrent works, or works just prior or just after the proposed activities. The purpose is to:

- Consider noise levels when works occur concurrently, as this may change the additional mitigation measures which are considered (refer Section 8.11 and 8.12);
- Identify other contractors' agreed hours of respite and make efforts to align the proposed works with the agreed respite hours, or negotiate for changed respite periods, or else provide robust justification for not being able to observe the same respite period;
- Ensure that Evenings / Nights of Respite have been provided by confirming that works are not planned immediately before or after the Project's planned works.

This coordination is also a requirement for CoA E26. Refer to Section 8.10 for provision of respite and coordination with other contractors.

It must be recognised that this Project takes place in the context of other Sydney Metro construction activities. For local receivers, the various works packages are likely to be perceived as one works package, being "Sydney Metro works". The duration of the Project's works may be relatively short for a large infrastructure project, but the total duration of Sydney Metro construction activities affect the same receivers for an extended period.

It is important to acknowledge that construction activities carried out over a period of more than a year, affecting the same receivers, is likely to become less tolerable.

For this reason, it is important to understand that the receivers may experience "construction fatigue". There is no definition for construction fatigue, or when it is likely to occur. As with all noise responses, there is likely to be a significant range among individuals. This may be due to individual noise or vibration sensitivity, and individual circumstances.

Even for seemingly straightforward, relatively low noise activities, all feasible and reasonable efforts to mitigate the noise must be made. For example noise screening around noise generators will be provided out-of-hours works, not because they are the dominant noise source, but because they are constant noise sources used over long periods.

8.10 Utility Coordination and Respite

Related to cumulative impacts and provision of aligned respite periods described in Section 8.9, CoA E26 states that:

> *Work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must:*
>
> *(a) reschedule Work to provide respite to impacted noise sensitive receivers so that the respite is achieved in accordance with **Condition E23**; or*
>
> *(b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and*
>
> *(c) provide documentary evidence to the **ER** in support of any decision made by the Proponent in relation to respite or mitigation.*

The Place Manager and Utility Coordination Manager will be able to assist in helping Martinus coordinate works with third parties and understand the various agreed Respite Periods and, where possible, negotiate respite periods which can be effectively implemented by all contractors working in the local area. It is the responsibility of Martinus to liaise directly with other Sydney Metro contractors to coordinate works and proposed respite periods.

Interface meetings are regularly facilitated by Sydney Metro to coordinate works including those carried out by local Councils.

If Respite Periods cannot be aligned between Contractors working in the same area, Martinus must be able to justify why the Project cannot observe the same Respite Periods as other Contractors. Justification may be related to limited access to the worksite for a rail possession, for example. All reasonable and feasible efforts will be made to observe the same respite periods as other works packages. Community information about planned works must provide information about which package of work cannot adhere to Respite Periods which are observed by other Contractors working in the area, and provide the reason(s) for not being able to align Respite Periods.

Documentary evidence of works coordination including copies of written correspondence and meeting minutes with relevant third parties will be retained by Martinus and be provided to the ER within one week - should this evidence be requested by the ER.

8.11 Additional Mitigation Measures

The implementation of the standard management measures, compliance with maximum sound power levels for plant and equipment, construction hour management and standard community engagement measures in this NVMP should significantly reduce the noise and vibration impacts on nearby sensitive receivers.

Nevertheless, due to the highly variable nature of construction activities and the likelihood of work outside the standard construction hours the Project, exceedances of the construction NML and VML are likely to occur, even after application of all feasible and reasonable mitigation.

Where there is a potential exceedance of the construction NML and VML a number of additional measures to mitigate such exceedances – primarily aimed at pro-active engagement with affected sensitive receivers – would be explored and have been included in this Strategy. The Additional Mitigation Measures (AMM) to be applied are outlined in Table 20.

Table 19: Additional Mitigation Measures

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. It is recommended that residential receivers who decline the offer of Alternative Accommodation should still have Respite Offers (such as movie tickets or dinner vouchers) made available to them, although this is not a strict requirement under the CNVS.	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 (door knocks) are used to inform neighbouring properties about the impacts of high noise activities and mitigation measures that will be implemented. Place Managers from the contractor would visit identified receivers 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. Respite offers may be in the form of movie tickets or dinner vouchers, to provide residents with opportunities to spend time away from their home during works exceeding the applicable level. Alternative respite offers to movie or dinner vouchers may be considered as the Place Manager is familiar with the local community.	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.	PC
Specific Notification	Specific notifications will be issued to affected properties 7 days before work starts and may include paper notifications letterbox dropped to affected properties or emailed to registered stakeholders. Phone calls and/or emails provide affected receivers with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc. This form of communication is used to support periodic notifications, or to advertise unscheduled works.	SN

8.12 Applying AMM

The Sydney Metro CNVS provides guidance on the application of AMM. In circumstances where - after application of the standard mitigation measures - the $L_{Aeq(15minute)}$ construction noise and vibration levels are still predicted to exceed the noise or vibration objectives, the relevant AMM matrix (see Table 20, Table 21 and

Table 22) is to be used to determine the AMM to be implemented. This requirement is supplemental to the basic requirements in the ICNG.

Using the relevant AMM matrix, the following steps need to be carried out to determine the additional mitigation measures to be implemented:

- Determine the duration (time period) when the work is to be undertaken.
- Determine the level of exceedance.
- From the relevant AMM matrix, identify the additional mitigation measures to be implemented (using the abbreviations which are expanded in Table 19).

Note that the AMM matrix considers residential impacts and noise sensitivity in terms of the standard construction hours defined in the ICNG, and this concept is to be applied to Sydenham to Bankstown works. As the CSSI CoAs permit Saturday 1-6pm work as “standard” for this project, this is not considered to be “out of hours” for the purpose of applying AMM. However, during works under a rail possession, in accordance with EPL12208 O13.1, Saturday 1-6pm is considered “out of hours”.

Table 20: AMM matrix – Airborne construction noise

Time Period		Mitigation Measures			
		Predicted LAeq(15minute) Noise Level Above Background (RBL) for residential receivers, or above NML for non-residential receivers / internal residential receiver locations			
		0 to 10 dB	10 to 20 dB	20 to 30 dB	> 30 dB
Standard	Mon-Fri (7.00 am - 6.00 pm) Sat (8.00 am - 6.00 pm CoA E19) Sat (8.00 am - 1.00 pm EPL) Sun/Pub Hol (Nil)	-	-	M, LB	M, LB
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm) Sat (6.00 pm - 10.00 pm CoA E19) Sat (1.00 pm - 10.00 pm EPL) Sun/Pub Hol (8.00 am - 6.00 pm)	-	LB	M, LB	M, IB, LB, RO,SN
OOHW 2	Mon-Fri (10.00 pm - 7.00 am) Sat (10.00 pm - 8.00 am) Sun/Pub Hol (6.00 pm - 7.00 am)	-	M, LB	M, IB, LB, RO, SN	AA, M, IB, LB, RO, SN

The AMM for airborne noise is based on external noise levels when applied to residential receivers. If the Contractor confirms that a residential receiver has been provided (either by the project, past projects or independently designed and built) with at-property treatments which allow windows to be fixed or kept closed, then the trigger level for AMM may be adjusted to account for reduced internal noise levels. Sydney Metro and the ER must be consulted to approve any adjustments to the external AMM airborne noise trigger level for residential receivers.

Table 21: AMM matrix – Ground borne construction noise

Time Period		Mitigation Measures		
		Predicted LAeq(15minute) Noise Level Exceedance above NML		
		0 to 10 dB	10 to 20 dB	> 20 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	LB	LB	M, LB, SN
	Sat (8.00 am - 6.00 pm CoA E19) Sat (8.00 am - 1.00 pm EPL)			
	Sun/Pub Hol (Nil)			
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm)	LB	M, LB, SN	M, IB, LB, RO, SN
	Sat (6.00 pm - 10.00 pm CoA E19) Sat (1.00 pm - 10.00 pm EPL)			
	Sun/Pub Hol (8.00 am - 6.00 pm)			
OOHW 2	Mon-Fri (10.00 pm - 7.00 am)	M, LB, SN	AA, M, IB, LB, RO, SN	AA, M, IB, LB, RO, SN
	Sat (10.00 pm - 8.00 am)			
	Sun/Pub Hol (6.00 pm - 7.00 am)			

Table 22: AMM matrix – Ground borne construction vibration

Time Period		Mitigation Measures
		Predicted Vibration Levels Exceed Maximum Levels (for human comfort), or the recommended limit (for vibration-sensitive equipment)
Standard	Mon-Fri (7.00 am - 6.00 pm)	M, LB, RP
	Sat (8.00 am - 6.00 pm CoA E19) Sat (8.00 am - 1.00 pm EPL)	
	Sun/Pub Hol (Nil)	
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm)	M, IB, LB, RO, SN
	Sat (6.00 pm - 10.00 pm CoA E19) Sat (1.00 pm - 10.00 pm EPL)	
	Sun/Pub Hol (8.00 am - 6.00 pm)	
OOHW 2	Mon-Fri (10.00 pm - 7.00 am)	AA, M, IB, LB, RO, SN
	Sat (10.00 pm - 8.00 am)	
	Sun/Pub Hol (6.00 pm - 7.00 am)	

Based on the predicted typical worst case noise levels and the review of minimum work distances for vibration-generating works, AMM are expected to be considered for the Project's works (refer to Table 20). The requirements for AMM will be refined as Martinus prepares more detailed OOHW Applications which delineate when noisy equipment is used, which engineering mitigation measures can be applied, and where and when noise screening is implemented.

8.13 Construction Traffic Noise Management

Construction-related activities can occur outside the defined worksite or premises. The most far-reaching aspect is construction-related transport - mostly trucks and large equipment arriving on site by road.

REMM NVC15 requires that "The routes for construction haulage vehicles and bus services associated with the Temporary Transport Strategy would be selected on the basis of compliance with the relevant road noise traffic criteria, where reasonable and feasible. Where compliance with the noise criteria is not possible, reasonable and feasible noise mitigation would be implemented."

Mitigation measures that will be implemented where feasible and reasonable include:

- Implementing and monitoring driver behaviour rules, such as smooth braking and accelerating, adhering to truck speed limits;
- Monitoring and enforcing vehicle compliance including ensuring that compliant mufflers are fitted;
- Engineering solutions such as high grade mufflers.
- Establishing truck routes which avoid noise-sensitive residential receivers as far as practicable. Truck routes would be determined and described Martinus's CTMP;
- Deliveries to site and removal of material from site is to be restricted to standard construction hours, unless otherwise approved. Access to the site will use the access points specified in Martinus' Construction Traffic Management Plan (CTMP). These will consist of existing Sydney Trains access gates and any new gates that need to be constructed to access the corridor.

9 CONSTRUCTION NOISE AND VIBRATION MONITORING PROGRAM

9.1 Baseline Data

Baseline noise data is available from the extensive noise surveys carried out by SLR for the EIS in late 2016. The data is still relevant for the Project.

Several NCAs have been split into two for the purpose of assessing the Project's works. This is possible without new noise measurements because SLR's EIS Technical Paper includes noise survey results from individual noise loggers along the alignment, some of which are near the Station worksites and more applicable to the proposed works covered by this NVMP and the associated CNVIS.

These SLR baseline noise survey results have been used to set the applicable NMLs for Day, Evening and Night-time works.

No additional baseline noise surveys are considered necessary for the Project at this stage.

9.2 Monitoring

In accordance with CoA C13, a noise and vibration monitoring program is to be carried out for the duration of Construction.

Noise or vibration monitoring is required:

- In response to noise or vibration complaints;
- If requested by Sydney Metro, the ER, DPHI or EPA;
- To augment baseline noise levels, if the noise environment at a receiver is considered to be different from the noise logger locations used for the EIS;
- To confirm baseline vibration levels currently experienced at heritage-listed structures and at any vibration-sensitive equipment;
- To verify predictions, particularly at the commencement of vibration-generating works;
- Where vibration levels are predicted to exceed the vibration screening level, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure, in accordance with REMM NVC12;
- As part of a plant noise audit;
- If predicted noise or vibration levels exceed the trigger levels requiring "M" (Monitoring) in accordance with the AMM matrices provided in Section 8.11.

Noise monitoring is required if the predicted airborne noise level is above the applicable AMM trigger level, which is set relative to the NML. Vibration monitoring is required if vibration-generating works are carried out within the Minimum Working Distances provided in Section 6.7.

Ground borne noise measurements are not required for the Project, as the review of ground borne noise indicates that it would not be audible above airborne noise and therefore does not require further assessment in accordance with the CNVS.

Attended noise or vibration monitoring during construction is necessary to:

- Observe the character of the existing noise or vibration sources;

- Note the local topography, built environment, and other man-made or natural features which may affect sound or vibration propagation (eg existing walls which may act as a noise barrier or sound-reflective surface, or structural breaks on site which reduce vibration propagation);
- Validate the noise or vibration logger data by comparing attended and unattended data, and also by comparing subjective experience of how audible or perceptible the noise and vibration is with the measured levels (particularly when the NML is lower than the prevailing ambient noise level, as noted in Section 6.3);
- Obtain spot measurements at more locations around the area to understand local noise variations and confirm that the noise or vibration logger data is representative of the most-affected receivers;
- Determine whether the noise levels from the works are within the predicted levels presented in the CNVIS;
- Meet the requirements of the CNVS AMM to consider monitoring when predicted levels exceed trigger levels defined in the CNVS (refer Section 8.12).

Generally, noise and vibration monitoring which is triggered by the CNVS AMM are to be carried out in a location representing the receiver. Martinus will be responsible for determining the most appropriate monitoring locations, based on the proposed Construction activities and any noise and vibration modelling or assessments carried out, in accordance with the CNVS. The measurements must include a method to derive or directly compare the measured levels with the applicable NML or VML, and the predicted noise levels.

For example, the applicable NML is in terms of $L_{Aeq(15min)}$ which applies outside a residence. The measurement may be carried out on the footpath outside the residence, and the measured level would ideally also be a 15-minute measurement but might need to be a shorter period to exclude other ambient noises such as passing buses. If any post-processing or analysis is required to compare with measurement with the applicable NML or VML, then the adjustment method is to be clearly described in the monitoring report. The raw measured data must be presented in all monitoring reports, and the post-processed data must also be presented if requested by Sydney Metro (or EPA or DPHI).

Unattended noise or vibration loggers are suitable for meeting the requirements of the CNVS AMM matrices, particularly if the noise- or vibration-intensive work is localised (for example, at the station platform). Unattended monitoring is useful for works which move to different parts of the worksite (for example, along the rail corridor). Loggers are less labour-intensive, however it is also important to note the value provided by attended monitoring due to the operator's ability to make observations about the audibility of the noise or perceptibility of the vibration, and the changing levels as s/he moves to different receiver locations.

Each Out-of-Hours Works Application must identify whether the proposed monitoring will be attended, unattended or both. The Application requires justification or explanation on the reasons for selecting attended or unattended monitoring, and locations of the proposed monitoring, to provide the Environmental Representative with sufficient information to be able to assess whether the proposed monitoring is suitable for the proposed works.

For monitoring of works around the Stations, CoA E30 requires that a heritage specialist be consulted when installing equipment used for vibration, movement and noise monitoring around heritage listed structures. Generally noise and vibration monitors do not affect the building fabric in any way. Noise and vibration loggers will be secured such that any chains do not damage the building, and so that they are unlikely to be knocked over and thereby damage surfaces. Note, the vibration transducer fixing method to the structure will need to be approved by a heritage consultant.

9.2.1 Plant Noise Auditing

The CNVS requires that plant noise auditing is conducted on a regular basis to ensure that they are operating as expected.

Plant noise auditing would preferably be carried out on site, in order to better assess how it operates in the field. Plant noise measurements carried out on site are often affected by other activities, and therefore it is most meaningful for attended measurements to measure event noise levels at a location near to the source. This is a valid method of validating the Sound Pressure Level (SPL) at 10m or the Sound Power Level (SWL) assumed in the CNVS and for the predictions presented in the CNVIS.

However, plant noise auditing can also be carried out in controlled conditions to compare the noise output with applicable standards, including the maximum allowable plant noise levels listed in the CNVS. Off-site plant noise auditing may be requested at any time by Sydney Metro, if inspections indicate that plant used on site is louder than expected.

9.2.2 Vibration Monitoring

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.

If any vibration-generating works take place within the Minimum Working Distances of buildings or structures (for both human comfort and building damage), this means that there is the potential for the VML to be exceeded. In these cases, further vibration site law investigations are to be undertaken to determine the site-specific minimum working distances for that vibration generating activity. This is in recognition of the fact that vibration propagation is highly variable and site-dependent.

Attended vibration monitoring of each specific item of vibration intensive plant is to be conducted before beginning construction works to establish a more accurate minimum working distance.

Generally, the Minimum Working Distances are considered to be conservative. If site conditions are atypical and the vibration levels are higher than expected, then the Minimum Working Distance is to be extended to reflect the site conditions. Sydney Metro is to be advised of any extended site-specific Minimum Working Distances.

Vibration monitoring will be carried out by a person with experience and / or qualifications in vibration and acoustics.

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 minimum-working distances. Where more than one building falls within the Minimum Working Distance, the continuous vibration monitoring shall be located at the building which is nearest to the works and which is accessible to the Contractor's acoustic consultant.

In order to assess the likelihood of cosmetic damage due to vibration, vibration measurements would be undertaken at the base of the building and the highest of the orthogonal vibration components (transverse, longitudinal and vertical directions) would be compared with the guidance curves presented in BS 7385. This is based on the assumption that the base of the building is most affected by construction-related vibration. Where other parts of the building are more affected than the base, for example if demolition is occurring at higher levels of a building which is structurally connected to an adjacent building, then the measurements and assessment need to apply at the most affected part of the receiver building.

CoA E30 requires that a heritage specialist be consulted when installing equipment used for vibration, movement and noise monitoring around heritage listed structures. Generally the method of affixing

sensors must meet the requirements outlined in ISO 5348-2021, and also meet the heritage requirements of being removable without leaving any permanent markings or damage to the building fabric.

Locations of proposed vibration monitoring, both attended and unattended, must be provided to Sydney Metro for review and consultation as required, at least one week prior to the vibration-generating works commencing. This information can be provided in Out-of-Hours Works Applications, or separately if the works are proposed to be carried out during Standard work hours.

9.2.3 Dilapidation or Condition Surveys

If construction activities have the potential to cause damage through vibration to nearby public utilities, structures, buildings and their contents, an Existing Condition Inspection of these items is required to be undertaken in accordance with AS 4349.1 "*Inspection of Buildings*".

A Condition Survey is required for any building or structure which is located within the recommended Minimum Working Distances (refer Section 8.4.2).

The Project REMMs specifically require:

- NVC3 – Where vibration levels are predicted to exceed the vibration screening level, a more detailed assessment of the structure would be carried out to determine the appropriate vibration limits for that structure; and
- NVC4 – For heritage items where vibration screening levels are predicted to be exceeded, the more detailed assessment would include condition assessment and specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.

Refer Section 8.4.2 for Minimum Working Distances used to assess whether the vibration screening level may be exceeded.

All stations require a Condition Survey. They are all heritage-listed buildings located within close proximity of vibration-generating works, and a requirement of the CNVS is that they are subject to a Condition Survey to determine whether or not they are structurally sound. Martinus is responsible for the Condition Survey, and for providing results of the survey to Sydney Metro for review.

Heritage-listed buildings are to be considered "structurally unsound" until a structural engineering survey is carried out and determines that it is "structurally sound". In the unlikely event that the structural engineering survey for a station determines that the building is to be considered "structurally unsound", the relevant criterion will be as stated in Section 6.7. Sydney Metro is to be advised if the station building or other railway structure is considered to be "structurally unsound", prior to any vibration-generating works commencing.

If any buildings outside the railway premises are located within the Minimum Working Distances of vibration-generating works, the potentially affected buildings also require a Condition survey. The Minimum Working Distances are based on the assumption that the buildings are structurally sound. Heritage-listed buildings within 30m of vibration-generating works require a Condition Survey prior to works commencing, even if they are outside the Minimum Working Distance.

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.

Martinus must maintain a register of all properties inspected and of any properties where owners refused the inspection offer. Evidence is required to demonstrate that three attempts have been made to contact

the property owner to offer a Condition Survey. If the property owner does not respond to requests for access to the property after three attempts by Sydney Metro contractors, then the offer for a Condition Survey is considered to be refused by the owner.

The findings of all dilapidation surveys conducted for each construction site would be compiled into a report by Martinus and provided to Sydney Metro. Follow-up Condition Inspections may be required at the completion of works.

The results of any Condition Surveys are to be documented in CNVIS updates, and a register is to be kept and managed by Martinus. The CNVIS and / or site register will be updated to document the vibration criteria which apply at each affected heritage building, to assist with management, monitoring and evidence in case of queries or complaints.

9.3 General Monitoring Requirements

CoA C13 requires that approved Construction Monitoring Programs must be implemented for the duration of the Construction, and for any longer period set out in the monitoring program or specified by the Planning Secretary (whichever is greater).

Because the proposed Project is a subset of the wider Sydney Metro Sydenham to Bankstown project, the Noise and Vibration Monitoring Program required for this Project will be carried out as required by the CNVS for these works only. Longer-duration construction noise and vibration monitoring is likely to be carried out by other contractors.

The monitoring requirements are described in detail in the CNVS. The CNVS describes technical requirements for the monitoring equipment, as well as the required content and measurement parameters to be reported. The measurement parameters must be aligned with, or comparable with, the applicable NMLs or VMLs.

If measurements are carried out at alternative locations to the receiver, such as at a publicly accessible location near the site boundary, then adjustments will be presented to be able to compare the measured levels with those predicted in the relevant CNVIS and the applicable NML or VML.

Martinus' acoustic consultant or environmental personnel must provide details of their proposed equipment, methodology and reporting format or template to Sydney Metro for review, prior to carrying out any surveys.

Sydney Metro's acoustic representatives may accompany Martinus' acoustic consultant or environmental personnel and carry out independent monitoring at any time as requested by Sydney Metro or DPHI.

As stated in the CNVS, all acoustic instrumentation used in the monitoring programme will be designed to comply with the requirements of AS IEC 61672.1:2004 Electroacoustics – Sound level meters – Specifications and carry current National Association of Testing Authorities (NATA) or manufacturer calibration certificates. The instrumentation must be installed, operated and maintained by suitably qualified or trained personnel. The instruments must be externally calibrated at regular intervals.

Airborne noise measurement metrics and metre settings are as follows:

- As a minimum, LAeq(15min/event) noise levels should be recorded, to allow direct comparison against NMLs. The measured level may need to be corrected to an equivalent distance to the receiver location in order to compare directly with the NML, which applies at the receiver.

- Attended measurements may also report LAeq(event) levels to provide useful information about particular activities, or to limit measurements to when construction noise events are clearly audible and measurable above extraneous ambient noise. This also allows direct comparison between measured levels for particular plant and activities against the assumed noise levels used in predictions. The measured levels may need to be corrected by distance to compare with data sheets (e.g. correct to a sound pressure level at 10m). This is a useful measurement to understand whether plant or activities are significantly louder than predicted, and therefore whether actions are required to check the plant.
- In addition, statistical measures may be measured and recorded, such as;
    - LAmax (maximum event level), can be compared against Sleep Disturbance or Sleep Awakening Levels. This needs to be measured at the receiver location, or corrected to an equivalent distance to the receiver location
    - LA10(15min) (highest 10% of noise). The construction LA10 is no longer used in NSW to assess construction noise, but it is a useful indicator of "typical noisiest" event levels.
    - LA90(15min) (lowest 10% of noise) should be measured in the absence of construction noise, to verify the background noise levels.
- These A-weighted airborne noise measurements are to be taken using the Fast response setting on the sound level meter or noise logger.

Vibration measurements shall be carried out in accordance with the CNVS Appendix, which describes requirements for construction vibration monitoring instrumentation used for the identification of structural and cosmetic damage. It should be noted that equipment specifications detailed in the Appendix of the CNVS may not be suitable for the measurement of all vibration impacts such as human comfort and or the measurement of vibration impacts to sensitive equipment. Prior to any measurement being conducted the contractor must ensure that the monitoring equipment being proposed is suitable for the type of measurement being conducted.

For Sydney Metro projects, vibration is to be measured using the Fast response setting. Vibration is generally measured using a vibration logger which records Peak Particle Velocity (PPV) levels which can be directly compared with the VMLs for vibration effects on structures.

Attended measurements may also be carried out and this is recommended if there are vibration-sensitive equipment such as medical imaging equipment, in order to measure r.m.s. vibration levels to directly compare with the applicable VMLs for sensitive equipment. If vibration monitoring is conducted for human comfort assessments, then it is typically accepted for PPV vibration loggers to be used as a screening measure, although the VMLs for human comfort are based on a Vibration Dose Value (VDV), rather than a continuous vibration level. It is not always practical to measure VDV during construction works, as the calculation relies upon duration, intensity and characteristic frequency of the measured vibration events throughout a workday. In some cases, it may be necessary to relate to an instantaneous measurement, such as Peak Particle Velocity (PPV). Appendix C of the AVTG provides guidance on relating measurements of continuous and impulsive vibration to PPV.

9.4 Frequency of Monitoring

Vibration monitoring is to be conducted whenever vibration-generating works take place within the site-specific Minimum Working Distance of sensitive receivers, as described in Section 8.4.

The Project Environmental Manager will consider implementing noise monitoring whenever the predicted works noise levels exceed the trigger levels listed in the AMM matrices (Section 8.11). If Martinus is of the opinion that noise monitoring is not required during out-of-hours works, then justification is to be provided in the OOHW Application or via email and that decision must be endorsed by the Environment Representative. Potential reasons for not carrying out noise monitoring may be that similar works with the same equipment had been carried out on a previous night and found to be compliant with applicable NMLs. In general, noise monitoring would be carried out as specified by the AMM matrices.

Noise or vibration monitoring may also be required:

- In response to noise or vibration complaints;
- To validate predicted noise levels associated with each works scenario assessed in the CNVIS;
- To confirm vibration "site-law" propagation at commencement of vibration-generating works, to confirm that the Minimum Working Distances are valid for the site;
- To monitor vibration for human comfort and structural effects as required by the CNVS (refer Section 8.12);
- If requested by an authorised officer of the EPA for works undertaken under EPL 12208 (i.e. under a rail possession);
- If requested by Sydney Metro, the ER, or DPHI for works undertaken in accordance with the CoAs.

Additional monitoring may be requested by Sydney Metro, DPHI or EPA at any time, for example in response to complaints or observations of unexpected sound or vibration generated at worksites during inspections. Additional monitoring may be carried out by Martinus, or by Sydney Metro's acoustic representatives.

9.5 Reporting

In accordance with C9(g), Martinus will submit noise and vibration monitoring reports to Sydney Metro and the Environment Representative for their review.

The requirements of the reports are described in Sections 9.2 to 9.3 of this NVMP and Sections 9.2 and 9.3 of the CNVS.

CoA C14 requires that the results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies including councils and the EPA, for information in the form of a Construction Monitoring Report.

The Construction Monitoring Report will encompass other environmental aspect reports, and would not be limited to noise and vibration monitoring. Martinus' Construction Monitoring Report would be submitted to Inner West Council, City of Canterbury-Bankstown Council, the Planning Secretary and EPA on a six-monthly basis.

The six-monthly Construction Monitoring Reports will include a summary of monitoring undertaken, an overview of the results, analysis of the results and comparison against the nominated noise and vibration management levels, and raw data from monitoring as well as summary of complaints received and actions taken as a result. Once Sydney Metro and the ER have reviewed the reports, the monitoring reports will be provided to DPHI, EPA, the City of Bankstown-Canterbury and Inner West Council.

Reporting associated with incidents, non-conformances and non-compliances are described in the CEMP Section 3.7.2 and 3.10.3. Other noise and vibration-related reporting requirements are as follows:

- Emergency works are to be reported to the Environment Representative and the EPA (if an EPL applies, ie for works under a rail possession), in accordance with CoA E21. The proponent / Contractor must also "use best endeavours to notify all noise and / or vibration affected receivers of the likely impact and duration" of Emergency works.
- E23 requires that the outcomes of the community consultation including the agreed appropriate respite periods and works scheduling must be provided to the EPA (for works carried out under Sydney Trains' EPL 12208 under a rail possession) and the Planning Secretary (for high risk activities after 9pm), upon request. The Environmental Representative will determine whether the noise and / or vibration impacts for any proposed out of hours works are considered to be "high risk" in accordance with Sydney Metro's approved Out of Hours Work Strategy/Protocol.
- For works carried out under a rail possession under EPL 12208, when requested by an authorised officer of the EPA, O13.6 requires that the Contractor must provide written reasons to demonstrate that works undertaken outside the standard hours specified in EPL 12208 O13.1 comply with the licence.
- For works carried out under a rail possession under EPL 12208, when requested by an authorised officer of the EPA, the Contractor must provide information as described in O13.5 to describe any proposed out-of-hours works, including a contact name and number of a responsible person who will be on site during the works.

9.6 Review of Monitoring

Survey notes are required for all attended surveys, which provide details of the works taking place, observed mitigation measures on site, how audible the works noise is relative to the ambient conditions at the time of the survey, and any other details as described in the CNVS which are relevant to the assessment of the success or otherwise of the site noise and vibration mitigation methods.

Attended measurements provide the opportunity to identify ways to improve future works noise and vibration management – for example whether:

- There were ways to reduce impact, for example locating fixed plant behind an existing building, or installing noise curtains to break line of sight between source and receiver;
- There were lessons learned about good or bad practice observed on site;
- Adjustments will be made to future predictions, for example if plant was significantly quieter than the CNVS plant SWLs suggest and this make / model is proposed for future works.

Attended surveys may also determine potential non-conformances and/or non-compliances, which are to be reported to Sydney Metro and the ER within one business day of the survey – for example whether:

- Noise curtains or other mitigation commitments made in the approved OOHW Application have been correctly implemented;
- Agreed respite periods have not been observed, including for Highly Noise Intensive Works (Section 6.4);
- Plant used is not among the approved list of plant from the CNVIS or approved OOHW Application;
- Any item of plant is louder than expected and resulting in exceeding the predicted CNVIS noise levels; or
- Vibration levels exceeded the predicted levels, and in particular were high enough to risk damage to structures.

If the noise mitigation was ineffective, Martinus must investigate and confirm how to correctly install so that it is effective when required in future. Any observations of ineffective noise mitigation and any rectification actions will be recorded by Martinus in the site inspection records and training to prevent recurrence will be provided if required.

Effectiveness of noise mitigation is determined by the decibel reduction achieved by the mitigation, and is not related to whether complaints have been received or not in relation to the works.

If mitigation has not been implemented, although it was stated as required under an approved OOHW Application, this is a non-compliance. Refer to Section 9.5.

Where the measured noise or vibration exceeds the predicted levels, Martinus shall undertake an investigation.

If the investigation finds that the works were not undertaken in accordance with the approved work or this NVMP (for example, plant was different and / or mitigation not implemented), then this is to be recorded as a non-conformance under the CEMP, and may have the potential to be a non-compliance against the Planning Approval.

If the investigation finds that the approved plant and mitigation were implemented, but the predicted levels were lower than measured, Martinus' acoustic consultant will investigate the reasons for this and update the noise model as required.

Monitoring results are to be reviewed by Martinus' Environmental Manager (or delegate) as soon as practicable. Where an opportunity for improvement is identified, mitigation measures will be reviewed. Reviews of monitoring shall occur within a week of any monitoring. If the review must document whether an exceedance of the predicted noise or vibration levels has been recorded, or if a complaint was received related to the works in question.

Martinus' Environmental Manager will consult with the construction team to determine whether any further mitigation measures will be adopted. This consultation will occur as soon as practicable following the review finding that measured noise or vibration levels exceeded the CNVIS predictions. If the excess is severe, for example vibration levels associated with risks of damage to structures or night-time noise levels associated with sleep awakening, then the consultation will occur formally through a meeting.

Further mitigation measures which may be considered include:

- Changes to construction methodology (change plant);
- Additional or modified respite periods, such as longer continuous breaks for high impact noise, or changing day-time periods of respite to accommodate individual receiver needs);
- Modifying timing of work to less sensitive periods;
- Modifying plant if safe and practicable, for example to install non-tonal vertical movement alarms on EWPs and mobile cranes; and
- Any other reasonable and feasible measure.

9.7 Monitoring Program Consultation

This Noise and Vibration Monitoring Program was prepared in consultation with the local Council(s), in accordance with CoA C8(a), CoA C9(i) and CoA C10. Any feedback from Council will be incorporated into this Noise and Vibration Monitoring Program. See Section 1.4 and Appendix E for consultation carried out in the development of this program.

10 NVMP ADMINISTRATION

10.1 Hold Points

The delivery of works covered by the NVMP cannot commence until the NVMP and associated CNVIS are approved by relevant authorities or their nominated representatives.

Approval of the NVMP and the associated CNVIS require approval of components as listed in Table 23 below.

Table 23: NVMP hold points

Item	Process Held	Acceptance Criteria	Approval Authority
CEMP and Sub-plans	Site activities (Prior to construction commencement)	Site specific CEMP and Sub-plans (including this NVMP) have been developed, reviewed, endorsed by the ER and approved by DPHI.	ER Endorsement DPHI Approval.
CNVIS	Site activities (Prior to construction commencement)	CNVIS to be prepared by Specialist Consultant	ER Endorsement
OOHW Applications – individual works scenarios	Works to be performed outside of approved construction hours (Pre-construction and during construction)	OOHW Strategy/Protocol and Application Form and Community Notification Noise and vibration assessment prepared using Gatewave EPL 12208	ER Endorsement and Approval Sydney Metro Approval (if OOHW are occurring under EPL 12208) EPA (Information to be provided on request)
Construction identified as affecting buildings	Site activities	Building Condition Survey conducted by an appropriate professional nominated by Martinus	Martinus' Construction Manager

10.2 Review and Improvement

The NVMP will be reviewed on a six monthly basis and earlier if required in response to the relevant findings of any audit, incident report, complaint, monitoring event or inspection.

Other reasons for updating the NVMP are:

- Ongoing of review of construction methodology and project noise and vibration issues, aiming for continuous improvement.

- Re-assess NVMP based on new inputs (if necessary, eg if scope, main works scenarios or location of works changes).
- Consistency Assessment (if required).
- Martinus application for a works-specific EPL.
- Amendments to the relevant EPL.

10.3 Records

Records are to be maintained for:

- Records of community enquiries and complaints, and Martinus' response – Sydney Metro central complaints management (refer to OCCS);
- Community Consultation – Sydney Metro Place Manager;
- Offers of Respite and / or Alternative Accommodation – Sydney Metro Place Manager;
- Plant and equipment hire – Martinus' Site Manager;
- Dilapidation or Condition surveys – Martinus' Site Manager;
- Works activities including Emergency Works – Martinus' Site Manager;
- Out of Hours Works Applications reviews, correspondence and approvals – Sydney Metro, Martinus, Environment Representative;
- Any works deemed by the Environment Representative to be "High Risk" in accordance with Sydney Metro's approved Out of Hours Work Strategy/Protocol – Sydney Metro, Environment Representative;
- Noise and vibration surveys – Martinus' Site Manager;
- Records of noise and vibration monitoring results against appropriate NMLs and vibration criteria, including those published in Construction Monitoring Reports;
- Site audits and inspections – Sydney Metro, Martinus, Independent Auditor (where required), Environment Representative;
- Noise and vibration potential and actual incidents – Sydney Metro, Martinus, Independent Auditor, Environment Representative.

11 APPENDICIES

APPENDIX A – Other CoA, REMM and CEMF Requirements Relevant to This Plan

Conditions of Approval, Construction Environment Management Framework requirements relevant to this NVMP.

No.	Requirement	Reference	How addressed?
Conditions of Approval			
C3	The CEMP Sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP Sub-plan and be consistent with the CEMF and CEMP referred to in Condition C1: (a) Noise and vibration — Relevant council(s)	Section 1.3 Appendix E	**This Plan has been prepared in accordance with this condition and describes how Martinus proposes to manage noise and vibration during construction of the Project. This plan has been provided to CoCB for consultation.**
C4	The CEMP Sub-plans must be prepared in accordance with the CEMF	This Table	**This table demonstrates how this Plan has been prepared in accordance with the relevant requirements of the CEMF.**
C5	Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-Plan.	Section 1.3 Appendix E	**This Plan has been provided to CoCB for consultation. Refer to Section 1.3 and Appendix E of this Plan for a summary of consultation.**
C6	Any of the CEMP Sub-plans may be submitted along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before Construction.	Refer to section 1.2 of the CEMP	**This Noise and Vibration Management Plan will not be submitted any later than one (1) month before Construction.**
C7	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of Construction. Where Construction of the CSSI is staged, Construction of a stage must not commence until the CEMP and CEMP	Refer to section 1.2 of the CEMP	**Construction has not commenced until the CEMP and all CEMP Sub-plans have been approved by DPHI. The CEMP and Sub-plans are being implemented for the duration of construction.**

	Sub-plans for that stage have been approved by the Planning Secretary.		
C8	The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of Construction of the CSSI against the predicted performance. (a) Noise and Vibration — Relevant council(s)	Section 1.3 Section 9 Appendix E	**This Plan has been prepared in accordance with this condition and describes how Martinus proposes to manage noise and vibration during construction of the Project. This plan has been provided to CoCB for consultation. The Noise and Vibration Monitoring Program is incorporated in Section 9 of this this Plan.**
C9	Each Construction Monitoring Program must provide:	Section 4	**Details of all monitoring of the Project to be undertaken, including the parameters, frequency and location of monitoring is outlined in this Section of this Plan.**
	(a) details of baseline data available; (b) details of baseline data to be obtained and when;	Section 4	**Details of baseline noise and vibration data available, and how and when further baseline data is to be obtained is outlined in Section 4 of this Plan.**
	(c) details of all monitoring of the project to be undertaken;	Section 4	**Details of all monitoring of the Project to be undertaken, including the parameters, frequency and location of monitoring is outlined in this Section of this Plan.**
	(d) the parameters of the project to be monitored;	Section 4	**Details of the parameters of the project to be monitored are outlined in this Section of this Plan.**

	(e) the frequency of monitoring to be undertaken;	Section 4	**Details of the frequency of monitoring to be undertaken is outlined in this Section of this Plan.**
	(f) the location of monitoring;	Section 4	**Details of the location of monitoring to be undertaken is outlined in this Section of this Plan.**
	(g) the reporting of monitoring results;	Section 4	**The reporting of monitoring results is outlined in this Section of this Plan.**
	(h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and	Section 4	**The procedures to identify and implement additional mitigation measures where results of noise and vibration monitoring are unsatisfactory are outlined in this Section of this Plan.**
	(i) any consultation to be undertaken in relation to the monitoring programs.	Section 1.3 Appendix E	**Consultation undertaken in relation to the monitoring program is detailed in this Section of this Plan.**
C10	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C8 of this approval and must include reasonable information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.	Section 1.3 Appendix E	**The Noise and Vibration Monitoring Program has been prepared in accordance with this condition and describes how Martinus propose to monitor noise and vibration during construction of the Project.**

C11	The Construction Monitoring Programs 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.	Section 3.4	**The Noise and Vibration Monitoring Program will be endorsed by the ER.** **The Noise and Vibration Monitoring Program was submitted to DPHI as part of this NVMP, for approval no later than one month prior to the commencement of Construction.**
C12	Construction must not commence until the Planning Secretary has approved all of the required Construction Monitoring Programs.	Section 9	**Construction did not commence until the CEMP and Sub-plans, including relevant construction monitoring programs have been approved by DPE.**
C13	The Construction Monitoring Programs, as approved by the Planning Secretary 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, whichever is the greater.	Section 9	**The Noise and Vibration Monitoring Program is being implemented for the duration of construction as detailed in Section 9 of this Plan.**
C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	Section 9.5	**Section 9.5 details the reporting requirements and the frequency required for this reporting.**
C15	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	Section 9	**The Noise and Vibration Monitoring Program is incorporated in Section 9 of this this Plan.**
Construction Environmental Management Framework			
9.2(a)	Principal Contractors will develop and implement a Construction Noise and Vibration Management Plan for their scope of works	This NVMP	**The NVMP addresses the key requirements of 9.2(a) as follows:**

	consistent with the Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009). The Construction Noise and Vibration Management Plan will include as a minimum:		
	Identification of work areas, site compounds and access points,	Appendix C	**Work areas, site compounds and access points described in this NVMP and presented in Appendix C – Worksite Maps**
	Identification of sensitive receivers and relevant construction noise and vibration goals,	Section 4.1 Appendix B Section 6	**Sensitive receiver types are described in Section 4.1 and are identified individually in the NVMP Appendix B (Land Use Map)** **Construction noise and vibration goals are presented in Section 6**
	Be consistent with and include the requirements of the noise and vibration mitigation measures as detailed in the environmental approval documentation and the Sydney Metro Construction Noise and Vibration Strategy (CNVS).	Section 8	**CNVS noise and vibration mitigation measures relevant to the scope of works are presented in Section 8 of this Plan.**
	Details of construction activities and an indicative schedule for construction works, including the identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to generate noise or vibration impacts on surrounding sensitive receivers, in particular residential areas.	Section 5.1	**Section 5.1 of this Plan includes a description of the main phases of work and the main works scenarios expected to generate noise and / or vibration with potential to impact on surrounding receivers.**
	Identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibrations and blasting criteria are achieved, including a suitable blast program.	Section 8.4 Section 8.4.2 Section 8.4.3	**Section 8.4 describes vibration controls to minimise vibration impacts, and Section 8.4.2 and Section 8.4.3 describe vibration monitoring and building condition survey requirements.**

			Blast program is not applicable to the proposed works.
	Community notification provisions specifically in relation to blasting	Section 8.5	**Community notification requirements are covered in Section 8.5 (Community Consultation and Management) and 8.11 of this Plan (Additional Mitigation Measures which include community notification requirements based on predicted noise levels).** **Blast program is not applicable to the proposed works.**
	The requirements of any applicable EPL conditions.	Section 3.3 Section 6.1	**Not applicable. Refer to Section 3.3**
	Additional requirements in relation to activities undertaken 24 hours of the day, 7 days per week.	Section 6.1	**Section 6.1 of this Plan describes permissible hours of work under the Conditions of Approval (for works carried out under a rail possession).** **24-hours a day, 7-days a week work is not anticipated for the proposed Station upgrade works.**
	Pre-construction compliance requirements and hold points.	Section 10.1 Section 8.4.2 Section 8.4.3	**Section 10.1 of this Plan describe hold points for NVMP and Noise and Vibration Monitoring Plan approvals which are required prior to carrying out the works covered by the NVMP.** **Section 8.4.2 requires that Condition or Dilapidation surveys are required in any building or structure which is inside the recommended Minimum Working Distance for**

			vibration-generating activities. These surveys must be carried out prior to commencement of the vibration-generating works. **Section 8.4.3 requires that "site-law" vibration propagation measurements are carried out at the commencement of vibration-generating works, to ensure that the Minimum Working Distances applied in the vibration assessment are suitable.**
	The responsibilities of key project personnel with respect to the implementation of the plan.	Section 3.4	**Roles and responsibilities are listed in Section 3.4 of this Plan.**
	Noise monitoring requirements.	Section 9 Section 8.12	**Section 9 of this Plan presents noise monitoring requirements for obtaining additional baseline noise data (if required), plant noise audits (as required or requested during the project), and general environmental noise monitoring in accordance with the CNVS Additional Mitigation Measures Matrix (Section 8.12).**
	Compliance record generation and management.	Section 10.3 Section 8.5 Section 9.5	**Section 10.3 describes requirements for record-keeping.** **Section 8.5 also describes requirements for keeping records of complaints and community consultation.** **Section 9.5 describes requirements for noise and vibration monitoring reports.**

	Community consultation requirements.	Section 8.5 Section 8.11	**Section 8.5 describes community consultation requirements** **Section 8.11 includes Additional Mitigation Measures which include community notification requirements based on predicted noise levels.**
	An Out of Hours Works Protocol applicable to all construction methods and sites.	Section 8.6 Appendix C	**Section 8.6 refers to the approved Sydney Metro City and Southwest Out of Hours Works Strategy/Protocol. A copy of Sydney Metro's Out of Hours Works Application (to be utilised in accordance with the Strategy/Protocol is provided in the Appendix C.**

Other relevant Conditions of Approval

CoA No.	Condition Requirement	Document Reference
A26	For the duration of the Work until the commencement of Operation, or as agreed with the Planning Secretary, the approved ER must: receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; consider and inform the Planning Secretary on matters specified in the terms of this approval; consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; as may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under Condition A34 of this approval;	**The interface between the ER and this Plan are outlined in:** **Section 3.4** **Section 8.11** **Section 9.4** **Section 9.5** **Section 9.6** **Section 10.1**

	as may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; assess the impacts of minor ancillary facilities as required by Condition A19 of this approval; consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI.	
A36	The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Proponent becomes aware of an incident. The notification must identify the CSSI (including the application number and the name of the CSSI if it has one) and set out the location and nature of the incident.	**CEMP Section 3.10.3** **Section 9.5**
A37	Subsequent notification must be given, and reports submitted in accordance with the requirements set out in Appendix A. [Appendix A of CoA SSI 8256 not replicated in this NVMP]	**CEMP Section 3.10.3** **Section 9.5**
E18	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, Construction ground-borne noise and Operational noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of Work which generate Construction or Operational noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Construction	**Section 4.1** **Appendix B**

	Noise and Vibration Impact Statement(s) or Operational Noise and Vibration Review, where relevant.	
E19	Work must only be undertaken during the following Construction hours: 7:00am to 6:00pm Mondays to Fridays, inclusive; 8:00am to 6:00pm Saturdays; and at no time on Sundays or public holidays.	**Section 6.1** **Section 8.6**
E20	Notwithstanding Conditions E19 and E24 Work may be undertaken outside the hours specified in the following circumstances: for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or where different Construction hours are permitted or required under an EPL in force in respect of the CSSI; or Work approved under an Out-of-Hours Work Protocol for Work not subject to an EPL as required by Condition E25; or Construction that causes LAeq(15 minute) noise levels: no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), and no more than the 'Noise affected' noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses, and continuous or impulsive vibration values, measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), and	**Section 6.1** **Section 8.6**

	intermittent vibration values measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006); or where a negotiated agreement has been reached with a substantial majority of sensitive receivers who are within the vicinity of and may be potentially affected by the particular Construction, and the noise management levels and/or limit for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Planning Secretary at least one (1) week before the commencement of activities. Note: Section 5.24(1)(e) of the EP&A Act requires that an EPL be substantially consistent with this approval.	
E21	On becoming aware of the need for emergency Work in accordance with Condition E20(b), the Proponent must notify the ER and the EPA (if a EPL applies) of the need for that Work. The Proponent must use best endeavours to notify all noise and/or vibration affected sensitive receivers of the likely impact and duration of those Work.	**Section 6.1**
E22	Out-of-Hours Work that are regulated by an EPL as per Condition E20(c) or through the Out- of-Hours Work Protocol as per Condition E25 include: Work which could result in a high risk to construction personnel or public safety, based on a risk assessment carried out in accordance with AS/NZS ISO 31000:2009 “Risk Management – Principles and Guidelines”; or where the relevant road authority has advised the Proponent in writing that carrying out the activities could result in a high risk to road network operational performance; or where the relevant utility service operator has advised the Proponent in writing that carrying out the activities could result in a high risk to the operation and integrity of the utility network; or where the Transport for NSW Transport Management Centre (or other road authority) has advised the Proponent in writing that a road occupancy licence is required and will not be issued for the activities during the hours specified in Conditions E19 and E20; or	**Section 6.1** **Section 8.5** **Section 8.6** **Section 8.9** **Section 8.11** **Appendix C**

	where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required. Note: Other Out-of-Hours Work can be undertaken with the approval of an EPL, or through the project's Out-of-Hours Work Protocol for Work not subject to an EPL.	
E23	In order to undertake Out-of-Hours Work, the Proponent must identify appropriate respite periods for the Out-of-Hours Work in consultation with the community at each affected location on a regular basis. This consultation must include (but not be limited to) providing the community with: a schedule of likely Out-of-Hours Work for a period no less than two (2) months; he potential work, location and duration; the noise characteristics and likely noise levels of the Work; and (d) likely mitigation and management measures. The outcomes of the community consultation, the identified respite periods and the scheduling of the likely Out-of-Hours Work must be provided to the EPA (if an EPL applies) and the Planning Secretary (for high risk activities after 9pm) upon request.	**Section 6.1** **Section 8.5** **Section 8.6** **Section 8.9** **Section 8.11** **Appendix C**
E24	Except as permitted by an EPL, highly noise intensive Work that result in an exceedance of the applicable Noise Management Level at the same receiver must only be undertaken: between the hours of 8:00 am to 6:00 pm Monday to Friday; between the hours of 8:00 am to 1:00 pm Saturday; and 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. For the purposes of this condition, 'continuous' includes any period during which there is less than a one (1) hour respite between ceasing and recommencing any of the work that are the subject of this condition.	**Section 6.4** **Section 8.6**

E25	An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of Work which are outside the hours defined in Condition E19, and that are not subject to an EPL. The Protocol must be approved by the Planning Secretary before commencement of the Work. The Protocol must: provide a process for the consideration of Out-of-Hours Work against the relevant noise and vibration criteria, including the determination of low and high-risk activities; provide a process for the identification of mitigation measures for residual impacts, including respite periods in consultation with the community at each affected location, consistent with the requirements of Condition E23; identify procedures to facilitate the coordination of Out-of-Hours Work approved by an EPL to ensure appropriate respite is provided; identify an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where: low risk activities and high risk activities that cease by 9pm can be approved by the ER, and all other high risk activities must be approved by the Planning Secretary; and identify Planning Secretary, EPA and community notification arrangements for approved Out-of-Hours Work, which may be detailed in the Community Communication Strategy.	**Sydney Metro Out Of Hours Works Strategy/Protocol** **Section 6.1** **Section 8.5** **Section 8.6** **Section 8.9** **Section 8.11** **Appendix C**
E26	Work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must: reschedule Work to provide respite to impacted noise sensitive receivers so that the respite is achieved in accordance with Condition E23; or consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and provide documentary evidence to the ER in support of any decision made by the Proponent in relation to respite or mitigation.	**Section 8.10**

E27	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.	**Section 7**
E28	Noise generating Work in the vicinity of potentially-affected community, religious, or educational institutions resulting in 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.	**Section 8.5** **Section 8.6**
E29	Mitigation measures must be implemented with the aim of achieving the following Construction noise management levels and vibration criteria: Construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009); vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure); BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage). Note: The Interim Construction Noise Guideline 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 3** **Section 6** **Section 8**
E30	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-listed structures.	**Section 6.7** **Section 8.5**

		Section 8.6
E32	Operational noise mitigation measures as identified in Condition E31 that will not be physically affected by Construction, must commence implementation within six (6) months of the commencement of Construction in the vicinity of the impacted receiver(s) to minimise Construction noise impacts, and detailed in an updated Noise and Vibration CEMP Sub-plan for the CSSI. Note: For the purpose of Conditions E32 and E33, operational noise mitigation measures refer to at property or other identified non-source controls, the detail of which would broadly be included in the Noise and Vibration CEMP Sub-plan. When detail on the specific mitigation measures is known and before the implementation of the mitigation measures, the CEMP sub- plan must be updated.	**CoA E32 is not relevant to the Project as station works are not near locations where operational noise mitigation is identified**
E33	Where implementation of Operational noise mitigation measures will be physically affected by Construction such that they cannot commence implementation within six (6) months of the commencement of Construction in accordance with Condition E32, the Proponent must submit to the Secretary a report providing justification as to why, along with details of temporary measures that would be implemented to address construction noise impacts until such time that the Operational noise mitigation measures identified in Condition E31 are implemented. The report must be submitted to the ER for review. When the ER is satisfied that the justification and alternative measures are appropriate to address construction noise impacts, and within six (6) months of the commencement of Construction which would affect the identified sensitive receivers, the report must be submitted to the Planning Secretary for information.	**CoA E32 is not relevant to the Project as station works are not near locations where operational noise mitigation is identified**

Revised Environmental Mitigation Measures relevant to the development of this NVMP

REMM No.	REMM Requirement	Timing	Document Reference
NVC1	In accordance with the Construction Noise and Vibration Strategy, construction noise impact statements would be prepared prior to the commencement of construction components, to consider the scale and duration of construction noise impacts, and identify measures to minimise impacts to sensitive receivers. This would include noise modelling to confirm the results of modelling undertaken as part of the Environmental Impact Statement and Submissions and Preferred Infrastructure Report. Where exceedances of the noise management levels are identified, feasible and reasonable mitigation measures would be identified.	Design/pre-construction	**Section 7**
NVC2	In accordance with the Construction Noise and Vibration Strategy, all employees, contractors and subcontractors would receive an environmental induction. The induction must at least include: 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 designated loading/unloading areas and procedures site opening/closing times (including deliveries).	Design/pre-construction	**Section 8.7**

NVC3	Where vibration levels are predicted to exceed the vibration screening level, a more detailed assessment of the structure would be carried out to determine the appropriate vibration limits for that structure.	Design/pre-construction	**Section 8.4**
NVC4	For heritage items where vibration screening levels are predicted to be exceeded, the more detailed assessment would include condition assessment and specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	Design/pre-construction	**Heritage Management Plan** **Section 6.7** **Section 8.4.3**
NVC5	The Construction Noise and Vibration Strategy would be implemented with the aim of achieving the noise management levels where feasible and reasonable. This may include the following example mitigation measures alone or in combination, where feasible and reasonable: The provision of noise barriers around each construction site. The coincidence of noisy plant working simultaneously close together would be avoided. Residential grade mufflers would be fitted to all mobile plant. Non-tonal reversing alarms would be fitted to all permanent mobile plant. High noise generating activities would be scheduled for less sensitive periods considering the nearby receivers, where reasonable and feasible. The layout of construction sites would consider opportunities to shield receivers from noise. Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.	Construction	**Section 8** **All example NVC5 mitigation measures will be considered in the development of CNVIS assessments.**

	Loading and unloading of materials/deliveries is to occur as far as possible from noise sensitive receivers. Select site access points and roads as far as possible away from noise sensitive receivers. Dedicated loading/unloading areas to be shielded if close to noise sensitive receivers wherever feasible and reasonable. Use quieter and less vibration emitting construction methods where feasible and reasonable. The noise levels of plant and equipment must have operating Sound Power Levels compliant with the criteria in the Construction Noise and Vibration Strategy. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where feasible and reasonable, the offset distance between noisy plant items and nearby noise sensitive receivers would be as great as possible. Where reasonable and feasible heavy vehicle movements would be limited to daytime and evening hours, with night-time movements avoided where possible. Active community consultation and the maintenance of positive, cooperative relationships with schools, local residents and building owners and occupiers, through: periodic notification or work activities and progress (e.g. regular letterbox drops, e-consult) specific notification (letter-box drop) prior to especially noisy activities comprehensive website information project information and construction response telephone line		

	email distribution lists.		
NVC6	Noise intensive plant for, would not be used during the night-time period (10pm to 7am) unless: during a weekend rail possession or shut down a requirement of a road authority, emergency services or Sydney Coordination Office requires works to be undertaken during this period.	Construction	**Section 6.1** **Section 6.4** **Section 8.6**
NVC7	When working adjacent to schools, medical facilities and child care centres, particularly noisy activities would be scheduled outside normal working hours, where reasonable and feasible.	Construction	**This will be addressed in the CNVIS and will incorporate outcomes of consultation in line with Section 8.5**
NVC8	When working adjacent to churches and places of worship, particularly noisy activities would be scheduled outside services, where reasonable and feasible.	Construction	**This will be addressed in the CNVIS and will incorporate outcomes of consultation in line with Section 8.5**
NVC9	Alternative accommodation may be offered to residents living in close proximity to construction works where detailed construction planning identifies unreasonably high noise impacts over a prolonged period. Alternative accommodation arrangements would be offered and discussed with residents on a case-by-case basis.	Construction	**Alternative accommodation is to be applied where triggered in accordance with the Sydney Metro City and Southwest Construction Noise and Vibration Strategy, as outlined in:** **Section 8.11** **Section 8.12**
NVC10	High noise and vibration generating activities including ballast tamping, may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block and these works.	Construction	**Section 6.4** **Section 8.6** **No ballast tamping is proposed as part of this Project's scope.**

NVC11	Ongoing noise monitoring would be undertaken during construction at sensitive receivers during critical periods (i.e. times when noise emissions are expected to be at their highest) to identify and assist in managing high risk noise events.	Construction	**Section 6.4** **Section 8.11** **Section 9.2**
NVC12	Where vibration levels are predicted to exceed the vibration screening level, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure.	Construction	**Section 6** **Section 8.4.3**
NVC13	Reasonable and feasible measures would be implemented in accordance with the Construction Noise and Vibration Strategy to minimise ground-borne noise where exceedances are predicted.	Construction	**Ground borne noise management levels expected to be below airborne noise levels, therefore risk of ground-borne noise levels is low.**
NVC14	Reasonable and feasible mitigation measures would be implemented where power supply works would result in elevated noise levels at receivers. This could include: carrying out works during the daytime period when in the vicinity of residential receivers where out of hours works are required, scheduling the noisiest activities to occur in the evening period (up to 10pm) use of portable noise barriers around particularly noisy equipment.	Construction	**This NVMP** **Section 8** **No power supply works are proposed in this Project's station upgrade scope of this Project.**
NVC15	The routes for construction haulage vehicles and bus services associated with the Temporary Transport Strategy would be selected on the basis of compliance with the relevant road traffic noise criteria, where reasonable and feasible. Where compliance with the noise criteria is not possible, reasonable and feasible noise mitigation would be implemented.	Construction	**Bus services for the purpose of the Temporary Transport Strategy is outside the scope of this NVMP, and is not the responsibility of Martinus. The sections below only address the construction haulage vehicles component of this REMM.** **Section 6.6** **Section 8.13**

NVC16	An Out of Hours Work Strategy would be prepared, in consultation with the Environment Protection Authority, to guide the assessment, management, and approval of works outside recommended standard hours.	Construction	**Sydney Metro Out of Hours Works Strategy/Protocol** **Section 6.1** **Section 8.5** **Section 8.6** **Section 8.9** **Section 8.11** **Appendix C**

Construction Environmental Management Framework requirements relevant to the development of this Plan

CEMF Section	CEMF Requirement	Document Reference
3.7(a)	Prior to the commencement of construction Martinus will offer Pre-construction Building Condition Surveys, in writing, to the owners of buildings where there is a potential for construction activities to cause cosmetic or structural damage. If accepted, Martinus will produce a comprehensive written and photographic condition report produced by an appropriate professional prior to relevant works commencing.	**Section 8.4.3** **Section 10.1** **Table 23**
5.1(a)	Standard working hours are between 7am – 6pm on weekdays and 8am – 1pm on Saturdays.	**Section 6.1 - Note via the Project CSSI-8256 Standard hours on Saturday is between 0800-1800 and shall apply to the Project.**
5.1(b)	Works which can be undertaken outside of standard construction hours without any further approval include: Those which have been described in respective environmental assessments as being required to take place 24/7. For example, tunnelling and underground excavations and supporting activities will be required 24/7 Works which are determined to comply with the relevant Noise Management Level at sensitive receivers The delivery of materials outside of approved hours as required by the Police or other authorities (including RMS) for safety reasons Where it is required to avoid the loss of lives, property and / or to prevent environmental harm in an emergency Where written agreement is reached with all affected receivers.	**Section 6.1**
5.1(c)	Martinus may apply for EPA approval to undertake works outside of normal working hours under their respective Environment Protection Licences	**Section 6.1**

5.2(a)	Martinus will consider the following in the layout of construction sites: The location of noise intensive works and 24 hour activities in relation to noise sensitive receivers The location of site access and egress points in relation to noise and light sensitive receivers, especially for sites proposed to be utilised 24 hours per day The use of site buildings to shield noisy activities from receivers The use of noise barriers and / or acoustic sheds where feasible and reasonable for sites proposed to be regularly used outside of daytime hours Aim to minimise the requirement for reversing, especially of heavy vehicles.	**Section 8.1** **Section 8.2** **Section 8.3** **Section 8.6**
9.1(a)	Construction Noise and Vibration Management Objectives The following noise and vibration management objectives will apply to construction: Minimise unreasonable noise and vibration impacts on residents and businesses; Avoid structural damage to buildings or heritage items as a result of construction vibration; Undertake active community consultation; and Maintain positive, cooperative relationships with schools, childcare centres, residents and building owners.	**Section 6**
9.2(b)	Detailed Construction Noise and Vibration Impact Statements will be prepared for noise intensive construction sites and or activities, to ensure the adequacy of the noise and vibration mitigation measures. Specifically, Construction Noise and Vibration Impact Statements will be prepared for EPL variation applications and works proposed to be undertaken outside of standard construction hours.	**Section 7**
9.2(c)	Noise and vibration monitoring would be undertaken for construction as specified in the CNVS and the EPL.	**Section 9**
9.2(d)	The following compliance records would be kept by Martinus: Records of noise and vibration monitoring results against appropriate NMLs and vibration criteria; and Records of community enquiries and complaints, and the Contractor's response.	**Section 9.5**

9.3(a)	All feasible and reasonable mitigation measures would be implemented in accordance with the CNVS. Examples of noise and vibration mitigation measures include: Construction hours will be in accordance with the working hours specified in Section 5.1; Hoarding and enclosures will be implemented where required to minimise airborne noise impacts; and The layout of construction sites will aim to minimise airborne noise impacts to surrounding receptors.	**Section 6.1** **Section 8.6** **Section 8.3** **Section 8.1** **Section 8**

EPL 12208 Clauses relevant to this NVMP.

EPL Clause	Requirement / Measure	Document Reference
Environmental awareness		
O11.1	All staff, including contractors and subcontractors, involved in the carrying out of the activities authorised by this licence must be aware of their environmental responsibilities relating to the activities regulated by this licence.	**Section 8.7** **Section 8.8**
Other operating conditions – Railway maintenance activities		
O13	Note: The objectives of these conditions are to minimise noise impacts from railway maintenance activities, recognising that operational safety and other factors constrain when these activities can be carried out on the Sydney Trains Network. These factors include avoiding disruptions during peak periods for passenger services and ensuring that programmed track closures facilitate the efficient completion of maintenance activities. Night-time and weekend work will be required for some activities.	**Section 8.6**
Standard railway maintenance hours		
O13.1	Maintenance activities must be undertaken: between the hours of 7:00am and 6:00pm Monday to Friday between the hours of 8:00am and 1:00pm Saturday; and not on Sunday or public holidays, unless an exception in condition O13.2 or condition O13.3 applies.	**Section 6.1** **Section 8.6**
Exception to standard railway maintenance hours		

O13.2	The licensee may undertake maintenance activities outside of the hours specified in Condition O13.1: to provide safe and reliable train services or a safe working environment; or for emergency works; or for the delivery of oversized plant or structures that require special arrangements or authorisation to be lawfully transported along public roads.	**Section 6.1** **Section 8.6** **Requirements are aligned with the Sydney Metro CNVS and this NVMP** **Out of Hours Works Protocol to be applied – refer Section 8.6**
Exception to standard railway maintenance hours for low noise impact generating works		
O13.3	The licensee may undertake maintenance activities outside of the hours specified in Condition O13.1, if the activities do not exceed: 5dBA (LAeq, 15min) above the relevant rating background levels at day, evening and night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation, and 15dBA (LA1, 1min or LAmax) above the relevant rating background level at night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation. The results of any acoustic investigation undertaken in relation to Conditions O13.3(a)(i) and O13.3(a) (ii) must be provided by the licensee when requested by an authorised officer of the EPA.	**Requirements are aligned with the Sydney Metro CNVS and this NVMP** **Out of Hours Works Protocol to be applied – refer Section 8.6**

	An acoustic investigation referred to in Conditions O13.3(a)(i) and O13.3(a)(ii) is not required if there are no noise sensitive receivers impacted by the activities.	
Management of noise impacts from railway maintenance		
O13.4	Where maintenance activities are undertaken, including outside of the hours specified in Condition O13.1, noise impacts must be managed in accordance with the recommendations in the Interim Construction Noise Guideline (DECCW, 2009), as updated from time to time. The licensee is required to: identify noise sensitive receivers that may be affected; identify hours of work for the proposed activities; identify noise impacts at noise sensitive receivers; select and apply reasonable and feasible work practices to minimise noise impacts; and notify the identified noise sensitive receivers at least 5 days prior to the commencement of maintenance activities undertaken outside of the hours specified in Condition O13.1, except where the licensee first becomes aware of the need to undertake those maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the maintenance activities.	**Requirements are aligned with the Sydney Metro CNVS and this NVMP** **Out of Hours Works Protocol to be applied – refer Section 8.6**
Management of noise impacts from railway maintenance		

O13.5	When requested by an authorised officer of the EPA, the licensee must provide the following information regarding any proposed maintenance activities on the Sydney Trains Network: a) dates and times of the proposed maintenance activity; b) location of the proposed maintenance activity; c) type(s) of work to be performed in conducting the proposed maintenance activity; d) plant and equipment to be used; and e) contact name and telephone number of a person who will be on site during the activity and who is authorised by the licensee to take action, including the cessation of the activity or any part of it, if so directed by the EPA. A contact person must be contactable 24 hours a day via the supplied telephone number(s) during the whole of the period that the activity takes place outside the hours specified in Condition O13.1.	**Section 9.5** **Covered in Sydney Metro procedures for interaction with NSW government agencies.**
O13.6	When requested by an authorised officer of the EPA, the licensee must provide written reasons that demonstrate that maintenance activities undertaken outside of the hours specified in Condition O13.1 comply with the licence.	**Section 9.5** **Covered in Sydney Metro procedures for interaction with NSW government agencies.**

APPENDIX B – Construction Noise and Vibration Impact Assessment

APPENDIX C – Sydney Metro Out-of-Hours Works Application Example

APPENDIX D – Consultation Records

Initial email to CBC

From: Phillip Matevski <phillip.matevski@martinus.com.au>
Sent: Friday, 12 July 2024 9:46 AM
To: Imran Khan <Imran.Khan@cbcity.nsw.gov.au>; Metro <metro@cbcity.nsw.gov.au>
Cc: Sam Fard <Samaneh.Fard@transport.nsw.gov.au>
Subject: Sydney Metro southwest EHVMT - CEMP Subplan consultation
Importance: High

Dear Imran,

Thank you for your time on the phone a couple weeks ago regarding our request for your review of several of our Construction Environmental Management Sub-plans.

The following Sub-plans are attached for your review and/or comment:

- Noise and Vibration Management Sub-plan
- Heritage Management Sub-plan
- Waste and Recycling Management Sub-plan.

For reference, I will briefly summarise the scope of works for our project.

The Southwest Metro works will convert and upgrade the existing T3 Bankstown Line between Sydenham station to Bankstown station to Sydney Metro standards. To meet the test level safety standards for Sydney Metro operations, the Southwest Metro project requires the delivery of safety critical works to secure critical points from errant and hostile vehicles at station overbridges, non-station overbridges and non-bridge locations along the Southwest Metro rail corridor.

Martinus will be delivering the scope of the Construction of Errant and Hostile Vehicle Mitigation Treatments, generally including:

- Errant vehicle mitigation (EVM) treatments consisting of:
  - Eight (8) station overbridge barriers
  - Seven (7) non-station road-over-rail overbridge barriers; and
  - 67 non-bridge locations along the southwest corridor
- Hostile vehicle mitigation (HVM) treatments in the eight (8) station precincts
- Road upgrades (kerbside ramps) across various locations
- Fencing, finishing works and other streetscaping elements across various locations
- Remediation works.

As discussed, we would appreciate your review of our attached Sub-plans at your earliest convenience.

Any questions at all throughout your review process, please feel free to call or contact me at any time.

Kind regards,

Phil Matevski | Environment and Sustainability Manager
M 0420 353 980 | W www.martinusrail.com.au

Response email from CBC

RE: Sydney Metro southwest EHVMT - CEMP Subplan consultation

PM Phillip Matevski
To Imran Khan; Metro
Cc Sam Fard; Shelley Addison-Bell

This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

Sydney Metro EHVMT - Complaints Management.png .png File

Hi Imran,

Thank you for providing the below feedback from CBC's SMEs.

- Heritage Management Subplan (HMP) – please feel free to share the HMP with CBC's Aboriginal Liaison Officer. If you require any further action from our end, please let me know.
- Noise and Vibration Management Subplan (NVMP) – Shelley Addison-Bell is the Community Manager for the project, Shelley's contact details are below:

shelley.addison-bell@martinus.com.au
Shelley Addison-bell
Stakeholder and Communications Manager

Mobile: +61 434 370 740
www.martinusrail.com.au

I have also attached our complaints management procedure that the project will adhere to.

If you require any further information or have any questions, please forward through to myself and Shelley and we will endeavour to respond as soon as we can.

Kind regards,

Phil Matevski | Environment and Sustainability Manager
M 0420 353 980 | W www.martinusrail.com.au

From: Imran Khan <Imran.Khan@cbcity.nsw.gov.au>
Sent: Monday, August 12, 2024 3:44 PM
To: Phillip Matevski <phillip.matevski@martinus.com.au>; Metro <metro@cbcity.nsw.gov.au>
Cc: Sam Fard <Samaneh.Fard@transport.nsw.gov.au>
Subject: RE: Sydney Metro southwest EHVMT - CEMP Subplan consultation

HI Phillip,

The comments provided by council SME's :

- **Sydney Metro southwest EHVMT - CEMP Subplan consultation** - Heritage Management sub-plan : No comment. NOTE: The report should however be referred to Council's Aboriginal Liaison Officer for review and comment (if not already done so) given there are Aboriginal management measures proposed.
- **Sydney Metro southwest EHVMT - CEMP Subplan consultation - Noise and Vibration Management Sub-plan :** Provide council with details of the complaint management system and a direct contact in order for community concerns to be documented and forwarded onto the ARA for investigation and action.

Regards,

Imran Khan - Project Engineer
T 02 9707 9081
E Imran.Khan@cbcity.nsw.gov.au

Closure email from CBC

RE: Sydney Metro southwest EHVMT - CEMP Subplan consultation

IK Imran Khan <Imran.Khan@cbcity.nsw.gov.au>
To Phillip Matevski; Metro
Cc Sam Fard; Shelley Addison-Bell

This sender Imran.Khan@cbcity.nsw.gov.au is from outside your organization.

This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

HI Phillip,

The council has no issue with the complaints management.

Regards,

Imran Khan - Project Engineer
T 02 9707 9081
E Imran.Khan@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

CANTERBURY BANKSTOWN

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The City of Canterbury Bankstown acknowledges the traditional custodians of the land, water and skies of Canterbury-Bankstown, the Darug (Darag, Dharug, Daruk, Dharuk) People. We recognise and respect Darug cultural heritage, beliefs and relationship with the land. We acknowledge the First Peoples' continuing importance to our CBCity community.

From: Phillip Matevski <phillip.matevski@martinus.com.au>
Sent: Wednesday, 14 August 2024 2:20 PM
To: Imran Khan <Imran.Khan@cbcity.nsw.gov.au>; Metro <metro@cbcity.nsw.gov.au>
Cc: Sam Fard <Samaneh.Fard@transport.nsw.gov.au>; Shelley Addison-Bell <shelley.addison-bell@martinus.com.au>
Subject: RE: Sydney Metro southwest EHVMT - CEMP Subplan consultation

Hi Imran,

Thank you for providing the below feedback from CBC's SMEs.

Closure email from IWC

RE: EXTERNAL/2024/0015 - RE: Sydney Metro Southwest - Inner West Council Comments

MA Martin Amy <Martin.Amy@innerwest.nsw.gov.au>
To Phillip Matevski
Cc Tom Stanistreet; Conor Wilson; Minna Kilpelainen

This sender Martin.Amy@innerwest.nsw.gov.au is from outside your organization.

Follow up. Start by Friday, 23 August 2024. Due by Friday, 23 August 2024.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Hi Philip,

Thank you for the responses. We acknowledge those responses and any further information that will be shared/submitted to us in the future.

Regarding the Traffic and Transport Management Plan we are currently reviewing it and will provide any comments as necessary. If any comments are needed, we will provide them by the end of next week.

Thanks and have a good weekend,

Martin Amy
Development Assessment Manager (North)
p +61 2 9392 5066 e Martin.Amy@innerwest.nsw.gov.au

Right-click or tap and hold here to download pictures. To help protect your privacy, Outlook prevented automatic download of this picture from the Internet.
Inner West Council

Council acknowledges the Traditional Custodians of these lands, the Gadigal-Wangal people of the Eora Nation.

Right-click or tap and hold here to download pictures. To help protect your privacy, Outlook prevented automatic download of this picture from the Internet.
Built Environment Awards

From: Phillip Matevski <phillip.matevski@martinus.com.au>
Sent: Friday, 16 August 2024 9:13 PM
To: Martin Amy <Martin.Amy@innerwest.nsw.gov.au>
Cc: Tom Stanistreet <tom.stanistreet@innerwest.nsw.gov.au>; Conor Wilson <conor.wilson@innerwest.nsw.gov.au>; Minna Kilpelainen <minna.kilpelainen@innerwest.nsw.gov.au>
Subject: EXTERNAL/2024/0015 - RE: Sydney Metro Southwest - Inner West Council Comments

Dear Martin,

Please find our following responses to comments made to our several Sub-plans:

Noise and Vibration Management Plan

- While the developments are likely to have amenity impacts, the measures presented in Section 8 of the report will minimise the impacts to sensitive receivers.
  Noted.
- In addition to the provided six-monthly Construction Monitoring Reports, we also request that a report outlining the complaints being received and the actions taken as a result be provided.
  Martinus will provide a report summarising the complaints received and the actions taken as a result.

Waste and Recycling Management Plan