Construction Noise and Vibration Management Sub Plan

Transport for NSW Supply, Operate, Maintain (SOM) Package

Parramatta Light Rail

November 2023

PLR1SOM-GLR-ALL-PM-PLN-000034 Rev 4

NSW GOVERNMENT

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About this release

Title	Supply, Operate, Maintain Construction Noise and Vibration Management Plan

Version control

Revision	Date	Description	Approval (Position)
A	24/12/2019	Draft	-
B	16/03/2020	Update to TfNSW template, internal review	-
C	23/04/2020	Update for TfNSW comments	-
D	12/05/2020	Update for ER comments	-
E	19/05/2020	Update for TfNSW follow up comments	-
F	29/10/2020	Update for AA follow up comments	-
0	9/11/2020	Updated for DPE submission	-
1	13/01/2021	Updated with DPE comments	-
2	9/02/2021	Updated with DPE comments	-
3	14/07/2022	Updated to reflect EPL conditions	-
4	18/10/2023	Updated to address T&C scope	-
4.1	20/11/2023	Updated to incorporate comments received on revision 4.0.	-

Glossary/ Abbreviations

Abbreviations	Expanded text
AA	Acoustics Advisor
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Attenuation	The reduction in the level of sound or vibration.
Annoying activities	As defined in the Interim Construction Noise Guideline (DECC, 2009)
BOCC	Back-up Operational Control Centre
CBD	Central Business District
CCTV	Closed Circuit Television
CEMP	Construction Environmental Management Plan
CEP	Communication and Engagement Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CNVS	TfNSW's Construction Noise and Vibration Strategy
CNVIS	Construction Noise and Vibration Impact Statement
CoA	Condition of Approval
CSELR	CBD and Sydney East Light Rail
CSO	Customer Service Operator
CTTAMP	Construction Traffic, Transport and Access Management Plan
CWG	Completions Working Group
D&C	Design and Construction
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
DECC	Department of Environment and Climate Change (now EPA)
DPE	NSW Department of Planning and Environment
Eat Street	The section of Church Street between Palmer and George Streets.
ECM	Environmental Control Map
ECP	Environmental Control Plans
EIS	Environmental Impact Statement
EMS	Environmental management system
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.
EPA	Environment Protection Authority

Abbreviations	Expanded text
EPL	Environment Protection Licence (under schedule 1 of the POEO Act)
EPO	Environmental Performance Outcomes
Environmental objective	Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
ERAP	Environmental Risk Action Plans
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
ER	Environmental Representative
ERG	Environmental Review Group
ESP	Emergency Services Personnel
ETS	Electronic Ticketing System
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements.
GRCLR	Greater River City Light Rail
High Noise Intensive activity or works (HNIW)	Means rock breaking, rock hammering, sheet piling, pile driving and particularly annoying activities as described in ICNG (section 4.5).
Highly Noise Affected (HNA)	Activities that result in a noise level that exceed 75 dB(A)
Heritage item	As defined by the for the CSSI, a place, building, work, relic, archaeological site, tree, movable object or precinct of heritage significance, that is listed under one or more of the following registers: the State Heritage Register under the Heritage Act 1977 (NSW), a state agency heritage and conservation register under section 170 of the Heritage Act 1977 (NSW), a Local Environmental Plan under the EP&A Act, the World, National or Commonwealth Heritage lists under the Environment Protection and Biodiversity Conservation Act 1999 (Cth), and an “Aboriginal object” or “Aboriginal place” as defined in section 5 of the National Parks and Wildlife Act 1974 (NSW).
HSEQ	Health, Safety, Environment and Quality
IC	Independent Certifier
ICNG	Interim Construction Noise Guidelines
IMS	Integrated Management System

Abbreviations	Expanded text
Interface Contractor	Any relevant Rail Transport Agency, RMS (and its contractors), the Infrastructure Contractor, the Remediation Contractor, the Enabling Works Contractor, the RTR Contractor, and the ETS Contractor
IWLR	Inner West Light Rail
KPI	Key Performance Indicator
LAeq	The A-weighted equivalent continuous (energy average) sound pressure level. For the purpose of assessing or measuring construction noise, this is related to the construction works under consideration over a defined period (such as 15-minutes, shown as LAeq(15 minute)). Note that during verification monitoring the LAeq should exclude other sources such as from industry, road, rail and the community.
LAmax	The “Maximum Noise Level” for an event, used in the assessment of potential sleep disturbance during night-time periods. The subscript “A” indicates that the noise levels are filtered to match normal human hearing characteristics (i.e. A-weighted)
LRV	Light Rail Vehicle
LORAC	Laing O’Rourke Australia Construction Pty Ltd
NML	Noise Management Level
Noisy or Noise Affected	Activities that result in a noise level that exceed the Noise Management Level (NML)
O&M	Operations and Maintenance
OCC	Operations Control Centre
OEH	Office of Environment and Heritage
ONRSR	Office of the National Rail Safety Regulator
OPAM	Operational Performance and Asset Management
ORP	Operational Readiness Plan
ORT	Operational Readiness Team
PAS	Public Address System
PLR	Parramatta Light Rail
PLRC	Parramatta Light Rail Corridor
POEO	Protection of the Environment Operations Act 1997
Project	Construction of the PLR light rail systems, high-voltage power supply and stops above slab level, and the stabling and maintenance facility
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night)
REMMM	Revised Environmental Mitigation and Management Measure
RSNL	Rail Safety National Law (NSW)
RSW	Rail Safety Worker
RTBU	Rail Tram and Bus Union

Abbreviations	Expanded text
SaMF	Stabling and Maintenance Facility
Sensitive receiver	As defined by the CSSI, which includes residences, temporary accommodation such as caravan parks and camping grounds, and health care facilities (including nursing homes, hospitals) including within the Health Administration Corporation (HAC) received. Also includes the following, when in use: educational institutions (including preschools, schools, universities, TAFE colleges), religious facilities (including churches), child care centres, passive recreation areas, commercial premises (including film and television studios, research facilities, entertainment spaces, restaurants, office premises and retail spaces), and others as identified by the Secretary
SLR	Sydney Light Rail
SOM	Supply, Operate and Maintain
SPIR	Submissions and Preferred Infrastructure Report
SPL	Sound Pressure Level
SWL	Sound Power Level
T&C	Testing and Commissioning
TCP	Traffic Control Plan
TED	Traffic Event Database
TMC	Transport Management Centre
VMP	Site Vehicle Movement Plans

1 Introduction

1.1 Context

This Construction Noise and Vibration Management Sub Plan (CNVMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Parramatta Light Rail Stage 1 Package 5 Supply, Operate and Maintain (SOM) Contract.

This CNVMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the revised environmental mitigation and management measures (REMMM), the Environmental Performance Outcomes (EPO's) listed in the Parramatta Light Rail (Stage 1) Westmead to Carlingford via Parramatta CBD and Camellia Submissions Report (incorporating the Preferred Infrastructure Report) (SPIR), Environment Protection Licence (EPL) 21606, Environmental Impact Statement (EIS) and all applicable legislation.

1.2 Background and project description

1.2.1 Parramatta Light Rail – Stage 1 description

Parramatta Light Rail is one of the NSW Government's major infrastructure projects being delivered to serve a growing Sydney.

Parramatta Light Rail Stage 1 will connect Westmead to Carlingford via Parramatta Central Business District (CBD) and Camellia. Stage 1 is expected to be operational in 2024.

The project will create new communities, connect great places and help both local residents and visitors move around and explore what the region has to offer. The route will link Parramatta's CBD and train station to a number of key locations, including the Westmead Precinct, the Parramatta North Growth Centre, the Western Sydney Stadium, the Camellia Town Centre, the new Powerhouse Museum and Riverside Theatre arts and cultural precinct, the private and social housing redevelopment at Telopea, the Rosehill Gardens Racecourse and the three Western Sydney University campuses.

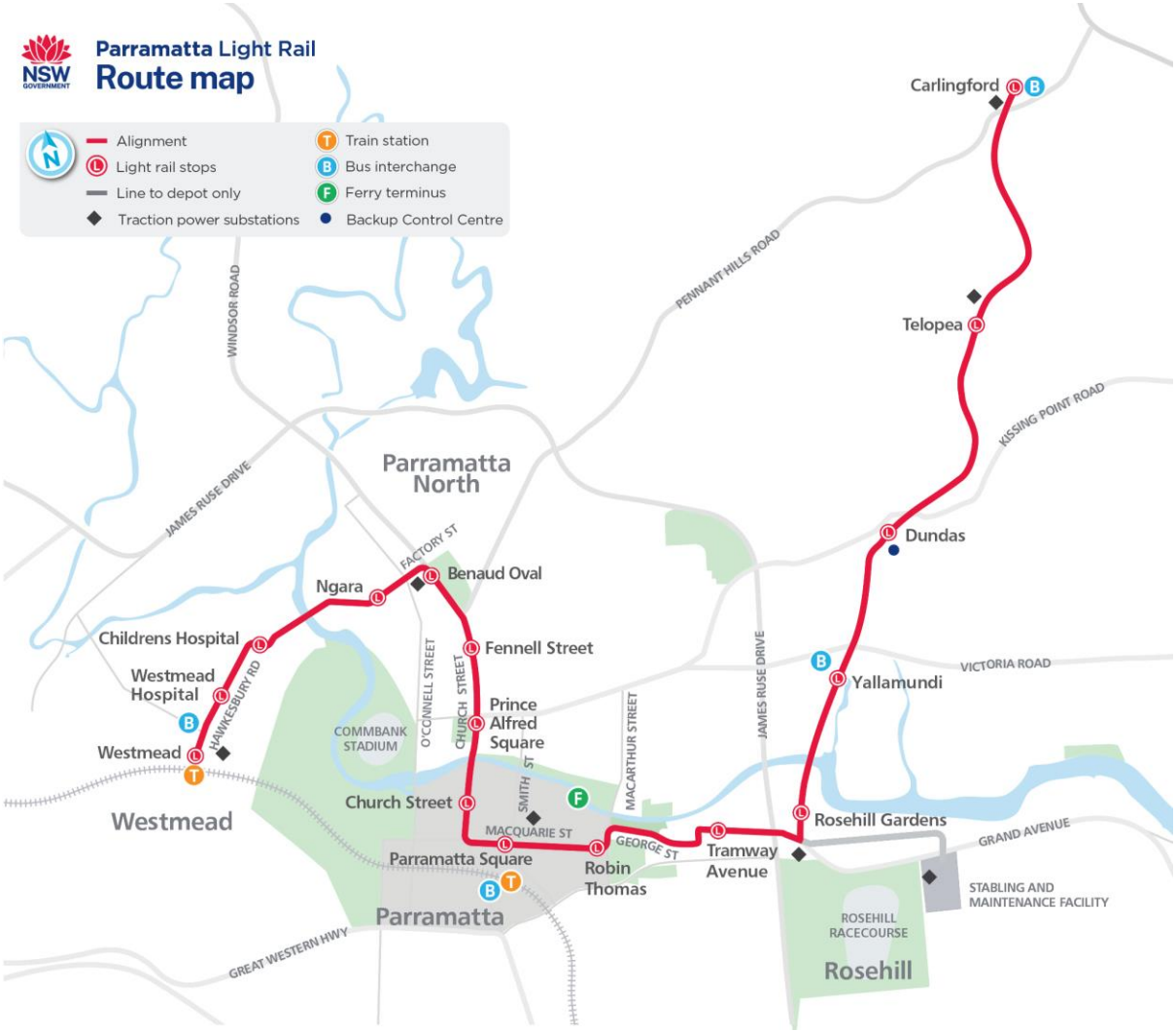
In summary, the key features of the project include:

- A new dual track light rail network of approximately twelve (12) kilometres in length, including approximately seven (7) kilometres within the existing road corridor and approximately five (5) kilometres within the existing Carlingford Line and Sandown Line, replacing current heavy rail services
- Sixteen (16) stops that are fully accessible and integrated into the urban environment including a terminus stop at each end of Westmead and Carlingford
- High frequency 'turn-up-and-go' services operating seven days a week from 5am to 1am. Weekday services will operate approximately every 7.5 minutes in the peak period between 7am and 7pm
- Modern and comfortable air-conditioned light rail vehicles, nominally 45 metres long and driver-operated, each carrying up to 300 passengers.
- Intermodal interchanges with existing public transport services at Westmead terminus, Parramatta CBD and the Carlingford terminus
- Creation of two light rail and pedestrian zones (no general vehicle access) within the Parramatta CBD along Church Street (generally between Market Street and Macquarie Street) and along Macquarie Street (generally between Horwood Place and Smith Street)

- A Stabling and Maintenance (SaM) Facility located in Camellia for light rail vehicles to be stabled, cleaned and maintained
- New bridge structures along the alignment including over James Ruse Drive and Clay Cliff Creek, Parramatta River (near the Cumberland Hospital), Kissing Point Road and Vineyard Creek, Rydalmere
- Alterations to the existing road network including line marking, additional traffic lanes and turning lanes, new traffic signals, and changes to traffic flows
- Relocation and protection of existing utilities
- Public domain and urban design works along the corridor and at Stop precincts
- Closure of the heavy rail line between Carlingford and Clyde
- Active transport corridors and additional urban design features along sections of the alignment and within Stop precincts
- Integration with the Opal Electronic Ticketing System (ETS)
- Real time information in light rail vehicles and at Stops via visual displays and audio.

An overview of Parramatta Light Rail Stage 1 route is shown in Figure 1-1.

Figure 1-1: Parramatta Light Rail Stage 1 Route



1.2.2 Statutory Context

The Parramatta Light Rail is subject to environmental impact assessment under the *Environmental Planning and Assessment Act 1979* (EP&A Act). It is classified as Critical State Significant Infrastructure (CSSI). Detailed environmental impact assessments have been carried out and approved by the Minister for Planning.

1.2.3 Parramatta Light Rail Planning Approval

The Environmental Impact Statement (EIS) assessed impacts for Parramatta Light Rail Stage 1 (Westmead to Carlingford). This covered the light rail and associated works including road enabling work.

The CSSI was approved by the Minister for Planning on 29 May 2018.

Modifications of the CSSI Infrastructure Approval have been approved twice on:

- 21 December 2018 (Modification 1)
- 25 January 2019 (Modification 2)

The planning approval (Infrastructure approval SSI 8285) and related environmental assessment documents are located at:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8285

1.2.4 Stage 1 Delivery Strategy

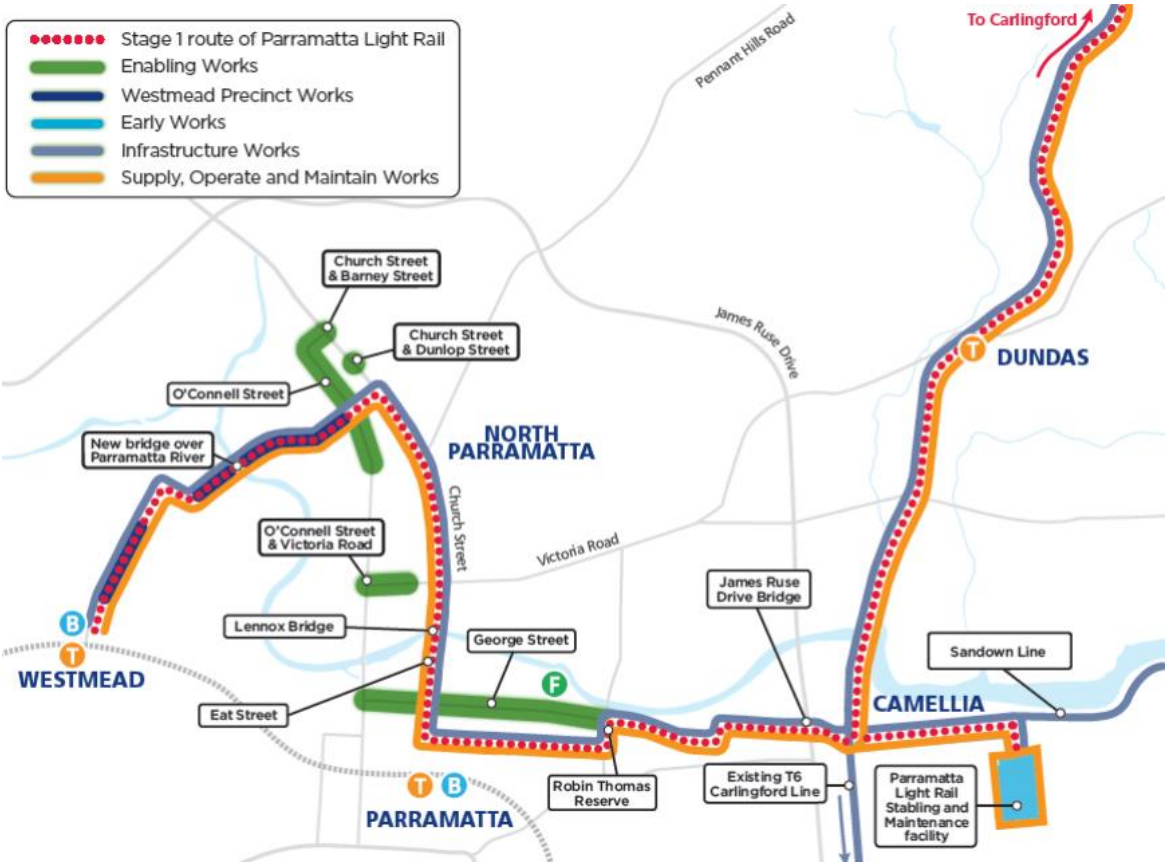
The Parramatta Light Rail (PLR1) – Stage 1 comprises approximately 12km alignment from Westmead to Carlingford via Camellia and consists of a mix of both on-street and dedicated corridor.

PLR1 is being delivered under five contracts:

- Enabling Works (Package One)
- Westmead Precinct Works (Package Two)
- Early Works – Remediation (Package Three)
- Infrastructure Works (INFRA) (Package Four)
- Supply, Operations and Maintenance (SOM) (Package Five) – the subject of this sub-plan.

Each package of work is to be delivered under separate contracts on behalf of the proponent Transport for NSW (TfNSW). While the packages will commence at different times under separate construction approvals, there will be periods during which the packages works will overlap. The interactions between the packages are shown in Figure 1-2.

Figure 1-2: Parramatta Light Rail Delivery Strategy



1.2.5 SOM Works

Great River City Light Rail (GRCLR) have been engaged to deliver SOM Works (Package 5). As System Integrator for PLR, GRCLR's Activities include:

- Delivery Activities
- LRV Procurement
- Operation and Maintenance (O&M).

The delivery activities include all investigation, selection, specification, design, approvals, construction, manufacture, installation, testing & commissioning, operational readiness and activities to transition from the Delivery Phase to the Operations Phase.

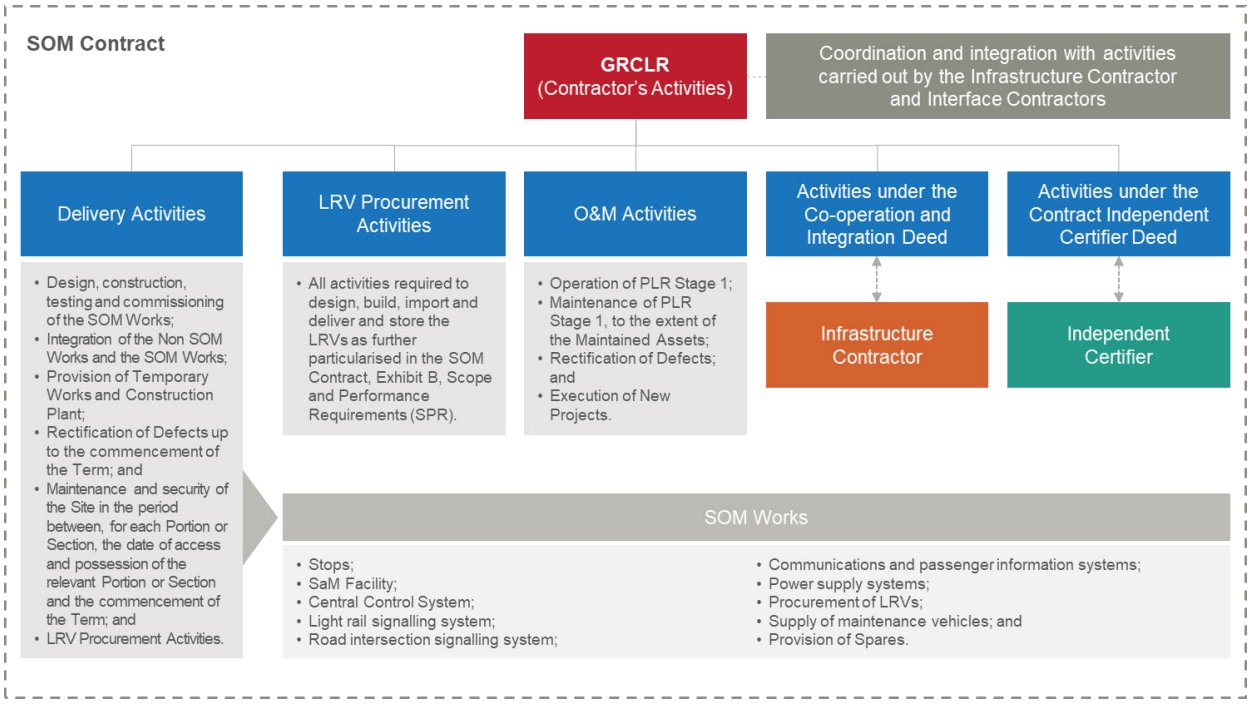
In summary works include:

- All works above and additional to the platform concrete foundation slab at all stops
- Stabling & Maintenance Facility (SaMF)
- Central Control System
- Light Rail signalling system
- Elements of the road intersection signalling system
- Communications and passenger information systems
- Power Supply system
- Procurement of Light Rail Vehicles (LRV)
- Testing and Commissioning

- Maintenance plant and machinery for the LRVs
- Earthing & bonding, electrolysis and electromagnetic compatibility
- Electronic Ticketing system (ETS) for top up or Ticket Machine and Fixed Location Reader.

Figure 1-3 further details these activities.

Figure 1-3: SOM Contractor's Activities for PLR Stage 1



1.2.6 Testing and Commissioning

The Testing and Commissioning (T&C) phase of Parramatta Light Rail – Stage 1 Supply, Operate, Maintain, Package 5 (SOM) includes the introduction of Light Rail Vehicles (LRVs) to the alignment, LRV testing and ramp-up to operational readiness, including a 28-day trial run period.

T&C is considered to be a 'construction' activity under the Infrastructure Approval (SSI-8285) and Environmental Protection Licence (EPL) 21606 and the subordinate management system framework. However, as T&C also incorporates movements of LRVs along the alignment, some approval conditions relating to rolling stock also apply. Therefore, T&C activities straddle 'construction' and 'operation' in a way that other SOM activities do not.

Key T&C activities (not necessarily in chronological order) include:

A. Introduction of LRVs to the alignment:
    i. Static testing of LRVs at the SaMF
    ii. Localised infrastructure tests on the alignment without LRVs
    iii. Running an LRV during the daytime from SaMF to Carlingford.
B. Increased LRV running, incorporating:
    i. Dynamic testing at the SaMF, including main depot interfaces
    ii. Initial dynamic testing along the alignment (SaMF to Carlingford) with traffic controls
    iii. LRV integration testing with signalling and communications system (SaMF to Carlingford)
    iv. Initial dynamic testing along the alignment (Westmead to Tramway Avenue) with traffic controls, including movements near Cumberland Hospital
    v. Broader dynamic testing along the alignment without traffic controls
    vi. Driver training.
C. Trial running on the alignment.

i. Full schedule trial running (28 days, 0500 to 0100).

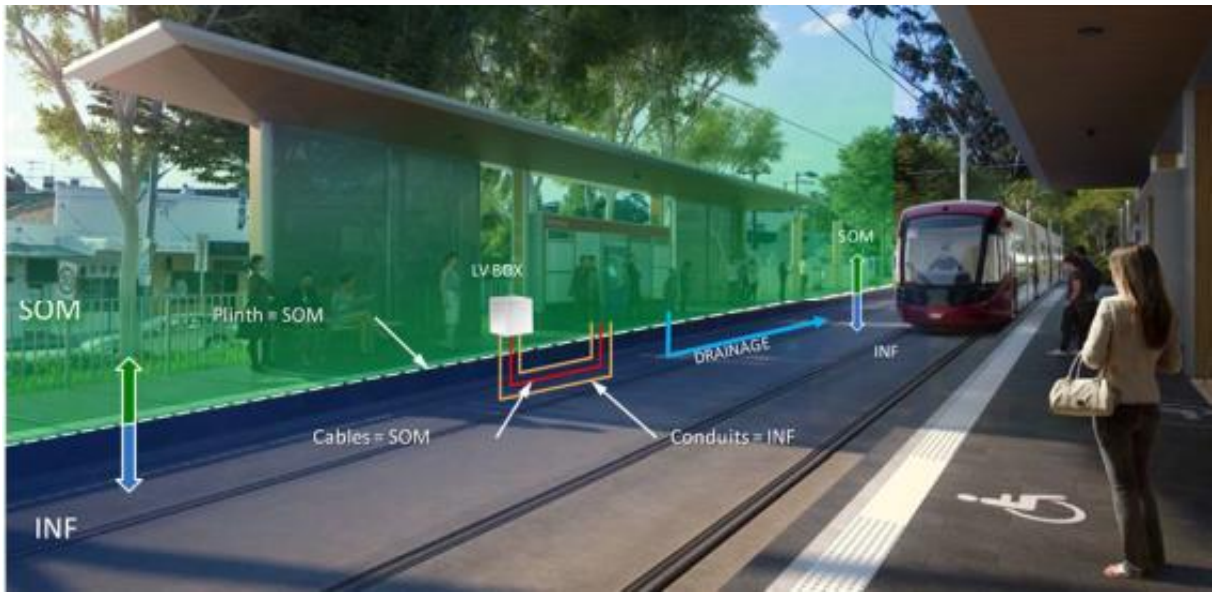
1.2.7 Relationship with other Packages

Infrastructure Works (Package 4)

The Infrastructure Works Package is closely aligned to the Package 5, SOM Works. A graphical representation of the split in scope between the two packages is depicted in **Figure 1-4**. The reason for dividing this work into two packages is to ensure that suitably qualified and experienced sub-contractors are in place for each specialised component; civil infrastructure, and operational systems. The Infrastructure Works will deliver the civil infrastructure components of PLR and will not trigger the operational conditions, except for those that relate to detailed design.

An interface between the two packages has been established to monitor cumulative impacts and the coordination of environmental complaints management, site management controls, and the delineation of incident reporting and non-compliance management.

Figure 1-4: Relationship between Infrastructure Works and SOM Works



Early Works Remediation Contractor – Ventia (Package 3)

The SOM contract is dependent on the completion of the remediation works at the stabling and maintenance facility (SaMF) site, by the remediation contractor.

The SaMF site is subject to historical contamination and is a listed contaminated site by the Environment Protection Authority (EPA). The works have been split to ensure that appropriately qualified contractor, experienced in remediating heavily contaminated sites, is managing the remediation of the site. The remediation contractor will complete their works and provide GRCLR a remediated site, complete with a site audit statement, and supporting management documentation, fit for purpose for site establishment, construction and operational activities associated with PLR.

The remediation works will deliver the remediated site, including any details of any ongoing management requirements, and will not trigger the construction and operational conditions, except

for those that relate to detailed design. The Remediation Contractor will provide GRCLR with a Long Term Environmental Management Plan (LTEMP) for the SaMF, the LTEMP will include all operation, management, maintenance and monitoring requirements for the SaMF. GRCLR will implement the requirements relevant to the construction of the Stabling and Maintenance facility.

Ongoing management for the remedial works on the SaMF site will be implemented through a Long Term Environmental Management Plan (LTEMP) which will be approved by the Site Auditor, as part of the issuing of the Site Audit Statement (SAS) for the site. The LTEMP will be a stand-alone document, and all monitoring and reporting will be managed through the processes and procedures in the LTEMP, and not through the SOM CEMP.

An interface between the two packages has been established to ensure the remediated site meets the design requirements for the construction, operation and maintenance of the site.

1.3 Scope of the Sub-Plan

This Sub-plan outlines how GRCLR proposed to minimise and manage potential noise and vibration impacts during design and construction of the SOM Works, while complying with relevant approval, statutory and contract requirements. Sections 3.2, 3.3 and 3.4 provide compliance tables identifying where in this Sub-plan relevant requirements are addressed.

This Sub-plan is applicable to all activities during construction of the SOM Works, including all areas where physical works will occur or areas that may be otherwise impacted by the construction works, and under the control of GRCLR. All GRCLR staff and sub-contractors are required to operate fully under the requirements of this Sub-plan and related environmental management plans, over the full duration of the construction program.

1.4 Environmental management systems overview

The environmental management system overview is described in Section 4.1 of the CEMP.

This Plan is a Sub-plan of the Construction Environmental Management Plan (CEMP) (PLR1SOM-GLR-ALL-PM-PLN-000014). It has also been prepared with reference to the following documents from the GRCLR Environment Management System (EMS):

- GRCLR Environment and Sustainability Policy
- CEMP
- Environmental Management Subplans
- Environmental Work Method Statements (EWMS)
- Environmental Control Maps (ECMs)
- Procedures, protocols, registers and forms

Key interactions for this Sub-plan with other management plans and documents include:

- Land Use Survey (CoA E20) – current survey to identify sensitive receivers (including critical working areas such as operating theatres, precision laboratories housing sensitive equipment and drama theatres) potentially exposed to construction noise and vibration, construction ground-borne noise and operational noise and vibration (included in Appendix B)
- Out of Hours Works (OOHW) Protocol (CoA E28, EPL Conditions L4.8-4.12 – Appendix A) – outlines a process for the consideration, management and approval of works which are outside of standard construction hours

- Construction Noise and Vibration Impact Statements (CoA E42) – site specific assessments which utilise information from the Land Use Survey to predict noise and vibration impacts of construction activities used to determine suitable mitigation measures
- TfNSW Community Communication Strategy (CoA B1) – provides the framework for communication and engagement for Stage 1 of the Parramatta Light Rail (PLR)
- Heritage Management Sub-plan (PLR1SOM-GLR-ALL-PM-PLN-000037) – details the management controls and requirements for managing potential vibration impacts on identified heritage items
- Health Administration Corporation (HAC) Assessment System – outlines the process for managing noise and vibration impacts on the Westmead Health and Education Precinct (including Westmead Hospital, research institutes, the Children's Hospital and Cumberland Hospital)
- Grey-headed flying fox Monitoring Program – identifies safeguards, including for noise control in relation to the protection of the grey-headed flying fox camp within Parramatta Park
- Safety Management Plan – provides the framework including details of procedures and protocols to manage potential noise and vibration impacts to workers
- Construction Noise and Vibration Monitoring Plan (Appendix F of this Plan) – details how construction noise and vibration will be monitored in order to compare against requirements the actual performance during all construction associated with the Project.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how the GRCLR proposes to manage potential noise and vibration impacts during construction of the SOM Works.

2.2 Objectives

The key objective of the CNVMP is to ensure all CoA, REMMMs and licence/permit requirements relevant to noise and vibration are described, scheduled and assigned responsibility as outlined in:

- EIS prepared for Parramatta Light Rail – Stage 1
- SPIR prepared for Parramatta Light Rail – Stage 1
- Conditions of Approval (CoA) granted to the Project on 29 May 2018 and modifications
- Environment Protection Licence (EPL) 21606
- Transport for NSW's Construction Noise and Vibration Strategy
- PLR Stage 1 Supply, Operate and Maintain (SOM) Contract Project Deed (Project Deed).

Additional objectives of the Sub-plan include:

- Minimise noise and vibration impacts to the community resulting from construction
- Avoid any damage to buildings, services, heritage items and sensitive equipment from vibration during construction.

2.3 Targets

The following targets have been established for the management of noise and vibration impacts during the project:

- Comply fully with all relevant legislative requirements, CoAs, REMMMs, EPOs and EPL
- Implement feasible and reasonable noise mitigation measures with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 2009)
- Manage works to avoid working within the minimum working distances for structural damage to buildings caused by vibration, in particular for heritage buildings
- Avoid recurring or major exceedances of vibration goals for human comfort criteria
- Minimal complaints from the community and stakeholders through effective management of noise and vibration during the construction stage
- No divergence from the noise management process.

3 Environmental requirements

3.1 Relevant legislation

3.1.1 Legislation

Legislation relevant to noise and vibration management for this Project includes:

- *Environmental Planning and Assessment Act 1979*
- *Protection of the Environment Operations Act 1997.*

3.1.2 Guidelines

The main guidelines, specifications and policy documents relevant to this Plan include:

- NSW Interim Construction Noise Guideline (ICNG), Department of Environment and Climate Change 2009
- NSW Assessing Vibration – a technical guideline (AVTG), Department of Environment and Conservation 2006
- NSW Road Noise Policy, Dept. of Environment, Climate Change and Water 2011
- NSW Noise Policy for Industry, Environment Protection Authority 2017
- NSW Industrial Noise Policy, Environment Protection Authority 2000
- IS Technical Manual Version 1.2, Infrastructure Sustainability Council of Australia (ISCA) 2016
- Transport for NSW's Construction Noise and Vibration Strategy (7TP-ST-157/4.0)
- Transport for NSW's Construction Noise Estimation Tool (9TP-FT-150).

Note that the EIS and the SEARs referenced the INP, which was superseded by the NSW Noise Policy for Industry (NPfI) in October 2017. CoA A7 states that "References in the terms of this approval to any guideline, protocol, Australian Standard or policy are to such guidelines, protocols, Standards or policies in the form they are in as at the date of this approval, unless agreed with the Secretary". The instrument of approval is dated post October 2017. Furthermore, the operational noise requirements in CoA E52 and E57 identify the NPfI as the appropriate criteria guideline. As such, the NPfI has been adopted as the relevant reference guideline in this CNVMP.

3.1.3 Standards

The main Standards relevant to this Plan include:

- Australian Standard AS/NZS 2107:2000 Acoustics - Recommended design sound levels and reverberation times for building interiors
- Australian Standard AS 2187.2 Explosives - Storage and use - Part 2 Use of explosives
- Australian Standard AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites
- Australian Standard 2834-1995 Computer Accommodation, Chapter 2.9 Vibration
- British Standard BS 6472-2008, Evaluation of human exposure to vibration in buildings (1-80Hz)
- British Standard 7385: Part 2-1993 Evaluation and measurement of vibration in buildings

- German Standard DIN4150-1999 Structural vibration Part 3: Effects of vibration on Structures
- ASHRAE Applications Handbook (SI) 2003, Chapter 47 Sound and Vibration Control.

3.2 Minister's Conditions of Approval and EPL Conditions

The CoA relevant to this Plan are listed Table 3-1. A cross reference is also included to indicate where the condition is addressed in this Plan or other project management documents. Where CoA are reflected in the EPL, the respective EPL Condition has been provided.

Table 3-1: Minister's Conditions of Approval and respective EPL Conditions, where appropriate.

CoA No.	Condition Requirements	Document Reference	How Addressed
A1	The CSSI must be carried out in accordance with the terms of this approval and generally in accordance with the description of the CSSI in the Parramatta Light Rail (Stage 1) Westmead to Carlingford via Parramatta CBD and Camellia Environmental Impact Statement (dated August 2017) (the EIS) as amended by (a) the Parramatta Light Rail (Stage 1) Westmead to Carlingford via Parramatta CBD and Camellia Submissions Report (incorporating Preferred Infrastructure Report) (February 2018) (the SPIR); (b) SSI 8285 Administrative modification (November 2018) (MOD 1); and (c) SSI 8285 Correction to Administrative modification (January 2019) (MOD 2).	This document (CNVMP) – Implementation of requirements for construction noise and vibration documented in this document	This document details where and how the terms of the Planning Approval (based on the consolidated conditions following MOD 2), the REMMMs and EPOs in the SPIR have been addressed. Detail of how compliance is addressed in Section 3.2, 3.3 and 3.4 of this CNVMP.
A5 A5	Where the terms of this approval require a document or monitoring program to be prepared or a review to be undertaken in consultation with identified parties, evidence of the consultation undertaken must be submitted to the Secretary with the document or monitoring program or review. The evidence must include: (a) documentation of the engagement with the party(ies) identified in the relevant condition of approval before submitting the document for approval;	Section 4 PLR1SOM-GLR-ALL-EN-RPT-001004 (A5 Consultation Report)	A summary of consultation carried out during the development of this Sub-plan is provided in Section 4. A separate, stand-alone document detailing the consultation undertaken and outcomes has been prepared and submitted to DPE together with this CNVMP.

CoA No.	Condition Requirements	Document Reference	How Addressed
(*contin.*)	(b) log of the points of engagement or attempted engagement with the identified party(ies) and a summary of the issues raised by the identified party(ies); (c) documentation of any follow-up with the identified party(ies), where feedback has not been provided, to confirm that the identified party(ies) has none or has failed to provide feedback after repeated requests; (d) outline of the issues raised by the identified party(ies) and how they have been addressed, including evidence that the party(ies) is satisfied the issues have been addressed; and (e) where there are outstanding issues raised by the identified party(ies) that have not been adopted, the reasons why they have not been/could not be adopted must be provided, including evidence of consultation with the relevant party(ies).		
A18	The Proponent must use best endeavours to ensure that the duration of construction in any one location or zone, as defined to the Secretary's satisfaction, is such that any receiver is impacted by construction works for the minimum, reasonably practicable time. The Proponent must demonstrate the principles that would be adopted to minimise the duration of construction in zones as part of the Staging Report required by Condition A13.	Section 8.1 Appendix A	CNVIS will assess the potential construction impacts including duration. They would address cumulative or consecutive construction impacts. CNVIS will be used in the development of construction works program, including Testing and Commissioning (T&C). CNVIS will detail the implementation of the OOHW protocol for the various works, and the process to minimise the

CoA No.	Condition Requirements	Document Reference	How Addressed
			duration of impacts on nearby sensitive receivers.
A26	A suitably qualified and experienced Acoustics Advisor (AA) must be engaged for the duration of construction and for no less than six months following completion of construction of the CSSI. The AA must provide a statutory declaration to the Secretary that they are independent of the design and construction personnel. The Proponent must cooperate with the AA by: (a) providing access to noise and vibration monitoring activities as they take place; (b) providing for review noise and vibration plans, assessments, monitoring reports and data analyses undertaken; and (c) considering any recommendations to improve practices and demonstrating, to the satisfaction of the AA, why any recommendation is not adopted.	Section 10.1.2	A suitably qualified and experienced Acoustics Advisor has been appointed to the Project and has been approved by the DPE (see Section 10.1.2).
A27	The AA must meet the following minimum requirements: (a) relevant experience in the last ten years as a senior acoustic specialist on major infrastructure projects, including a fieldwork and construction management component; (b) tertiary qualifications in an acoustic related discipline or equivalent experience; and (c) proven understanding and application of NSW State and local legislation, relevant Australian standards, NSW environmental regulatory	Section 10.1.2	A suitably qualified and experienced Acoustics Advisor has been appointed to the Project and has been approved by the DPE.

CoA No.	Condition Requirements	Document Reference	How Addressed
	requirements and implementation of noise mitigation and environmental best practice.		
A28	The Proponent must notify the Department in writing on the engagement of the AA including demonstrating the requirements of Conditions A26 and A27.	Section 10.1.2	The Acoustics Advisor has been appointed to the Project and has been approved by DPE.
A29	The AA must:	Section 10.1.2	The responsibilities of the AA are outlined in Section 10.1.2
	(a) receive and respond to communication from the Secretary about the performance of the CSSI in relation to noise and vibration;	Section 10.1.2	Details are included in the reference section.
	(b) consider and inform the Secretary on matters specified in the terms of this approval relating to noise and vibration;	Section 10.1.2	Details are included in the reference section.
	(c) consider and recommend, to the Proponent, improvements that may be made to work practices to avoid or minimise adverse noise and vibration impacts;	Section 10.1.2 Section 8.1 Section 9 Section 10.3 Section 11.2	The AA will review and endorse CNVIS, which will be provide the opportunity to recommend improvements that may be made to work practices. Additionally, the AA will review other noise and vibration assessment, management and monitoring documentation, which will provide an opportunity to review effectiveness and adequacy of work practices and of recommend improvements.

CoA No.	Condition Requirements	Document Reference	How Addressed
	(d) consider consultation outcomes with affected receivers to determine the adequacy of noise mitigation and management measures including work hours and respite periods;	Section 4 Section 9.4	The consultation outlined in Section 4 will inform the Project's mitigation and management measures. The Communication and Engagement Plan and Consultation Records will be made available to the AA. These measures will be revised as necessary.

A29 *(contin.)*	(e) review all noise and vibration documents required to be prepared under the terms of this approval and, should they be consistent with the terms of this approval, endorse them before submission to the Secretary (if required to be submitted to the Secretary) or before implementation (if not required to be submitted to the Secretary);	Section 10.1.2 Section 4 Section 5.1.1 Section 6.1 Section 8.1 Section 10.3 Section 10.6	The following noise and vibration documents will be provided to the AA for review, and endorsement where required: This Sub-plan - Land Use Survey (or subsequent updates to the Project wide land use survey) (Section 5.1.1) Building Condition Survey (or subsequent updates to the Building Condition survey) (Section9.6) Measurements of existing ambient N&V levels (Section 10.3) CNVIS (Section 8.1) Communication and Engagement Plan and Consultation Records (Section 4) Noise and Vibration Noise Complaint reports (CEMP Section 6.4) Noise and Vibration Monitoring Report (Section 10.6).

CoA No.	Condition Requirements	Document Reference	How Addressed
A29 *(contin.)*	(f) regularly monitor the implementation of all noise and vibration documents required to be prepared under the terms of this approval to ensure implementation is in accordance with what is stated in the document and the terms of this approval;	Section 10.1.2	GRCLR will facilitate the AA to attend inspections, monitoring or audits as requested by the AA or Secretary. The AA will review and audit this CNVMP and associated management measures annually, or in the case of an incident or non-conformance, in accordance with Section 9 of the CEMP.
	(g) in conjunction with the ER, the AA must:	Section 10.1	-
	i) as may be requested by the Secretary, help plan, attend or undertake audits of noise and vibration management of the CSSI including briefings, and site visits;	Section 10.1.2 Section 10.5	Audits will be undertaken in accordance with Section 10.5. The AA will plan and attend these audits if requested by the Secretary. GRCLR will attend and provide all relevant information required to complete these audits.
	ii) if conflict arises between the Proponent and the community in relation to the noise and vibration performance during construction of the CSSI, follow the procedure in the Community Communication Strategy approved under Condition B3 of this approval to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary;	Section 10.1.2 TfNSW Community Communication Strategy	GRCLR will cooperate with the AA and provide all relevant information required for the AA to assist in resolving conflicts between the Proponent and the community.

CoA No.	Condition Requirements	Document Reference	How Addressed
A29 *(contin.)*	iii) consider relevant minor amendments made to the CEMP, relevant Sub-plans and noise and vibration monitoring programs that require updating or are of an administrative nature, and are consistent with the terms of this approval and the management plans and monitoring programs approved by the Secretary and, if satisfied such amendment is necessary, endorse the amendment. This does not include any modifications to the terms of this approval;	Section 10.1.2 Section 11.2	The CEMP will have a section called Review and Continuous Improvement (Section 9). The CNVMP will be subject to the same process as the CEMP.
	iv) assess the noise impacts of minor construction ancillary facilities; and	Section 8.1 Section 10.1.2	The potential impacts of minor construction ancillary facilities will be assessed in CNVIS or endorsed appropriate modelling tool where impacts are likely to be short term of low impact. These assessments will be provided to the AA for review and endorsement.
	(h) prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Noise and Vibration Report detailing the AAs actions and decisions on matters for which the AA was responsible in the preceding month (or another timeframe agreed with the Secretary). The Noise and Vibration Report must be submitted within seven days following the end of each month for the duration of construction of the CSSI, or as otherwise agreed with the Secretary.	Section 10.1.2	Monthly Noise and Vibration Reports will be prepared by the AA and submitted to DPE within seven days following the end of each month for the duration of construction of the CSSI, or as otherwise agreed with the Secretary. The GRCLR will assist the AA in providing all documents, information and co-operation reasonably requested by TfNSW in relation to this reporting.

<table>
<tr><th>CoA No.</th><th>Condition Requirements</th><th>Document Reference</th><th>How Addressed</th></tr>
<tr><td>C3</td><td>The following CEMP Sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP Sub-plan and be consistent with the CEMP referred to in Condition C1:
<table>
<tr><th></th><th>Required CEMP Sub-plan</th><th>Relevant authority(s) and council(s) to be consulted for each CEMP and Sub-plan</th></tr>
<tr><td>b)</td><td>Noise and Vibration</td><td>Relevant Council(s), EPA,
NSW Health</td></tr>
</table></td><td>Section 4</td><td>This CNVMP has been prepared in accordance with this condition and describes how GRCLR proposes to manage noise and vibration during construction of the Project.
A summary of consultation undertaken with the relevant government agencies during preparation of this Sub-Plan is provided in Section 4 and full details in a stand-alone separate document provided to DPE together with the CNVMP.</td></tr>
<tr><td>C4</td><td>The CEMP Sub-plans must state how:</td><td></td><td></td></tr>
<tr><td></td><td>(a) The environmental performance outcomes identified in the documents listed in Condition A1 will be achieved;</td><td>Section 3.4
Section 9</td><td>This CNVMP was prepared in accordance with the environmental performance outcomes identified in the EIS and SPIR, and is evidenced primarily in Section 3.4 of this Sub-Plan.</td></tr>
<tr><td></td><td>(b) The mitigation measures identified in the documents listed in Condition A1 will be implemented;</td><td>Section 3.3
Section 9</td><td>A compliance table at Section 3.3 demonstrates where and how the relevant mitigation measures have been addressed in this CNVMP.</td></tr>
</table>

CoA No.	Condition Requirements	Document Reference	How Addressed
	(c) The relevant terms of this approval will be complied with; and	(This section) Section 3.2 Section 9	A compliance table at Section 3.2 demonstrates where and how the relevant terms of the CoA have been addressed in this CNVMP.

CoA No.	Condition Requirements	Document Reference	How Addressed
C4 *(contin.)*	(d) Issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	Section 7 Section 8 Section 9	Issues identified during the EIS that require management during construction are outlined in Section 7. Other issues will be identified through CNVIS process, outlined in Section 8. The process for quantitative risk assessment for the Project is outlined in the CEMP Section 3.5. CEMP Appendix A2 is the environmental risk register for the construction activities associated with the Project. The risk register is reviewed at least every six months, and in response to significant issues, incidents and non-compliances (Section 9.2 of CEMP). The approaches for mitigation and management of these risks has been outlined in Section 9. These will be implemented during pre-construction, design and construction phases of the Project.
C5	The CEMP Sub-plans must be developed in consultation with relevant government agencies (including Relevant Council(s)). Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including all copies of correspondence from those	Section 4	The CNVMP has been prepared in consultation with City of Parramatta Council, EPA and NSW Health. A summary of this consultation will be provided in a separate standalone

CoA No.	Condition Requirements	Document Reference	How Addressed
	agencies, must be provided to the Secretary with the relevant CEMP Sub-plan.		consultation document provided to DPE together with this Sub-Plan.
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 month before construction.	Section 4	This CNVMP will be submitted no later than one month prior to commencement of construction.
C8	Construction must not commence until the CEMP and any CEMP Sub-plan specified in Condition C3 have been submitted to or approved by the Secretary. The CEMP and CEMP Sub-plans submitted to or approved by the 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 Sub-plans for that stage have been submitted to or approved by the Secretary. *Note: the requirement to submit or have a CEMP or CEMP Sub-plan approved is specified in Condition C3*.	Section 4	Construction will not commence until this Sub-plan has been submitted to the Secretary and approved. Once approved, it will be implemented for the duration of construction.
C9	The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies for each to compare actual performance of construction of the CSSI against performance predicted in the documents listed in Condition A1 or in the CEMP: (b) Noise and Vibration Monitoring - Relevant Council(s), EPA, NSW Health (as relevant)	Section 4 Section 10.3	The Construction (Noise and Vibration) Monitoring Program has been prepared in consultation with City of Parramatta Council, EPA and NSW Health. A summary of this consultation is provided in a separate standalone consultation document provided to DPE together with this Sub-Plan.
C10	Each Construction Monitoring Program must provide:	Section 10.3	-

CoA No.	Condition Requirements	Document Reference	How Addressed
		Appendix F *(NVMonP)*	
C10 (*contin.*)	(a) details of baseline data available;	Section 10.3 Appendix F *(NVMonP)*	Details of baseline data are addressed in the Noise and Vibration Monitoring program (NVMonP) (Appendix F) construction noise.
	(b) details of baseline data to be obtained and when;	Section 10.3 Appendix F *(NVMonP)*	Ambient vibration monitoring will be undertaken at facilities with vibration sensitive scientific and medical equipment for a minimum of one week prior to the commencement of vibration intensive activities. The construction noise and vibration monitoring programs each include verification monitoring to assess the accuracy of predicted noise and vibration impacts at the commencement of new activities.
	(c) details of all monitoring of the project to be undertaken;	Section 10.3 Appendix F *(NVMonP)*	The NVMonP is included in Appendix F which includes a schedule of the inspection and monitoring to be undertaken.
	(d) the parameters of the project to be monitored;	Section 10.3	The parameters to be measured during construction works are

CoA No.	Condition Requirements	Document Reference	How Addressed
		Appendix F *(NVMonP)*	detailed in the NVMonP in Appendix F.
C10 (*contin.*)	(e) the frequency of monitoring to be undertaken;	Section 10.3 Appendix F *(NVMonP)*	The timing and frequency of the noise and vibration monitoring is included in the NVMonP in Appendix F.
	(f) the location of monitoring;	Section 10.3 Appendix F *(NVMonP)*	Locations of out of hours or high impact noise and vibration works will be determined in the CNVIS relative to the location and activities being undertaken and access to properties. The locations of periodic noise monitoring are detailed in the NVMonP in Appendix F.
	(g) the reporting of monitoring results against relevant criteria;	Section 10.3 Appendix F *(NVMonP)*	Details of the reporting requirement of the noise and vibration monitoring are included in the NVMonP in Appendix F.
	(h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and	Section 10.3 Appendix F *(NVMonP)*	The NVMonP provides actions to be implemented in the event of exceedance of the predicted impacts.
	(i) any consultation to be undertaken in relation to the monitoring programs.	Section 4	The NVMonP Sub-plan was provided to EPA, NSW Health and

CoA No.	Condition Requirements	Document Reference	How Addressed
			City of Parramatta Council for consultation.
C11	The noise and vibration monitoring data collected during monitoring required by Condition C9 must be available to the Proponent, ER, AA,, the EPA, Relevant Council(s) and the community to inform construction scheduling, the level of impacts and whether additional mitigation is required. The Department must also be provided access to this data if specifically requested.	Section 10.3 Appendix F *(NVMonP)*	A schedule of the reporting of the noise and vibration monitoring program is presented in the NVMonP provided in Appendix F. The schedule identifies the submission of each report generated as a result of the noise and vibration monitoring program.
C12	The Construction Monitoring Programs must be developed in consultation with relevant government agencies and Relevant Council(s) as identified in Condition C9 of this approval and must include, 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 4	The NVMonP for noise and vibration is included in this Sub-plan and was provided to EPA, NSW Health and City of Parramatta Council for consultation.
C13	The Construction Monitoring Programs must be endorsed by the ER and submitted to the Secretary for information at least one month before the commencement of construction.	Section 4	The Noise and Vibration Monitoring Program will be endorsed by the ER. The Noise and Vibration Monitoring Program will be submitted to DPE before commencement of construction.
C14	Construction must not commence until the Secretary has received all of the required Construction Monitoring Programs, and all relevant baseline data for the specific construction activity has been collected.	Section 10.1.2 Appendix F *(NVMonP)*	Construction activities, involving noise and vibration, will not commence until the Noise and Vibration Monitoring Program has

CoA No.	Condition Requirements	Document Reference	How Addressed
			been endorsed by the ER, AA and submitted to DPE for information, and relevant noise and vibration, and all the necessary baseline data for the monitoring program has been collected.
C15	The Construction Monitoring Programs, as submitted to the 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 Secretary, whichever is the greater.	Section 4	The Noise and Vibration Monitoring Program will be implemented for the duration of the construction of the Project, or as otherwise required by the Secretary.
C16	The results of the Construction Monitoring Programs must be submitted to the 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 10.3 Appendix F *(NVMonP)*	A schedule of the reporting of the noise and vibration monitoring program is presented in the NVMonP provided in Appendix F. The schedule identifies the submission of each report generated as a result of the noise and vibration monitoring program. Monthly monitoring reports will be prepared to report the noise and vibration monitoring data collected during monitoring undertaken in accordance with this Sub-plan and the CNVISs.

CoA No.	Condition Requirements	Document Reference	How Addressed
C17	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	Section 10.3 Appendix F *(NVMonP)*	The construction NVMonP is incorporated into this CNVMP in Appendix F.
C19	Boundary fencing that incorporates screening must be erected around all construction ancillary facilities that are adjacent to sensitive receivers for the duration of site establishment and construction of the CSSI unless otherwise agreed with Relevant Council(s), affected residents, business operators and/or landowners and in accordance with Condition B2(b).	Section 8.1	All boundary fencing would be adopted as required and incorporated into the Construction Noise and Vibration Impact Statements for each site as relevant.
C20	Boundary screening required under Condition C19 of this approval must reduce visual, noise and air quality impacts on adjacent sensitive receivers.	Section 8.1	As noted above, boundary fencing will be reviewed in the development of the Construction Noise and Vibration Impact Statements and adopted as appropriate for each site.
E20	A detailed land use survey must be undertaken to confirm sensitive receivers (including critical working areas such as operating theatres, precision laboratories housing sensitive equipment and drama theatres) potentially exposed to construction noise and vibration, construction ground-borne noise and operational noise and vibration. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of works which generate construction or operational noise, vibration or ground-borne noise in that area. The results of the survey must be used to develop the Noise and Vibration Management Sub-plan required by Condition C3 and Construction Noise and Vibration Impact Statements required by Condition E42.	Section 5.1 Appendix B-1 *(Land use survey)*	A land use survey was prepared for the SOM Works and is attached to the CNVMP in Appendix B. The results of the land use survey have been used in the development of this Sub-plan and will be used to inform noise and vibration management decisions during the development of CNVIS.

CoA No.	Condition Requirements	Document Reference	How Addressed
E21 (EPL L4.1)	Works must be undertaken during the following hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 12:00pm Saturdays; and (c) at no time on Sundays or public holidays.	Section 6.1	Construction activities will be undertaken during the approved construction hours as outlined in Section 6.1.
E22 (EPL L4.1)	Notwithstanding Condition E21, and with the exception of 'Eat Street', works may be undertaken during the following hours: (a) 6:00pm to 7:00pm Mondays to Fridays, inclusive; and (b) 12:00pm to 6:00pm Saturdays.	Section 6.1	Construction activities will be undertaken during the approved construction hours as outlined in Section 6.1.
E23 (EPL L4.5)	Notwithstanding Condition E21, works may be undertaken in the Camellia and Rosehill precincts (east of James Ruse Drive) and the Carlingford precinct (from Parramatta River to Victoria Road) 24 hours a day, seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), between 10.00pm and 7.00am.	Section 6.1 Appendix A *(OOHW Protocol)*	Construction activities will be undertaken during the approved construction hours as outlined in Section 6.1. An Out of Hours Works Protocol (Appendix A) has been developed to assess works proposed to be undertaken outside of standard construction hours against the Conditions of Approval and the EPL.
E24	Construction outside the hours identified in Condition E21 along 'Eat Street' must be established through consultation with affected businesses as outlined in the Business Activation Plan required by Condition E110.	Section 6.1.2 Section 9.4 Appendix A *(OOHW Protocol)*	The Business Activation Plan (BAP) developed to satisfy CoA E110 will direct the consultation with businesses of Eat Street to determine works period that

CoA No.	Condition Requirements	Document Reference	How Addressed
			minimise disruption to the businesses. Consultation will be undertaken with affected sensitive receivers as described in Section 9.4
E25 E25 (*contin.*)	Works may be undertaken outside of the hours defined in Conditions E21 to E22, as applicable, but only if one or more of the following applies: (a) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (b) 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 (c) where different hours of works are permitted or required under an EPL in force in respect of the CSSI; or (d) works approved under an Out-of-Hours Work Protocol for works not subject to an EPL; or (e) construction that causes LAeq (15 minute) noise levels: i) 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 ii) 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 iii) no more than 15dBA above the night-time rating background level at any residence during the night time period, when measured using the LA1(1 minute) noise descriptor, and	Section 6.1.2 Appendix A *(OOHW Protocol)*	An Out of Hours Works Protocol has been developed to assess works proposed to be undertaken outside of standard construction hours against the Conditions of Approval prior to works not subject to an EPL.

CoA No.	Condition Requirements	Document Reference	How Addressed
	iv) 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 v) 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).		
E26	On becoming aware of the need for emergency construction works, the Proponent must notify the ER of the need for those activities or works. The Proponent must also use best endeavours to notify all affected sensitive receivers of the likely impact and duration of those works.	Appendix A *(OOHW Protocol)*	TfNSW and the ER will be notified verbally immediately in the event of an environmental incident, and in writing within 4 hours, in accordance with the *TfNSW Environmental Incident Classification and Reporting Procedure (9TP-PR-105).* Depending upon the emergency, further appropriate departments, regulators and sensitive receivers will be notified of any emergency works occurring as outlined in Section 7 of the CEMP. When the EPL is sought for signalling works it will also be outlined in the Pollution Incident Response Management Plan (PIRMP).

CoA No.	Condition Requirements	Document Reference	How Addressed
E27	Except as permitted by an EPL, or through the Out-of-Hours Work Protocol, Highly Noise Intensive Works that result in an exceedance of the applicable NML at the same sensitive 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. *Note: A trial period of the Highly Noise Intensive Work undertaken with the approval of the Out of Hours Work Protocol may be established.*	Section 8.1 Appendix A *(OOHW Protocol)*	Predicted noise and vibration impacts will be assessed in the CNVIS in accordance with Section 8.1. The hours of works and respite will be programmed to comply with the Out of Hours Works Protocol or an EPL.

CoA No.	Condition Requirements	Document Reference	How Addressed
E28	An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of works which are outside the permitted hours defined in Conditions E21 to E22, where an EPL does not apply. The Protocol must be approved by the Secretary before commencement of out-of-hours works. The Protocol must be prepared and implemented in consultation with AA. The Protocol must: (a) provide a process for the consideration of out-of-hours works against the relevant noise and vibration criteria; (b) provide a process for the identification and implementation of mitigation and management measures for residual impacts, in consultation with the community at each affected location, consistent with the requirements of Condition E39; (c) identify an approval process that considers the risk level of activities (in accordance with AS/NZS ISO 31000:2009 “Risk Management”), proposed mitigation, management, and coordination, including where: i) low and moderate risk activities can be approved by the ER in consultation with the AA, and ii) high risk activities that are approved by the Secretary; and (d) identify Department and community notification arrangements for approved out of hours works, which will be detailed in the Communication Strategy. Note: This condition does not apply where work is required for an emergency (as defined in Condition E25 (b)).	Section 6.1.2 Appendix A *(OOHW Protocol)*	Not applicable, as an EPL exists for the entire project. However, an Out of Hours Works Protocol has been prepared by TfNSW and approved by DPE. GRCLR has developed a project specific OOHW protocol (Appendix A) which provides the process for the consideration and approval of out-of-hours works in accordance with the project EPL and identification of mitigation and management measures to be implemented including community notifications prior to out-of-hours works. The Out-of-Hours Protocol includes an Out-of-Hours Works Permit procedure. All works occurring outside of the standard working hours will require an Out-of-Hours Works Permit.

CoA No.	Condition Requirements	Document Reference	How Addressed
E29	Out-of-hours works that may be regulated through an EPL or the Out of Hours Work Protocol as per Condition E28 include, but are not limited to: Carrying out works that during standard hours would 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”; or The relevant road authority has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to road network operational performance and a road occupancy licence will not be issued; or The relevant utility service operator has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to the operation and integrity of the utility network; or Where the TfNSW 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 works or activities during the hours specified in Condition E21 and Condition E22; or Where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required.	Section 6.1.2 Appendix A *(OOHW Protocol)*	An Out-of-Hours-Work Protocol has been prepared by TfNSW and approved by DPE. For OOHW that is subject to an EPL, the EPL conditions will dictate the approval process.

CoA No.	Condition Requirements	Document Reference	How Addressed
E30	Mitigation measures must be applied to construction activities that are predicted to result in the following residential ground-borne noise levels being exceeded as a result of the CSSI: Evening (6.00pm to 10.00pm) – internal LAeq (15 minute): 40 dBA; and Night (10.00pm to 7.00am) – internal LAeq (15 minute): 35 dBA. The mitigation measures must be outlined in the Construction Noise and Vibration Management Sub-plan and the Out of Hours Works Protocol.	Section 6.1.2 Section 6.4 Section 9.1 Section 9.7 Appendix A *(OOHW Protocol)*	The ground-borne noise criteria is outlined in Section 6.4 as noise objectives. Exceedance of the ground-borne noise level criteria during the night period will be managed as exceeding the sleep disturbance. Exceedance of the ground-borne noise levels during evening and night periods will be managed in accordance with the additional mitigation measures for Highly Intrusive works. An Out-of-Hours-Work Protocol has been prepared by TfNSW and approved by DPE. For OOHW that is subject to an EPL, the EPL conditions will dictate the approval process.
E31	Noise generating works near places of worship, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories, operating theatres, and mental health services and accommodation) must not be timetabled within sensitive periods, unless otherwise agreed with the affected institutions, and at no cost to the affected institution. This must be determined through ongoing consultation with the community during construction.	Section 5.1 Section 8.1 Section 9.4 Appendix B-1 *(Land use survey)*	Non-residential noise and vibration sensitive receivers have been identified in the Land Use Survey and summarised in Sections 5.1 and Appendix B. The predicted construction noise and vibration impacts will be assessed in the CNVIS. Any restrictions on timetabling of works because of

CoA No.	Condition Requirements	Document Reference	How Addressed
			consultation will be documented in the CNVIS. Consultation will be undertaken with affected sensitive receivers as described in Section 9.4
E32	The Proponent must consult with proponents or applicants of other State Significant development and infrastructure works near the CSSI and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers.	Section 9.4	Consultation will be undertaken with proponents or applicants of other State Significant development (SSD) and infrastructure works (SSI) near the CSSI to coordinate respite periods. The exact nature of the consultation will be determined on a case by case basis in accordance with the GRCLR's CEP.
E33	Construction noise mitigation measures must be implemented in accordance with Tables 4, 5, 6 and 7 of TfNSW's Construction Noise and Vibration Strategy (2018), regardless of the number of sensitive receivers impacted.	Section 8.1 Section 8.3 Section 9	The impact assessment procedures in Figure 8-1 will be incorporated into the development of CNVIS. The mitigation and management measures outlined in Section 9 will be incorporated as part of the CNVIS process.
E34	Piling activities that affect sensitive receivers must be undertaken using quieter alternative methods than impact or percussion piling, such as bored piles or vibrated piles, where practicable.	Section 8.1 Section 9.1	This has been included in Section 9.1 as mitigation measure NV31.

CoA No.	Condition Requirements	Document Reference	How Addressed
			This will be addressed in design packages for permanent works and CNVIS for temporary works.
E35	Nothing in this approval permits blasting for construction of the CSSI.	Section 6, Table 6-1	No blasting is proposed for the Project works.
E36	The Proponent must provide respite periods for sensitive receivers where any construction activity during the hours specified in Condition E21 results in noise levels that exceed the Highly Noise Affected Level of 75 dB (LAeq,15 minute).	Section 9.1 Section 9.3	Section 9.3 outlines the respite periods and the applicable CoA for noise impacts for the project on sensitive receivers. This is included in mitigation measures presented in Section 9.1
E37	Where works are undertaken outside hours specific in Condition E21 and E22 and construction noise levels exceed 65 dB(A) LAeq (15 mins) at the façade of the building of a residential receiver, the Proponent must only work 4 nights in any 7 day period. The 4 nights worked must be informed by community consultation referenced in Condition E39. Outcomes of the community consultation, the identified works and respite periods and the scheduling of the likely out-of-hour works must be provided to the AA, ER and the Secretary for information. Relocation of work following 4 nights of works in any 7 day period must be sufficiently removed so as to provide clear respite of 3 days. Works in areas of respite must be subject to noise levels of no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009).	Section 8.1 Section 9.1 Section 9.3 Section 9.4 Appendix A *(OOHW Protocol)*	CNVIS will be prepared to predict the noise and vibration impacts at sensitive receivers. CNVIS outcomes will be used to inform programming of works. This is included in mitigation measures presented in Section 9.1 Where construction noise levels are predicted to exceed 65 dB(A) LAeq (15 min) at the façade of the building of a residential receiver, works would be programmed to only occur for 4 nights in any 7 day period.

CoA No.	Condition Requirements	Document Reference	How Addressed
	The requirements of this condition may be varied with the approval of the Secretary following the Secretary's review of community consultation outcomes, construction noise and vibration impacts and the implementation of noise management and mitigation measures.		Required respite for impacted receivers is detailed in Section 9.3. This is also informed by community consultation (detailed in Section 9.4) that will be undertaken where there are out of hours works required. It is noted that the requirements of this condition may be varied with the approval of the Secretary following the Secretary's review of community consultation outcomes, construction noise and vibration impacts and the implementation of noise management and mitigation measures.

CoA No.	Condition Requirements	Document Reference	How Addressed
E38	All work undertaken for the delivery of the CSSI, including those undertaken by utility contractors, must be coordinated to ensure respite, including the respite required by Condition E37. The Proponent must: a) schedule any works to provide respite to impacted noise sensitive receivers so that all respite periods are achieved; or b) consider the provision of alternative mitigation, including the provision of at receiver treatments and alternative accommodation to impacted noise sensitive receivers; and c) provide documenta`ry evidence to the AA in support of any decision made by the Proponent in relation to respite or mitigation.	Section 8.1 Section 9.3 Section 9.7 Section 10.1.2	Predicted noise and vibration impacts will be assessed in the CNVIS as described in the Section 8.1, including consideration of cumulative and consecutive Project impacts. Section 9.3 outlines the respite periods for noise and vibration for the Project. Alternative / additional mitigation measures will be determined based on the predicted impacts in accordance with the Additional Mitigation Measures described in Section 9.7. The AA will be provided the CNVIS for review and comment.
E39	In order to undertake out-of-hours work described in Condition E25 (c) and (d), the Proponent must identify appropriate work and respite periods for the works in consultation with the community at each affected precinct at three monthly intervals. This consultation must be ongoing and include (but not be limited to) providing the community with: a) a schedule of likely out-of-hours work for a period of no less than two (2) months for medium to high risk work (as defined in the Out of Hours Works Protocol (Condition E28);	Section 9.3.3 Appendix A *(OOHW Protocol)*	Consultation will occur with affected receivers as outlined in Section 9.3.3. Appropriate work and respite periods will be informed by this consultation as appropriate. The outcomes of the consultation will be incorporated in the mitigation measures determined in the CNVIS and provided to community members as appropriate.

CoA No.	Condition Requirements	Document Reference	How Addressed
E39 (*contin.*)	b) a schedule of likely out-of-hours work for a period of no less than seven (7) days for low risk work (as defined in the Out-of-Hours Works Protocol (Condition E28) c) the potential works, location and duration; d) the noise characteristics and likely noise levels of the works; and e) likely mitigation and management measures. The Proponent shall consider and respond to the affected community's preference for alternative hours and/or durations. The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour works must be provided to the AA, ER and the Secretary.		TfNSW, the Secretary, AA and ER will be provided with the outcomes of the community consultation, and subsequent construction respite periods and scheduling of OOHW.
E40	The provision of respite periods does not preclude the application of other construction noise management measures, including the provision of at receiver treatments and or alternate accommodation.	Section 9.3	Section 9.3 outlines the respite periods for the project. Mitigation measures will be implemented even together with respite periods as determined through the preparation of the CNVIS as a wholistic approach to noise and vibration mitigation.
E41	At no time can noise generated by construction exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of LAeq,8h, of 85dB(A) for any employee working at a location near the CSSI.	Section 6.9 Section 9.1	Construction noise will be managed to not exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of LAeq,8h, of 85dB(A) for any

CoA No.	Condition Requirements	Document Reference	How Addressed
			employee working at a location near the Project. This has been included in Section 9.1 as mitigation measure NV58.

E42 E42 (*contin.)*	Construction Noise and Vibration Impact Statements must be prepared and implemented for each construction site before construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receivers. Each Construction Noise and Vibration Impact Statement will supplement the Noise and Vibration Management Sub-plan and must specifically address each of the major construction sites and must include but not be limited to: (a) A description of the proposed activities; (b) Predicted noise and vibration levels based on background noise levels; (c) Examination of alternative methods of construction that would potentially reduce noise and vibration if the potential noise and vibration exceeds the relevant criteria; (d) Description and commitment to work practices which limit noise and vibration; (e) Description of specific noise and vibration mitigation treatments and time restrictions, including respite periods, duration, and frequency; (f) Justification for any activities to be undertaken outside the specified construction hours defined in Conditions E21 and E22; (g) Internal noise audit systems including recording of daily hours of construction, progressive impact assessments as work proceeds, conducting informal checks by the AA, providing active and communication links to Council and surrounding residents and sensitive receivers; (h) Assessment of potential noise from the proposed construction methods including noise from construction vehicles and noise impacts from required traffic diversions; (i) Community consultation and notification; (j) All reasonable and feasible measures including adopting the least noisy available construction methods, systems and equipment;	Section 8.1	Construction Noise and Vibration Impact Statements will be prepared and implemented for each construction site before construction commences. Section 8.1 outlines how CNVIS will be prepared and reviewed and endorsed by the ER and AA as required.

CoA No.	Condition Requirements	Document Reference	How Addressed
	(k) Additional noise and vibration mitigation measures as negotiated with affected residents and other sensitive receivers. Note: Existing noise levels, pre-construction noise levels, or the like for the purposes of identifying rating background noise levels, noise management levels and construction noise impacts are noise levels that do not include any other construction related noise.		
E43	The Proponent must conduct vibration testing before and during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and monitoring shows that the preferred dose values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures.	Section 6.7.3 Section 9.1 Section 10.3 Appendix F *(NVMonP)*	Vibration testing will be undertaken as outlined in the Noise and Vibration Monitoring Program.
E44	The Proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage-listed structures.	Section 9.1 Appendix B-2 *(Heritage items)*	Identified heritage structures potentially impacted by the project are listed in Appendix B-2. A heritage specialist will be engaged when vibration, movement and noise monitoring of heritage-listed structures will occur, as outlined in Section 9.1 in NV52. This has also been referenced in the noise and vibration monitoring methods.
E45	Before commencement of any construction, and with the agreement of the landowner, a structural engineer must undertake building condition surveys	Section 9.1	Building Condition Survey Reports will be undertaken prior to the

CoA No.	Condition Requirements	Document Reference	How Addressed
	of all buildings identified in the documents listed in Condition A1 as being at risk of damage. The results of the surveys must be documented in a Building Condition Survey Report for each building surveyed. Copies of Building Condition Survey Reports must be provided to the landowners of the buildings surveyed, and if agreed by the landowner, the relevant Council within three weeks of completing the surveys and no later than one month before the commencement of construction.	Section 9.6 Appendix B-2 *(Heritage items)* Appendix F *(NVMonP)*	commencement of construction as detailed in Section 9.6. Structures at risk of damage will be identified as per Section 9.6 (NV53) and the monitoring protocol for structural damage presented in Figure 4-2 of the Noise and Vibration Monitoring Program (Appendix F).
E46	After completion of construction and with the agreement of the landowner, Building Condition Surveys of all buildings for which building condition surveys were undertaken in accordance with Condition E45 of this approval must be undertaken by a structural engineer. The results of the surveys must be documented in a Building Condition Survey Report for each building surveyed. Copies of Building Condition Survey Reports must be provided to the landowners of the buildings surveyed, and if agreed by the landowner, the relevant Council within three weeks of completing the surveys and no later than three (3) months following the completion of construction.	Section 9.1 Section 9.6 Section 10.3 Appendix F *(NVMonP)*	Building Condition Survey Reports will be undertaken after construction where required as detailed in Section 9.6. Structures at risk of damage requiring pre-construction inspections were identified as per E45.

CoA No.	Condition Requirements	Document Reference	How Addressed
E47	Any physical damage caused to a property as a result of the CSSI shall be rectified or the property owner compensated, within a timeframe agreed to by the property owner with the costs borne by the Proponent. This condition is not intended to limit any claims that the property owner may have against the Proponent.	Section 9.6 Section 10.3 Appendix F *(NVMonP)*	The GRCLR will review the pre-construction and post-construction Building Condition Survey Reports. In the case that issues are identified through these surveys, GRCLR will review the pre-construction and post-construction Building Condition Survey Reports and prepare a root cause analysis for each damage claim received. In the event that the root cause analysis determines that the damage is not attributable to the SOM Works and the outcome is disputed by the property owner, the GRCLR will engage an independent structural engineer to assist in resolving the dispute.
E49	Noise mitigation measures as identified in Condition E48 that will not be physically affected by works must be implemented within eighteen (18) months of the commencement of construction in the vicinity of the impacted receiver to minimise construction noise impacts, and detailed in the Construction Noise and Vibration Management Sub-plan for the CSSI.	Section 9.1 Section 9.2	During construction planning, the operational noise mitigation measures identified in the Project's Operational Noise and Vibration Review (ONVR) will be reviewed to determine what identified mitigation measures would be feasible and reasonable to install during the early construction stages, and where operational the noise mitigation measures will not be physically affected by works. This will take into consideration heritage

CoA No.	Condition Requirements	Document Reference	How Addressed
			aspects of the any buildings proposed to be modified as part of these mitigation measures.

<table>
<tr><th>CoA No.</th><th>Condition Requirements</th><th>Document Reference</th><th>How Addressed</th></tr>
<tr><td>E54</td><td>Ground-borne noise from rail traffic must not result in increases in existing noise levels by 3 dBA or more and exceedances of the criteria outlined in Table E3 at the nearest receiver. If exceedances are identified, the Proponent must implement mitigation measures which may include at-receiver property treatments:

Table E3 Operational Noise Trigger Levels for Sensitive Receivers adjacent to the Carlingford Corridor (dBA)
<table><tr><th>Receiver Type</th><th>Time of day</th><th>Internal Noise Trigger Level (dBA)</th></tr><tr><td>Residential</td><td>Daytime 7.00am to 10.00pm
Night-time 10.00pm to 7.00am</td><td>40 L_{ASmax} [1]
35 L_{ASmax}</td></tr><tr><td>Schools, educational institutions, places of worship</td><td>When in use</td><td>40-45 L_{ASmax} [2]</td></tr><tr><td>Medical</td><td>When in use</td><td>35 L_{ASmax} [1]</td></tr><tr><td>Public buildings</td><td>When in use</td><td>40 L_{ASmax} [1]</td></tr><tr><td>Theatres</td><td>When in use</td><td>NR25 [3]</td></tr></table>General Note: Ground-borne noise level values are relevant only where they are higher than the airborne noise from railways and where the ground-borne noise levels are expected to be, or are, audible within habitable rooms (RING, EPA 2013).

Note 1: L_{ASmax} refers to the maximum noise level not exceeded for 95 percent of rail pass-by events and is measured using the 'slow' response setting on a sound level meter.
Note 2: The lower value of the range is applicable where low internal noise levels are expected, such as in areas assigned to studying, listening and praying.
Note 3: NR curves are used for rating noise levels and are a set of octave band curves which provide limiting sound pressure level values. NR 15 is equivalent to approximately 20 dBA and NR 25 is approximately 30 dBA.</td><td>Section 6.6</td><td>Ground-borne noise form rail traffic has been addressed as part of the Operational Noise and Vibration Review (ONVR) (PLR1SOM-GLR-ALL-EN-RPT-000003) which has been developed in consultation with DPE and other stakeholders, and was approved by DPE on the 16 June 2022.

The ground-borne noise trigger levels for the Carlingford to Camellia section are provided in Section 3.1.3 of the ONVR. Ground-borne noise levels are assessed in Section 3.5 of the ONVR.

This CoA will also be complied with as part of the T&C stage where LRV movements will first commence in anticipation of operation. This CoA will be addressed as part of the CNVIS prepared for the T&C works.</td></tr>
</table>

<table>
<tr><th>CoA No.</th><th>Condition Requirements</th><th>Document Reference</th><th>How Addressed</th></tr>
<tr><td>E55</td><td>Ground-borne noise from rail traffic must not exceed the criteria outlined in Table E4 as measured at the nearest receiver. If exceedances are identified, the Proponent must implement mitigation measures which may include at-receiver property treatments:
Table E4 Operational Noise Trigger Levels for Sensitive Receivers between Camellia and Westmead (dBA)
<table>
<tr><th>Receiver Type</th><th>Time of day</th><th>Internal Noise Trigger Level (dBA)</th></tr>
<tr><td>Residential</td><td>Daytime 7.00am to 10.00pm
Night-time 10.00pm to 7.00am</td><td>40 L_{ASmax}[1]
35 L_{ASmax}</td></tr>
<tr><td>Schools, educational institutions, places of worship</td><td>When in use</td><td>40-45 L_{ASmax}[2]</td></tr>
<tr><td>Medical</td><td>When in use</td><td>35 L_{ASmax}[1]</td></tr>
<tr><td>Public buildings</td><td>When in use</td><td>40 L_{ASmax}[1]</td></tr>
<tr><td>Theatres</td><td>When in use</td><td>NR25 [3]</td></tr>
<tr><td colspan="3">General Note: Ground-borne noise level values are relevant only where they are higher than the airborne noise from railways and where the ground-borne noise levels are expected to be, or are, audible within habitable rooms (RING, EPA 2013).</td></tr>
<tr><td colspan="3">Note 1: L_{ASmax} refers to the maximum noise level not exceeded for 95 percent of rail pass-by events and is measured using the 'slow' response setting on a sound level meter.
Note 2: The lower value of the range is applicable where low internal noise levels are expected, such as in areas assigned to studying, listening and praying.
Note 3: NR curves are used for rating noise levels and are a set of octave band curves which provide limiting sound pressure level values. NR 15 is equivalent to approximately 20 dBA and NR 25 is approximately 30 dBA.</td></tr>
</table></td><td>Section 6.6</td><td>Ground-borne noise form rail traffic has been addressed as part of the ONVR (PLR1SOM-GLR-ALL-EN-RPT-000003) which has been developed in consultation with DPE and other stakeholders, and was approved by DPE on the 16 June 2022.

The ground-borne noise trigger levels for the Camellia to Westmead section are provided in Section 3.1.3 of the ONVR. Ground-borne noise levels are assessed in Section 3.5 of the ONVR.

This CoA will also be complied with as part of the T&C stage where LRV movements will first commence in anticipation of operation. This CoA will be addressed as part of the CNVIS prepared for the T&C works.</td></tr>
</table>

CoA No.	Condition Requirements	Document Reference	How Addressed
E57	Testing of warning bells in the stabling and maintenance facility must be undertaken in an enclosed space or with all doors of the facility closed. No testing of warning bells is permitted to take place at the stabling facility unless it meets the noise goals (including for sleep disturbance) outlined in the Noise Policy for Industry (2017) at the nearest residential receiver as outlined in Condition E52.	Section 6.6	This CoA is predominately triggered during operations and has been addressed as part of the ONVR (PLR1SOM-GLR-ALL-EN-RPT-000003) which has been developed in consultation with DPE and other stakeholders, and was approved by DPE on 16 June 2022. For T&C, this CoA will be addressed as part of the CNVIS prepared for the T&C works. During T&C, noise monitoring will be carried out to ensure the noise goals (including for sleep disturbance) outlined in the *Noise Policy for Industry* (2017) at the nearest residential receiver as outlined in Condition E52.
E69	Before installing acoustic treatment at any heritage item identified in the documents listed in Condition A1 the advice of a suitably qualified heritage architect or heritage engineer with specific experience in built heritage must be obtained and implemented to ensure any such work does not have an adverse impact on the heritage significance of the item.	Section 9.2 Section 10	An approved heritage consultant would be appointed to review and endorse any modifications required to heritage items as part of installing acoustic treatments.

3.3 Revised Environmental Mitigation and Management Measures

Relevant REMMMs are listed Table 3-2 below. This includes reference to required outcomes, the timing of when the commitment applies, relevant documents or sections of the environmental assessment influencing the outcome and implementation.

Table 3-2: Revised Environmental mitigation measures relevant to this CNVMP

Ref #	Commitment	Timing	CNVMP	How Addressed
GEN-1	A construction environmental management plan (CEMP) would be prepared for the construction phase of the project. The CEMP would provide a centralised mechanism through which all potential environmental impacts would be managed. The CEMP would document mechanisms for demonstrating compliance with the commitments made in the Environmental Impact Statement), the submissions report, as well as any other relevant statutory approvals (e.g. conditions of approval, licences and permits). The CEMP would outline a framework for the management of environmental impacts during construction, including further details on the following: …. Noise and vibration management.	Pre-construction Construction	CEMP and this Sub-plan	The CEMP provides a central reference document for how the project will address all potential environmental impacts and provide the framework for assessment, mitigation and management of environmental impacts throughout the construction of the Project.
GEN-2	A construction compounds plan would be prepared for the project as part of the overall CEMP. This sub-plan would set out details for each of the approved construction compounds, including stockpile areas, laydown areas and other ancillary activities required to construct the project. The sub-plan would supplement, in greater detail, the information provided in the main body of the CEMP. The	Pre-establishment	SEMP.	A Site Establishment Management Plan (SEMP) for the Project has been prepared and approved by DPE separately to the CEMP and Sub-plans. The SEMP relates only to the establishment of the construction ancillary sites, and

Ref #	Commitment	Timing	CNVMP	How Addressed
GEN-2 *(contin.)*	objectives and strategies of the construction compounds and ancillary facilities management sub-plan would include the following: » Minimise the impact of construction compounds on surrounding land uses and sensitive receivers. » Locate construction compounds away from sensitive land uses and receivers, wherever practical and feasible, or configure internal compound layouts in a manner that considers noise and light sensitive receivers (e.g. use of buildings to shield noisy activities, minimising the requirement for reversing vehicles, or locating noise intensive activities to maximise the distance to noise sensitive receivers). … … » Locate construction compounds away from (or able to be managed in such a way so as to not impact on) heritage items and high retention value trees. … » Situate construction compounds and ancillary facilities on relatively level ground, and avoid excavation in construction compounds where risk of heritage impacts or disturbance of contaminated material. ... …			addresses noise and vibration requirements for the establishment activities. All other noise and vibration requirements related to the construction phase are addressed in this CNVMP, CEMP and EPL.

Ref #	Commitment	Timing	CNVMP	How Addressed
GEN-2 *(contin.)*	Environmental management measures for construction compounds would be developed as part of the overall CEMP, with the construction compounds sub-plan identifying where such measures are documented within the CEMP. [This additional mitigation and management measure is from section 17.2.9 of the EIS].			
NV-1	A Construction Noise and Vibration Management Plan (CNVMP) would be developed in accordance with the requirements of Transport for NSW's *Construction Noise Strategy* and the *Interim Construction Noise Guidelines* (DECC 2009). It would document all necessary measures to manage and mitigate potential noise and vibration levels during standard working hours and for all out-of-hours construction activities (refer to Section 17.2.3 of the EIS). The CNVMP would also provide the framework and mechanisms for:	Construction	This Sub-plan Section 3.1.2 Section 6 Section 6.8 Section 9	The CNVMP provides a central reference document for how the project will address all construction noise and vibration requirements outlined in the CoA, REMMM, EPO's, TfNSW CNVS. EPL and EPA ICNG. The CNVMP will: • detail construction noise and vibration requirements across the project (Section 6) • detail how site specific construction noise and vibration impact statements (CNVIS) would be prepared to mitigate and manage impacts associated within each site or set of construction works (Section 8.1 and Section 9) • Appendix A details the OOHW Protocol which addresses how construction works outside of standard construction hours would be mitigated and managed (Section 9 and Appendix A).
	» The mitigation and management of the noise and vibration impacts from the project.	Construction	Section 9	
	» Development of site specific construction noise management plans.	Construction	Section 8.1	
	» Out-of-hours work associated with the project.	Construction	Section 6.1.2 Section 9	

Ref #	Commitment	Timing	CNVMP	How Addressed
			Appendix A	
NV-2	The CNVMP prepared for the project would include mitigation and management measures for the works with reference to the NSW *Interim Construction Noise Guideline* (ICNG) and *Transport for NSW Construction Noise Strategy* (CNS). Mitigation and management measures which would be considered include:	Construction	This Sub-plan Section 3.1.2 Section 9 Section 9.7	This CNVMP has been developed to address all the requirements outlined in the CoA, REMMM, EPO's, TfNSW CNVS, EPL and EPA ICNG, which are covered in the mitigation and management measures presented in Section 9.
	» For construction concentrated in a single area, such as at the stops, worksites, substation construction sites, bridge sites and the stabling and maintenance facility location, temporary acoustic fencing/barriers around the site perimeter would be considered where feasible and reasonable to mitigate off-site noise levels.	Construction	Section 8.1 Section 9	This CNVMP details how CNVIS would be prepared for each works area or activity. Specific mitigation measures, including site hoarding, would be assessed and included in the design following the process outlined in Section 8.1 and Figure 8-1, as detailed in mitigation measure NV44.
	» Given the potentially high noise levels at residential receivers, adherence to daytime construction hours would be used for excavation, demolition or rock breaking activities, and for activities concentrated in a single area (i.e. activities that do not move along the alignment, and do not require out-of-hours activities for safety reasons or to minimise disruption to road networks).	Construction	Section 8.1 Section 9	As part of the CNVIS process, construction hours for high noise activities would be prioritised to standard hours where feasible and reasonable, and detailed in mitigation measure NV8.
	» Where possible, noisy works would be scheduled to minimise impacts to adjacent businesses and commercial properties, such as avoiding undertaking	Construction	Section 6.1 Section 8.1 Section 9	The scheduling of works on Eat Street will be determined through consultation with affected businesses through the Business Activation Plan and Communications and

Ref #	Commitment	Timing	CNVMP	How Addressed
	noisy activities on Eat Street during lunch and dinner periods.		Section 9.4	Engagement Plan in accordance with CoA E24. This has been included as mitigation measure NV7.
NV-2 (*contin.*)	» Out of hours works would be programmed to minimise the number of consecutive out of hour work periods impacting the same receptors.	Construction	Section 9.4 Appendix A (*OOHW Protocol*)	Out-of-Hours-Work will be determined in accordance with the Out-of-Hours-Work Protocol, included in Appendix A. This has been included as mitigation measure NV12.
	» Consultation would be carried out with local schools and other educational facilities prior to noise intensive works to ensure impacts are minimised during examination periods and/or other critical periods in the school calendar (where works are predicted to exceed the relevant construction noise management level for this receiver). Consultation with nearby childcare centres would be carried out to potentially avoid noisy works during rest periods at the centres (where possible).	Construction	Section 8.1 Section 9 Section 9.4	Consultation with schools, other educational facilities and childcare centres would be undertaken to ensure impacts are minimised during sensitive periods (ie. exam periods or childcare rest times). This has been included as mitigation measure NV15.
	» Simultaneous operation of noisy plant in close proximity to sensitive receptors would be avoided (where possible).	Construction	Section 9	Where possible, the operation of multiple noisy plant items will be avoided in close proximity to sensitive receptors. This has been included as mitigation measure NV33. Toolbox talks and daily pre-start briefings will ensure these measures are communicated for implementation construction personnel.

Ref #	Commitment	Timing	CNVMP	How Addressed
	» Equipment which is used intermittently would be shut down when not in use.	Construction	Section 9	Equipment which is used intermittently would be shut down when not in use. This has been included as mitigation measure NV34. Toolbox talks and daily pre-start briefings will ensure these measures are communicated for implementation construction personnel.
NV-2 (*contin.*)	» Where possible, the offset distance between noisy plant items and nearby noise sensitive receptors would be as great as possible.	Construction	Section 8.1 Section 9	During the CNVIS process and during construction work planning the offset distance between noisy plant items and nearby noise sensitive receptors would be as far as is practical maximised. This has been included as mitigation measure NV43. Toolbox talks and daily pre-start briefings will ensure these measures are communicated for implementation construction personnel.
	» Where possible, equipment with directional noise emissions would be oriented away from sensitive receptors.	Construction	Section 8.1 Section 9	During the CNVIS process and during construction work planning equipment with directional noise emissions would where practical be oriented away from sensitive receptors. This has been included as mitigation measure NV35. Toolbox talks and daily pre-start briefings will ensure these measures are

Ref #	Commitment	Timing	CNVMP	How Addressed
				communicated for implementation construction personnel.
	» Construction compounds would use 2.4 metre high hoarding of solid construction where required to minimise noise on sensitive receivers, where safe to do so.	Pre-construction Construction	Section 8.1 Section 9	Specific mitigation measures would be detailed in each CNVIS, including such things as site hoarding. These would be assessed and included in the design following the process outlines in Section 8.1 and Figure 8-1, as detailed in mitigation measure NV44 where required.
NV-2 (*contin.*)	» Structures such as site sheds would be positioned to further shield sensitive and residential receivers from works activities.	Pre-construction Construction	Section 8.1 Section 9	Site layouts to maximise shielding to nearby noise sensitive receivers would be assessed as part of each CNVIS following the process outlined in Section 8.1 and Figure 8-1, as detailed in mitigation measure NV42. This will be captured in ECMs.
	» Regular compliance checks for noise emissions from all plant and machinery used for the project would be carried out to indicate whether noise emissions from plant items are higher than predicted. This would also identify defective silencing equipment on the items of plant.	Construction	Section 9 Section 10.3	Compliance checks for noise emissions from all plant and machinery used for the project, including rental equipment, would be carried out to ensure they are no greater than assumed in the CNVIS and TfNSW CNVS requirements, in mitigation measure NV54 and NV55.
	» Ongoing noise monitoring would be carried out during construction at sensitive receptors during critical periods to identify and assist in managing high risk noise events.	Construction	Section 9 Section 9.7	Ongoing noise monitoring and verification would be undertaken during construction to manage high risk noise impacts at sensitive receivers (NV56).

Ref #	Commitment	Timing	CNVMP	How Addressed
			Section 10.3	Verification of noise levels would also be undertaken as additional mitigation measures in accordance with the TfNSW CNVS (Section 9.7)
	» Where possible heavy vehicle movements should be limited to daytime hours.	Construction	Section 9	Out-of-hours deliveries will be minimised where possible, with heavy vehicle movements limited to daytime hours where feasible and reasonable (NV23).
NV-2 (*contin.*)	» Reversing of equipment should be minimised so as to prevent nuisance caused by reversing alarms, which would be limited to the use of non-tonal reversing alarms.	Pre-construction Construction	Section 8.1 Section 9	This will be considered during compound layout design and the CNVIS, and will be included in the Construction Traffic, Transport and Access Management Plan (CTTAMP). Implementation will be verified during site inspections and noise verification monitoring.
	» Loading and unloading should be carried out away from sensitive receptors, where practicable.	Pre-construction Construction	Section 8.1 Section 9	This will be managed through Site Vehicle Movement Plans. During the CNVIS process and during construction work planning the offset distance between noisy plant items and nearby noise sensitive receptors would be maximised. This has been included as mitigation measure NV43. Toolbox talks and daily pre-start briefings will ensure these measures are communicated for implementation construction personnel.

Ref #	Commitment	Timing	CNVMP	How Addressed
	» Work should be scheduled to provide respite periods from the noisiest activities, and impacted residents should be communicated with to clearly explain the duration and noise levels for the works.	Construction	Section 9 Section 9.3 Section 9.4	Coordination of works within the SOM project and with infrastructure works will occur to provide nearby sensitive receivers sufficient respite and to respond to community consultation throughout the project (Section 9.3). Updates such as email updates, signage, and newsletters will be provided to communicate with the community, and the community information line will provide feedback (Section 9.4) (NV13). This has been included as mitigation measure NV14 in Section 9.1.
NV-3	In the event of predicted exceedances of the noise goals, particularly during out-of-hours works, additional noise mitigation and management measures to be considered in the CNVMPs as described in the CNS. Additional mitigation and management measures would be determined on a site specific basis and are dependent upon the level of predicted impact. Additional mitigation and management measures which would be considered include:	Construction	Section 8.1 Section 9 Section 9.7 Appendix A *(OOHW Protocol)*	Predicted noise impacts will be assessed in the CNVIS, following the process outlines in Section 8.1 and Figure 8-1. The frameworks for application of additional mitigation measures is outlined in Section 9.7. These are the basis of how residual impacts will be addressed following the CNVIS process. The planning of Out of Hours Works will be undertaken in accordance with the Out of Hours Works Protocol (Appendix A)
	» *Periodic notifications* – These include regular newsletters, letterbox drops or advertisements in local papers to provide an overview of current and upcoming works and other topics of interest.	Construction	Section 9.4 Section 9.7	The community will be informed of OOHW and other updates at monthly and quarterly intervals through various forms of communication.

Ref #	Commitment	Timing	CNVMP	How Addressed
				This has been included as mitigation measure NV13.
	» *Website updates* – The project website would form a resource for members of the community to seek further information, including CNVPs and current and upcoming construction activities.	Pre-construction Construction	Section 9.4	The community will be informed of Project construction works via website updates. The website will provide a variety of information regarding the project including a schedule of out-of-hours work. This has been included as mitigation measure NV13.
NV-3 (*contin.*)	» Project info-line and construction response line – Transport for NSW will operate a construction response line and a project info-line (1800 775 465). These numbers will provide a dedicated 24-hour contact point for any complaints regarding construction works and for any project enquiries. All complaints require a verbal response within two hours. All enquiries require a verbal response within 24 hours during standard construction hours, or on the next working day during out-of-hours work (unless the enquirer agrees otherwise).	Construction	Section 9.4	A Project Info-line has been set up by TfNSW as a single contact point for enquiries and complaints for the project.
	» Email distribution list – An email distribution list would be used to disseminate project information to interested stakeholders.	Construction	Section 9.4	A project stakeholders email list will be developed in order to regularly notify stakeholders of upcoming construction works.
	» Signage – Signage on construction sites would be provided to notify stakeholders of project details and project emergency or enquiry information.	Construction	Section 9.4	Signage around the construction works areas will be implemented to notify the community of important project details.

Ref #	Commitment	Timing	CNVMP	How Addressed
	» Specific notifications – Specific notifications would be letterbox dropped or hand distributed to the nearby residences and other sensitive receptors no later than seven days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to Support periodic notifications, or to advertise unscheduled works.	Construction	Section 9.7	Specific receptors may be notified within seven days of construction works, having been identified as potentially noise impacted as part of the CNVIS process (NV48).
NV-3 (*contin.*)	» Phone calls – Phone calls may be made to identified/affected stakeholders within seven days of proposed work. For these works considering the large numbers of receptors, phone calls are not likely to be considered a reasonable mitigation and management measure in all cases, but could be used to inform specific receptors if requested (after notification of the works as above).	Construction	Section 9.7	Specific receptors may be called via phone within seven days of construction works, having been identified as potentially noise impacted as part of the CNVIS process (NV48).
	» Individual briefings – Individual briefings may be used to inform stakeholders about the impacts of high noise activities and mitigation and management measures that would be implemented. Communications representatives from the contractor(s) would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Considering the large numbers of potentially affected receptors, individual briefings may not be considered a reasonable mitigation and management measure in all cases, but could be used for specific receptors if requested (after notification of the works as above).	Construction	Section 9.7	Specific receptors may be provided with an individual briefing, at least 48 hours prior construction works, having been identified as potentially noise impacted as part of the CNVIS process (NV48).

Ref #	Commitment	Timing	CNVMP	How Addressed
NV-3 (*contin.*)	» *Monitoring* – Ongoing noise monitoring during construction at sensitive receptors during critical periods would be used to identify and assist in managing high risk noise events. Monitoring of noise would also be carried out in response to complaints. All noise monitoring would be carried out by an appropriately trained person in the measurement and assessment of construction noise and vibration, who is familiar with the requirements of the relevant standards and procedures.	Construction	Section 9.7	Noise verification monitoring would be undertaken to verify the noise levels that have been predicted at specific potentially impact sensitive receivers as part of the CNVIS process (NV48). Details of the Noise and Vibration Monitoring Program are included in Appendix F
	» *Project specific respite offer* – Residents subjected to lengthy periods of noise or vibration may be eligible for a project specific respite offer. The purpose of such an offer is to provide residents with respite from an ongoing impact. An example of a respite offer might be pre-purchased movie tickets. The provision of this measure would be determined on a case-by-case basis. Project specific respite offers are unlikely to be reasonable and feasible in the CBD precinct. This is partly due to the impracticability of providing respite offers to large	Construction	Section 9.7	Specific receptors may be provided with a project specific respite offer having been identified as potentially noise or vibration impacted as part of the CNVIS process (NV48).

Ref #	Commitment	Timing	CNVMP	How Addressed
	numbers of people during the proposed 24-hour works, but also reflects the existing evening and weekend noise environment in the Parramatta CBD precinct.			
NV-3 (*contin.*)	» *Alternative accommodation* – As described in the CNS, provision of alternative accommodation for residents should be considered in the event that highly intrusive noise impacts are predicted during the night-time period (between 10 pm and 7 am). However, as the project is likely to require night-time works at many locations (particularly in the Parramatta CBD precinct), provision of alternative accommodation in all cases may not always be feasible or reasonable.	Construction	Section 9.7	Specific receptors may be provided with an offer of alternative accommodation having been identified as potentially noise or vibration impacted as part of the CNVIS process (NV48).
NV-4	For sensitive receiver that operate outside standard construction hours, for example hospitals which operate on a 24-hour basis, feasible and reasonable noise mitigation options and measures would be developed in consultation with the sensitive receiver.	Construction	Section 8.1 Section 9.4	The Communication and Engagement Plan (Section 9.4) will detail how consultation will occur with various sensitive receivers, and the nature and potential impacts of construction works to be explained clearly and timely. The outcomes of the consultation will be incorporated into the CNVIS (NV16).

Ref #	Commitment	Timing	CNVMP	How Addressed
NV-5	The use of noise intensive plant items would be scheduled for normal working hours. If the works cannot be carried out during the daytime, it has been recommended to complete them before 11 pm, where practicable. This would be particularly relevant for works impacting the following noise catchment areas (NCAs) where a number of activities have been predicted to result in high impacts on many residential receivers during the night-time: » NCA04 in the Westmead precinct » NCA06 and NCA07 in the Parramatta North precinct » NCA11 in the Rosehill and Camellia precinct.	Construction	Section 8.1 Section 9.7	The approach detailed Section 8.1 and the standard mitigation and management measures in this CNVMP will typically achieve this requirement. Where noise intensive activities are required after 11pm additional mitigation measures would be implemented as feasible and reasonable in accordance with the TfNSW CNVS (Section 9.7). This is as detailed in NV9.
NV-6	Opportunities to reduce road traffic noise during construction would be investigated during construction planning, including restricting heavy vehicle movements to standard construction hours and/or to routes with fewer sensitive receivers.	Pre-construction Construction	Section 6.5 Section 9.1	Measures to mitigate and manage construction road traffic noise impacts are detailed in Section 6.5 and Section 9.1 (NV19 to NV28) and are included in the project CTTAMP.
NV-7	Where vibration intensive construction activities are proposed within 100 metres of sensitive receivers, these works would be confined to the less sensitive daytime period where possible. The potential impacts from vibration are to be considered in the site-specific Construction Noise and Vibration Impact Statements (to be developed during detailed design). In general, mitigation and management measures that would be considered include:	Construction	Section 8.1 Section 9.1 Section 9.5 Section 10.3	Vibration impacts will be assessed as part of the CNVIS process outlined in Section 8.1 and Figure 8-1 for each construction area. Appropriate mitigation and management measures would be implemented in the case that vibration sensitive structures/buildings are identified within the minimum working distances, which are detailed in mitigation measure NV51. Where

Ref #	Commitment	Timing	CNVMP	How Addressed
NV-7 *(contin.)*				vibration intensive construction activities are proposed within 100 metres of sensitive receivers, these works will be confined to the less sensitive daytime periods where feasible and reasonable (NV40).
	» Relocate vibration generating plant and equipment to areas within the site in order to lower the vibration impacts.	Construction	Section 8.1	Vibration impacts will be assessed as part of the CNVIS process outlined in Section 8.1 and Figure 8-1 for each construction area. Appropriate mitigation and management measures would be implemented in the case that vibration sensitive structures/buildings are identified within the minimum working distances, which are detailed in mitigation measure NV51.
	» Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment.	Construction	Section 8.1	Vibration impacts will be assessed as part of the CNVIS process outlined in Section 8.1 and Figure 8-1 for each construction area. Vibration generating plant and equipment with the potential to disturb nearby sensitive building occupants or items, where feasible and reasonable, would be scheduled to provide respite (NV11), or where applicable during agreed periods when vibration intensive works can occur with least impact (NV17).

Ref #	Commitment	Timing	CNVMP	How Addressed
NV-7 *(contin.)*				Appropriate mitigation and management measures would be implemented in the case that vibration sensitive structures/buildings are identified within the minimum working distances, which are detailed in mitigation measure NV51.
	» Use lower vibration generating items of excavation plant and equipment (e.g. smaller capacity rock breaker hammers).	Construction	Section 8.1	Where feasible and reasonable, lower vibration generating plant and equipment would be selected for construction works (NV30)f
	» Minimise consecutive works in the same locality (if applicable).	Construction	Section 8.1	Vibration impacts will be assessed as part of the CNVIS process outlined in Section 8.1 and Figure 8-1 for each construction area. Appropriate mitigation and management measures would be implemented in the case that vibration sensitive structures/buildings are identified within the minimum working distances, including minimising consecutive works in the same locality, which are detailed in mitigation measure NV51.
	» Use dampened rock breakers to minimise the impacts associated with rock breaking works.	Construction	Section 8.1	Vibration impacts will be assessed as part of the CNVIS process outlined in Section 8.1 and Figure 8-1 for each construction area. Appropriate mitigation and management measures would be implemented in the

Ref #	Commitment	Timing	CNVMP	How Addressed
				case that vibration sensitive structures/buildings are identified within the minimum working distances, including reviewing the size and methodology of rock-breakers to minimise impacts, which are detailed in mitigation measure NV51.
NV-7 *(contin.)*	If vibration intensive works are required within the safe working distances, vibration monitoring or attended vibration trials would be carried out to ensure that levels remain below the cosmetic damage criterion.	Construction	Section 9.5 Appendix F *(NVMonP)*	See mitigation measures NV51. Vibration monitoring would be used to verify vibration levels at sensitive buildings/structures.
	Building condition surveys would be completed both prior to the commencement of construction works and following the completion of construction works to identify existing damage and any damage due to the works.	Pre-construction	Section 9.6 Section 10.3	See mitigation measures NV52 and NV53.
	Measurements of existing ambient vibration levels would be carried out at receivers with vibration sensitive equipment during the detailed design. This information would be used to inform the site-specific Construction Noise and Vibration Impact Statements for works near these locations.	Pre-construction	Section 8.1 Section 10.3 Appendix F *(NVMonP)*	Measurements of existing ambient vibration levels would be carried out at receivers with vibration sensitive equipment during the detailed design as part of the Noise and Vibration Monitoring Plan (Appendix F) and would be considered as part of the CNVIS process.

Ref #	Commitment	Timing	CNVMP	How Addressed
NV-8	Mitigation and management measures to address potential noise and vibration impacts to facilities within the Westmead Research Zone would be implemented during construction. Mitigation and management measures would be determined in consultation with the facility operator / owner and informed by the sensitivity of impacted spaces prior to the commencement of construction. The mitigation and management measures (in addition to those provided in NV-1 to NV-7) could include:	Pre-construction Construction	Section 4 Section 9.4 Appendix F *(NVMonP)*	The Communication and Engagement Plan (Section 9.4) will detail how consultation will occur with the various facilities within the Westmead Research Zone. This is in order for consultation to occur, and the nature and potential impacts of construction works to be explained in a clear and timely fashion, and reasonable and feasible mitigation and management measures for impacted sensitive spaces to be developed. The outcomes of the consultation will be incorporated into the CNVIS (NV16). Unattended noise and vibration monitoring as part of the Noise and Vibration Monitoring Plan (Appendix F), would be used to verify noise and vibration impacts for sensitive receivers within the Westmead Research Zone facilities (NV57).
NV-8 *(contin.)*	» Consultation with the affected facilities to determine periods when noise and/or vibration intensive works can occur with least impact.	Construction		
	» Relocation of vibration sensitive equipment to less impacted locations within the facilities.	Construction		
	» Vibration isolation of sensitive equipment predicted to have potential impacts.	Construction		
	» Unattended noise and vibration monitoring within the facilities to ensure noise and/or vibration levels are within acceptable levels.	Construction		

Ref #	Commitment	Timing	CNVMP	How Addressed
HE-22	The construction methodology (including for demolition of existing buildings and/or structures) would be developed to minimise direct and indirect impacts on adjacent and/or adjoining heritage items. This would include consideration of potential (vibration related impacts, where identified in the Construction Noise and Vibration Management Plan).	Pre-construction Construction	Section 8.1 Section 9 Section 9.5	Vibration impacts will be assessed as part of the CNVIS process outlined in Section 8.1 and Figure 8-1 for each construction area. Appropriate mitigation and management measures, including monitoring and building surveys, would be implemented in the case that vibration sensitive structures/buildings are identified within the minimum working distances, which are detailed in mitigation measure NV50 to NV52.
TT-28	Hours of when construction deliveries and spoil removal would be undertaken within the Parramatta CBD and Rosehill and Camellia precincts would be determined in consultation with the Sydney Coordination Office and Roads and Maritime Services.	Construction	Section 4 Section 9	Consultation with the Sydney Coordination Office and Roads and Maritime Services as part of project planning to determine feasible and reasonable hours for construction deliveries and spoil removal (NV19).

3.4 Environmental Performance Outcomes

Relevant EPOs are listed in Table 3-3 below, to satisfy CoA C4. This includes reference to required outcomes, the timing of when the commitment applies relevant documents or sections of the environmental assessment influencing the outcome and implementation.

Table 3-3: Environmental Performance Outcomes relevant to this CNVMP

ID Ref#	Environmental Performance Outcome	Timing	CNVMP reference	How Addressed
EPO-NV-1	Noise levels would be minimised with the aim of achieving the noise management levels where feasible and reasonable.	Construction	Section 6 Section 8.1 Section 9 Section 10	Construction Noise and Vibration Impact Statements (CNVIS) (see Section 8.1) would be prepared to assess Project impacts against Project objectives (Section 6) as per the Construction Noise and Vibration Management Plan (this Sub-Plan) and that feasible and reasonable noise and vibration mitigation and management measures for the Project (Section 9) are implemented to achieve these objectives. This includes reviewing, auditing and monitoring the effectiveness of these mitigation and management measures (Section 10)
EPO-NV-2	The project would avoid any damage to buildings or heritage items from vibrations.	Construction	Section 6.7.2 Section 6.7.3 Section 9.5	Construction Noise and Vibration Impact Statements (CNVIS) for each work site identifying how works and activities at each worksite will be managed to satisfy specific vibration goals Implement the processes in Section 6.7.3

3.5 EPL Conditions

The EPL Conditions relevant to this Plan are listed Table 3-14 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other project management documents.

Table 3-4: EPL Conditions relevant to this CNVMP

EPL Condition	Requirement	CNVMP reference	How Addressed
L3.1	Noise Limits Minimise noise and vibration impacts at residences and other sensitive land uses	Section 6.1.2 Section 6.4 Section 9.1 Section 9.7 Appendix A (OOHW Protocol)	Development of this CNVMP based on appropriate guidance and implementation of all measures detailed within. Development and implementation of reasonable and feasible mitigation measures as required. Use of Out-of-Hours-Work Protocol.
L4.1	Standard construction hours Construction works and activities must be undertaken during the following hours: a) 7:00am to 6:00pm Mondays to Fridays, inclusive b) 8:00am to 12:00pm Saturdays; and c) at no time on Sundays or public holidays. With the exception of 'Eat Street', construction works and activities may be undertaken during the following hours: a) 6:00pm to 7:00pm Mondays to Fridays, inclusive; and b) 12:00pm to 6:00pm Saturdays.	Section 6.1	Construction activities will be undertaken during the approved construction hours as outlined in Section 6.1.
L4.2	High noise impact activities and works Undertake high noise impact works and activities only during permitted hours, and with appropriate respite periods as required.	Section 8.1 Appendix A *(OOHW Protocol)*	Predicted noise and vibration impacts will be assessed in the CNVIS in accordance with Section 8.1. The hours of works and respite will be programmed to comply with the Out of

EPL Condition	Requirement	CNVMP reference	How Addressed
			Hours Works Protocol and EPL requirements.
L4.3	High noise impact works – assessment at receiver If high noise impact works and activities are to be undertaken continuously within the standard construction hours, a noise assessment must be prepared and submitted to the EPA, and approval obtained, prior to the works. The assessment must confirm through noise modelling that the noise from the works is predicted to generate an LAeq (15 minute) noise level no more than 10 dB(A) above the NML, or 75dB(A) whichever is lower, at the most noise affected residences or at other sensitive land uses.	Section 8.1	Predicted noise and vibration impacts will be assessed in the CNVIS in accordance with Section 8.1. The assessment will be provided to the EPA for approval as required.
L4.4	Exemptions to standard construction hours - Eat Street Works in Eat Street outside of the standard construction hours in are only to be undertaken an agreement has been reached with the Parramatta Light Rail Business Reference Group.	Section 6.1.2 Section 9.4 Appendix A *(OOHW Protocol)*	The Business Activation Plan (BAP) developed to satisfy CoA E110 will direct the consultation with businesses of Eat Street to determine works period that minimise disruption to the businesses. Consultation will be undertaken with affected sensitive receivers as described in Section 9.4
L4.5	Standard construction hours - Camellia and Rosehill Notwithstanding Condition L4.1, works may be undertaken in the Camellia and Rosehill precincts 24 hours a day, seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at	Section 6.1 Appendix A *(OOHW Protocol)*	Construction activities will be undertaken during the approved construction hours as outlined in Section 6.1. An Out of Hours Works Protocol (Appendix A) has been developed to assess works proposed to be undertaken

EPL Condition	Requirement	CNVMP reference	How Addressed
	any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), between 10.00pm and 7.00am.		outside of standard construction hours against the Conditions of Approval and the EPL.
L4.6	Exemptions to standard construction hours - low noise impact works Works and activities may be carried out outside of the hours specified in Condition L4.1 if the works and activities do not cause, when measured at the boundary of the most affected noise sensitive receiver: a) LAeq(15 minute) noise levels greater than 5dBA above the day, evening and night rating background level (RBL) as applicable; b) more than the 'Noise Affected' management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses; c) LA1(1 minute) or LAmax noise levels greater than 15dB above the night RBL for night works; d) continuous or impulsive vibration values greater than those for human exposure to vibration, set out for residences in Table 2.2 in "Environmental Noise Management – Assessing Vibration: a technical guideline" (DEC, 2006); e) intermittent vibration values greater than those for human exposure to vibration, set out for residences in Table 2.4 in "Environmental Noise Management – Assessing Vibration: a technical guideline" (DEC, 2006);	Section 6.1.2 Appendix A *(OOHW Protocol)*	An Out of Hours Works Protocol has been developed to assess works proposed to be undertaken outside of standard construction hours against the Conditions of Approval and EPL.

EPL Condition	Requirement	CNVMP reference	How Addressed
	f) no more than the 'Noise Affected' management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses		
L4.7	Exemptions to standard construction hours – Emergency works and special deliveries a) the licensee may undertake works outside of standard construction hours for: i. emergency works required to avoid the loss of lives or property, or to prevent material harm to the environment; ii. the delivery of oversized plant or structures determined by the police or other authorised authorities to require special arrangements to transport along public roads. b) the licensee must, on becoming aware of the need to undertake emergency works under this condition notify the EPA's Environment Line as soon as practicable and submit a report to the EPA by 2pm on the next business day after the emergency works commenced that describes: i. the cause, time and duration of the emergency; ii. action taken by or on behalf of the licensee in relation to the emergency; and iii. details of any measures taken or proposed to be taken by the licensee to prevent or mitigate against a recurrence of the emergency.	Section 6.1.2 Appendix A *(OOHW Protocol)*	An Out of Hours Works Protocol has been developed to assess works proposed to be undertaken outside of standard construction hours against the Conditions of Approval and EPL. EPA to be notified on Environment Line as soon as practicable. Report to be submitted the EPA as required.

EPL Condition	Requirement	CNVMP reference	How Addressed
L4.8	Works approved outside of standard construction hours Works outside of standard construction hours may only be undertaken if one or more of the following applies: a) carrying on those works and activities during the hours specified in condition L4.1 would 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”; or b) the relevant road authority or network operator has advised the licensee in writing that carrying out the works and activities during the hours specified in condition L4.1 would result in a high risk to road network operational performance; or c) the relevant utility service operator has advised the licensee in writing that carrying out the works and activities during the hours specified in condition L4.1 would result in a high risk to the operation and integrity of the utility network; or d) the TfNSW Transport Management Centre (or other road authority) have refused to issue a road occupancy licence during the hours specified in condition L4.1; or e) where Sydney Trains (or other rail authority) has advised the proponent in writing that a rail possession is required.	Section 6.1.2 Appendix A *(OOHW Protocol)*	An Out of Hours Works Protocol has been developed to assess works proposed to be undertaken outside of standard construction hours against the Conditions of Approval and EPL.
L4.9	Works outside of standard construction hours – Requirements Any works undertaken outside of the standard construction hours in Condition L4.1 (excluding exemptions allowed by Conditions L4.5, L4.6 and L4.7), require:	Section 6.1.2 Appendix A *(OOHW Protocol)*	An Out of Hours Works Protocol has been developed to assess works proposed to be undertaken outside of standard construction

EPL Condition	Requirement	CNVMP reference	How Addressed
	a) a construction noise impact assessment that is to include: i. a description of the proposed out-of-hours works; ii. predictions of LAeq (15 minute) noise levels at noise sensitive receivers from these works and activities; and iii. a monitoring plan to validate the noise predictions, based on monitoring at the boundary of representative sensitive receivers during noise generating activities that are representative of the out-of-hours works; iv. the licensee must submit the construction noise and vibration assessment to the EPA 14 calendar days prior to any works commencing at the licenced premise.	Section 8.1	hours against the Conditions of Approval and EPL. Construction noise and vibration assessments will be prepared to predict the noise and vibration impacts at sensitive receivers. Assessment outcomes will be used to inform programming of works. This is included in mitigation measures presented in Section 9.1
L4.10	Works outside of standard construction hours – Respite For all works undertaken in accordance with Condition L4.8, the licensee must: a) ensure that works are undertaken on a maximum of 4 nights in any 7 day period; b) ensure that noise sensitive receivers are provided with 3 respite nights following 4 nights of work in any 7 day period; c) coordinate works (including those undertaken by third parties) permitted by Condition L4.7 with concurrent construction works licensed by the EPA and utility providers	Section 9.1 Section 9.3	Section 9.3 outlines the respite periods and the applicable CoA an EPL Conditions for noise impacts for the Project on sensitive receivers. This is included in mitigation measures presented in Section 9.1

EPL Condition	Requirement	CNVMP reference	How Addressed
	to ensure the respite nights required by Condition L4.10 b) are not compromised; and d) undertake community consultation to inform which evenings or nights work will be undertaken.		
L4.11	Work outside of standard construction hours – Utility Works If works are undertaken by a utilities provider during a scheduled respite period identified by Condition L4.10, and those works are related to the scheduled activity permitted by this licence, the licensee must: a) where feasible, reschedule any works permissible by Condition L4.10 to provide respite to impacted noise sensitive receivers so that the minimum number of respite periods in any 7 day period can be achieved; or b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and c) provide documentary evidence to an Authorised Officer on request in support of any decision made by the licensee in relation to the provision or refusal of any respite or mitigation.	Section 8.1 Section 9.3 Section 9.7 Section 10.1.2	Predicted noise and vibration impacts will be assessed in the CNVIS as described in the Section 8.1, including consideration of cumulative and consecutive Project impacts. Section 9.3 outlines the respite periods for noise and vibration for the Project. Alternative / additional mitigation measures will be determined based on the predicted impacts in accordance with the Additional Mitigation Measures described in Section 9.7. The AA will be provided the CNVIS for review and comment.
L4.12	Works outside of standard construction hours – Notification The licensee must notify potentially affected noise sensitive receivers of works outside of standard construction hours not less than 5 calendar days and not more than 14 calendar days before those works are to be undertaken. a) the notification must be:	Section 9.4	Notification to potential affected noise sensitive receive will be carried out as outlined in Section 9.4 and to meet the requirements of EPL L4.12.

EPL Condition	Requirement	CNVMP reference	How Addressed
	i. undertaken by letterbox drop or email; and ii. be detailed on the project website. b) the notification required by this condition must: i. clearly outline the reason that the work is required to be undertaken outside the hours specified in condition L4.1; ii. include a diagram that clearly identifies the location of the proposed works in relation to nearby cross streets and local landmarks; iii. include details of relevant time restrictions that apply to the proposed works; iv. include the dates and times of works v. clearly outline in plain English, the location, nature, scope and duration of the proposed works; vi. detail the expected noise impact of the works on noise sensitive receivers; vii. clearly state how complaints may be made and additional information obtained; viii. include the number of the telephone complaints line required by condition M5.1, an afterhours contact phone number specific to the works undertaken outside the hours specified in condition L4.1, and the project website address; and ix. include details of interpreting services for languages other than English where required.		

EPL Condition	Requirement	CNVMP reference	How Addressed
	Note: The requirements of this condition do not apply to the exemptions to standard construction hours allowed by conditions L4.5, L4.6 and L4.7		
M4.5	Noise and Vibration Complaints a) the licensee must investigate noise and vibration complaints: i. within two hours of the complaint being made; or ii. in accordance with any documented complaint management agreement between the licensee and the complainant. b) the licensee must offer to the complainant to undertake attended noise or vibration monitoring at their premises if: i. any investigation referred to in this condition identifies works or activities being undertaken on the licensed premises as the likely source of the complaint; ii. and the licensee is not in possession of noise monitoring data representative of the complainants location and of the subject works and activities being undertaken on the licensed premises. c) if the occupant of the dwelling or management personnel of a noise sensitive receiver (other than a dwelling) accepts the offer of attended noise or vibration monitoring the licensee must undertake that attended monitoring: i. as soon as practicable; or ii. at a time agreed with the complainant.	Section 10.4	Complaints will be recorded and managed as detailed in Section 10.4 of this Sub-plan and Section 6.4 of the CEMP.

EPL Condition	Requirement	CNVMP reference	How Addressed
	d) The licensee must, in respect of each complaint made, advise each complainant of the results of its investigation of their complaint and any proposed remedial action within a reasonable period of time.		
M6.1	Noise monitoring All noise monitoring must be undertaken in accordance with: a) Australian Standard AS 2659.1 – 1998: "Guide to the use of sound measuring equipment – portable sound level meters"; and b) the compliance monitoring guidance provided in the "NSW Noise Policy for Industry" (EPA, 2017).	Construction Noise Monitoring Program (Appendix F)	Details of monitoring to be carried out are provided in the Construction Noise Monitoring Program in Appendix F.
M6.2	Vibration monitoring All vibration monitoring must be: a) undertaken in accordance with the technical guidance provided in the "Environmental Noise Management – Assessing Vibration: a technical guideline" (DEC, 2006); and b) assessed and reported against the acceptable values of human exposure to vibration set out in Tables 2.2 and 2.4 of this guideline.	Construction Noise Monitoring Program (Appendix F)	Details of monitoring to be carried out are provided in the Construction Noise Monitoring Program in Appendix F.
M6.3	The licensee must undertake construction noise and vibration monitoring as directed by an authorised officer of the EPA.	Construction Noise Monitoring Program (Appendix F)	Details of monitoring to be carried out are provided in the Construction Noise Monitoring Program in Appendix F.

EPL Condition	Requirement	CNVMP reference	How Addressed
R4.2	Noise and Vibration Reports a) Upon request of an authorised officer, the licensee must submit a Preliminary Investigation Report to the EPA in respect of any noise or vibration monitoring undertaken in accordance with the requirements of Condition M4.5. b) The Preliminary Investigation Report must be submitted to the EPA by 4:30 pm on the afternoon of the next working day following any noise or vibration monitoring. c) The Preliminary Investigation Report must include: i. numerical and/or graphical representation of the noise and vibration monitoring results including both ambient noise levels and the level of noise from activities on the premises only; and ii. the noise levels reported using the following noise descriptors: LAeq,T; LAF90,T; and LAFmax,T (T representing the 15 minute measurement period unless an alternative period is justified); and iii. an assessment of measured construction noise levels against noise limits or noise management levels specified in this licence, requirements in the project specific Construction Noise and Vibration Plan and/or Impact Statement prepared the activities, relevant noise modelling and any relevant noise guidelines.	Section 10.6	Reports will be prepared and submitted as detailed in Section 8.5 of the CEMP.
R4.3	In the event of any exceedance of the best achievable noise performance objectives identified in the project specific	Section 9.7 Section 10.6	Alternative / additional mitigation measures will be determined based on the predicted impacts in accordance with the Additional

EPL Condition	Requirement	CNVMP reference	How Addressed
	Construction Noise and Vibration Plan and/or Impact Statement prepared for the activities, the licensee must: a) modify activities and implement all reasonable and feasible measures to prevent a recurrence of the exceedance and verify noise and vibration levels have reached the best achievable noise performance objectives; b) submit a Follow-Up Investigation Report to the EPA within 5 business days of any noise or vibration monitoring having been undertaken that detected the exceedance (unless otherwise approved by the EPA); and c) include the following information in the Follow-Up Investigation Report: i. confirmation of whether noise monitoring has been undertaken in accordance with AS2659 and the compliance monitoring guidance provided in the Interim Construction Noise Guideline (DECC, 2009); ii. confirmation of whether vibration monitoring has been undertaken in accordance with the guidance provided in Assessing Vibration: a technical guideline (DEC, 2006); iii. details of the prevailing meteorological conditions during the period when the monitoring was undertaken; iv. a map of each noise and vibration monitoring location in relation to the noise source, including relevant distances;		Mitigation Measures described in Section 9.7. Reports will be prepared and submitted as detailed in Section 8.5 of the CEMP.

EPL Condition	Requirement	CNVMP reference	How Addressed
	v. numerical and graphical representation of the noise and vibration monitoring results; vi. an analysis of the noise and vibration monitoring results; vii. details of any remedial action taken in relation to the matter; and viii. in cases not the subject of remedial action, detailed justification of the decision not to undertake remedial action.		

4 Consultation

The following sections summarises the consultation undertaken as part of developing this CNVMP.

4.1 Consultation Requirements under the Infrastructure Approval

In accordance with the CoA C5, this CNVMP as a Sub-plan to the CEMP is required to be developed in consultation with the relevant government agencies and councils, which include the NSW Environment Protection Authority (EPA), NSW Health, and City of Parramatta Council.

The consultation is intended to assist in the development and finalisation of the Sub-plan. Table 4-1 summarises the consultation undertaken for this CNVMP with the relevant stakeholder and their responses. A standalone consultation report, fulfilling the requirements of CoA A5 will be prepared and submitted with this CNVMP.

This CNVMP will be endorsed by the Environmental Representative (ER) and the Acoustics Advisor (AA) as per CoA C7 and A29(e) respectively, and then submitted to the Secretary for approval no later than one month prior to the commencement of construction. The Sub-plan, as submitted to Secretary, including any minor amendments approved by the ER and the AA, will be implemented for the duration of construction.

Table 4-1: Summary of Agency Consultation

Agency	Consultation Dates	Response Received	Issue Raised	Where Addressed
NSW Environment Protection Authority (EPA)	23 June 2020 and concluded 24 July 2020.	Yes – 24 July 2020.	No comments.	N/A
Health NSW – Westmead Precinct	23 June 2020 and concluded 30 July 2020.	Yes – 30 July 2020.	HAC Issued interim questions relating to: • Monitoring; • HAC receiver locations; and • Operational noise.	A5 Consultation Report [PLR1SOM-GLR-ALL-EN-RPT-001004].
City of Parramatta Council	7 August 2020 and concluded 9 October 2020.	9 October 2020.	One question relating to: • The Construction Noise and Vibration Monitoring Program, not the CNVMP.	A5 Consultation Report [PLR1SOM-GLR-ALL-EN-RPT-001004].

5 Existing environment

5.1 Sensitive receivers

The Project will take place within the urban environment of Westmead, North Parramatta, Parramatta CBD and Camellia. The majority of the project between Westmead and Camellia is within established road transportation corridors. The remainder of the project between Camellia and Carlingford will also use the existing heavy rail corridor of the Carlingford Line, travelling through the suburbs of Dundas, Telopea and Carlingford.

The Project is being constructed within a developed urban area, which means that it is surrounded by a variety of sensitive receivers. In addition to the residential, commercial and industrial receivers, several other sensitive receivers (OSR) (including educational facilities, childcare centres, recording studios and medical facilities) were identified as being potentially impacted by the Project (refer to Appendix B-1).

The Table 1 of the CSSI-8285 Infrastructure Approval defines ‘sensitive receiver’ as including:

- residences, temporary accommodation such as caravan parks and camping grounds, and healthcare facilities (including nursing homes and hospitals) and
- when they are in use, educational institutions (including preschools, schools, universities, TAFE colleges), religious facilities (including churches), childcare centres, passive recreation areas, commercial premises (including film and television studios, research facilities, entertainment spaces, restaurants, office premises and retail spaces), and others as identified by the Secretary.

5.1.1 Land Use Survey

CoA E20 requires a detailed land use survey to be completed to confirm sensitive receivers potentially exposed to construction noise and vibration. The Land Use Survey has been completed by the Infrastructure Contractor and is presented in Appendix B-1 of this CNVMP. Sensitive receivers have been classified as identified in **Figure 5-1**.

Figure 5-1: Land Use Survey classifications

Heritage items relevant to the project have also been identified as part of this land use survey.

5.1.2 Precincts and Noise Catchment Areas

To facilitate the assessment of noise impacts, the Project has been divided into five precinct areas, which reflect the changing land uses adjacent to the project. Each precinct is also made up of a

number of Noise Catchment Areas (NCAs) that have been used to represent each of the various areas within the precincts. NCAs group individual sensitive receivers by common traits such as existing noise environment and location in relation to the Project alignment. The EIS identified a total of 19 NCAs around the Project. An additional NCA (NCA12A) has been added within the Rosehill and Camellia Precinct to account for works being undertaken in the rail corridor at Clyde Junction and Clyde Station.

The NCAs for the Project are presented in Table 5-1 with a description of the noise characteristics of each area, and presented on maps in Appendix B-1.

Table 5-1: Precincts and Noise Catchment Areas

Precinct[1]	NCAs[1]	Minimum Distance (m)[2]	Description[1]
Westmead	NCA01	105 m	Residential receivers except for Westmead Public School and a small number of commercial receivers.
	NCA02	5 m	Mostly buildings and land usages associated with Marist High School, Western Sydney University (Westmead) and Westmead Hospital.
	NCA03	5 m	Residential receivers, with some commercial and medical receivers directly adjacent to the project alignment.
	NCA04	5 m	Residential receivers except for Westmead Church and Wesley Lodge.
	NCA05	5 m	Mostly medical receivers associated with The Children's Hospital at Westmead and Cumberland Hospital (West), together with some residential receivers.
Parramatta North	NCA06	5 m	Predominantly medical receivers associated with Cumberland Hospital (East) and some residential receivers.
	NCA07	5 m	Residential and commercial receivers.
Parramatta CBD	NCA08	5 m	Residential and commercial receivers as well as places of worship and educational receivers further from the project alignment. Outdoor dining areas associated with cafes and restaurants along Eat Street.
	NCA09	5 m	Commercial, educational and residential receivers are directly adjacent to the project alignment.
	NCA10	160 m	Residential receivers and educational receivers associated with Macarthur Girls High School are situated across the river from the project alignment.
Parramatta CBD *(continued)*	NCA11	5 m	Residential and commercial receivers.

Precinct[1]	NCAs[1]	Minimum Distance (m)[2]	Description[1]
Rosehill and Camellia	NCA12	5 m	Commercial receivers as well as residential receivers further from the project alignment. Rosehill Racecourse.
	NCA12A	900 m	Mixed commercial, industrial and residential receivers surrounding Clyde Junction. Educational receivers associated with Granville Boys High School.
	NCA13	5 m	Commercial and industrial receivers.
Carlingford	NCA14	10 m	Mostly commercial receivers and educational receivers associated with Western Sydney University (Parramatta), as well a small group of residential receivers.
	NCA15	5 m	Residential receivers, however, also commercial receivers and educational receivers associated with Dundas Public School.
	NCA16	5 m	Residential receivers.
	NCA17	5 m	Residential receivers.
	NCA18	5 m	Residential receivers.
	NCA19	5 m	Residential and some commercial receivers.

Notes:

1. Source: Section 2 of the EIS: Technical Paper – Noise and Vibration Impact Assessment, with the exception of NCA12A
2. Approximate minimum horizontal distance from track centre to nearest receiver building facade (receiver of any type).

5.1.3 HAC community

The PLR route passes through the Westmead Health and Education Precinct as shown in the Land Use Survey figures in Appendix B-1 of this CNVMP. The Precinct is managed by the Health Administration Corporation (HAC) and includes Westmead Hospital, research institutes, the Children's Hospital and Cumberland Hospital.

The Westmead Health and Education Precinct Development Agreement Parramatta Light Rail (Transport for New South Wales, *Westmead Health and Education Precinct Development Agreement Parramatta Light Rail*, 8 February 2018) is a third party agreement between HAC and TfNSW. The HAC Assessment System (see Section 1.4) has been developed by the Infrastructure Works Contractor in conjunction with HAC and TfNSW to manage noise and vibration impacts to HAC's sensitive equipment and operations.

The processes described in the HAC Assessment System will be incorporated into the CNVIS prepared under this CNVMP as applicable.

5.2 Existing acoustic environment

As part of the EIS process, noise monitoring was conducted between in October 2016 at a total of 16 locations in order to quantify and characterise the existing ambient noise environment across the receivers potentially impacted by the Project. The detailed results from this noise monitoring survey are presented in the *EIS: Technical Paper – Noise and Vibration Impact Assessment* and a summary of the noise monitoring results relevant to the Project is provided in Table 5-2. The monitoring locations were selected and considered to be representative of receivers potentially noise affected during the construction and operational stages of the Project.

The EIS noted that the existing ambient noise environment surrounding the route is variable, with road traffic noise typically the primary influence. In addition to road traffic, the CBD is influenced by general urban hum from mechanical plant and pedestrian activities. Existing noise levels are generally higher nearer to the CBD than in the surrounding suburbs. During the evening and night-time in the suburban areas the ambient noise decreases in locations where road traffic volumes are seen to reduce.

This noise monitoring was utilised to determine appropriate Rating Background Levels (RBLs) and Noise Management Levels (NMLs) (see Section 6.2 for further explanation) for each NCA. The RBLs for each area were determined for each of the day, evening and night periods as per the *Industrial Noise Policy* (INP) (EPA, 2000) and defined below:

- Day is defined as the period from 7:00am to 6:00pm Monday to Saturday and 8:00am to 6:00pm Sundays and public holidays,
- Evening is defined as the period from 6:00pm to 10:00pm,
- Night is defined as the period from 10:00pm to 7:00am Monday to Saturday and 10:00pm to 8:00am Sundays and public holidays,

These RBLs and the hours are consistent with the approach in the *Noise Policy for Industry* (EPA, 2017) which is the appropriate reference document for the project and superseded the INP in 2017.

The full details of the monitoring results are presented in the *EIS: Technical Paper – Noise and Vibration Impact Assessment*.

Table 5-2: Summary of Rating Background Levels (RBLs) at residential receivers[1]

Precinct	NCAs	Logger ID	Noise monitoring location	RBL Day	RBL Eve	RBL Ngt
Westmead	NCA01	BG01	8-12 Alexandra Ave, Westmead	49	47	37
	NCA02	BG02	157 Hawkesbury Rd, Westmead	51	48	43
	NCA03	BG02	157 Hawkesbury Rd, Westmead	51	48	43
	NCA04	BG03	199 Hawkesbury Rd, Westmead	49	48	47
	NCA05	BG03	199 Hawkesbury Rd, Westmead	49	48	47
Parramatta North	NCA06	BG04	Cumberland Hospital East	42	41	44
	NCA07	BG06	St Patricks Cemetery, North Parramatta	51	50	39
Parramatta	NCA08	BG07	20 Victoria Rd, Parramatta	59	57	46

Precinct	NCAs	Logger ID	Noise monitoring location	RBL Day	RBL Eve	RBL Ngt
CBD	NCA09	BG08	Arthur Phillip Highschool, Parramatta	58	53	43
	NCA10	BG09	9 Noller Pde, Parramatta	43	40	34
Rosehill and Camellia	NCA11	BG09	9 Noller Pde, Parramatta	43	40	34
	NCA12	BG10	5 Hope St, Rosehill	51	48	41
	NCA12A	BG17[2]	10-42 East Street, Granville	43	45	42
	NCA13	BG10	5 Hope St, Rosehill	51	48	41
Carlingford	NCA14	BG11	14 Dudley St, Rydalmere	45	43	38
	NCA15	BG12	Dundas Station	45	43	37
	NCA16	BG13	22 Adderton Rd, Telopea	46	42	34
	NCA17	BG14	Telopea Station	43	40	31
	NCA18	BG15	89 Marshall Rd, Telopea	42	40	32
	NCA19	BG16	Carlingford Station	52	47	39

Notes:

1. Source: *EIS: Technical Paper – Noise and Vibration Impact Assessment*, with the exception of NCA12A
2. Source: *Resonate Acoustics - Acoustic Planning Report: East and Cowper Streets Granville Residential Development* (S15235) July 2016

5.3 Heritage buildings

Heritage buildings are to be considered on a case by case basis, and detailed inspections of heritage listed structures should be undertaken for all potentially affected heritage structures prior to the commencement of works.

Heritage items identified as part of the Land Use Survey (CoA E20) are presented in presented in Appendix B-2).

Heritage items are identified in the Land Use Survey (CoA E20) based upon the EIS and other information available at the time of survey. As noted in Section 5.1.1, the Land Use Survey remains an active part of the CNVMP and will continue to be updated as additional items are identified during the CNVIS process, in consultation with the Project heritage consultants.

As part of the CNVIS process, heritage items would be considered during assessment; and where the assessment identifies potential for vibration impacts, appropriate mitigation and management measures will be recommended, in accordance with CoA E43.

Additionally, if a receiver is identified in accordance with CoA E69 for the installation of at-property acoustic treatments, the advice of a suitably qualified heritage architect or heritage engineer with specific experience in built heritage must be obtained and implemented to ensure any such work does not have an adverse impact on the heritage significance of the item.

6 Noise and vibration criteria for NSW

The EPA recommends management levels and goals when assessing construction noise and vibration. These are outlined in:

- The Interim Construction Noise Guideline (ICNG)
- Assessing Vibration: a technical guideline (AVTG), published in February 2006
- The ANZECC, Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration.

The TfNSW Construction Noise and Vibration Strategy (see Section 3.1.2) also provides direction for establishing noise and vibration criteria.

Relevant elements of these documents are summarised and discussed in this Chapter. Key environmental impacts and the applicable documents to set noise and vibration management objectives are summarised in **Table 6-1**.

Table 6-1: Construction noise and vibration objectives – applicable documents

Environmental impact	Applicable documents to set construction noise and vibration objectives
Construction hours	• Conditions of Approval (CoA) • EPL 21606
Airborne noise	• ICNG • CoA • EPL
Sleep disturbance and maximum noise events	• Construction noise – NSW Environmental Criteria for Road Traffic Noise (ECRTN) and NSW Road Noise Policy (RNP) • Road traffic noise - NSW Road Noise Policy (RNP) and the RMS Environmental Noise Management Manual (ENMM) Practice Note 3.
Ground-borne noise	• ICNG • CoA • EPL • Australian Standard AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors
Construction-related road traffic noise	• No specific guidelines, but guidance taken from the ICNG and the RNP.
Vibration (disturbance to building occupants)	• AVTG, which incorporates: • British Standard BS 6472-2008, Evaluation of human exposure to vibration in buildings (1-80Hz)

Environmental impact	Applicable documents to set construction noise and vibration objectives
Vibration (structural damage to buildings)	• British Standard 7385:1993 Evaluation and measurement of vibration in buildings – Part 2 Guide to damage from ground-borne vibration
Vibration (structural damage to buried services and screening criteria for heritage structures)	• German Standard DIN 4150:1999 – Part 3 Structural vibration in buildings – Effects on structures
Vibration (sensitive scientific and medical equipment) (guidance only)	• ASHRAE Applications Handbook (SI) 2003, Chapter 47 Sound and Vibration Control • Gordon GC 28 September 1999 Generic Vibration Criteria for Vibration Sensitive Equipment • Australian Standard 2834-1995 Computer Accommodation, Chapter 2.9 Vibration
Blast noise and vibration	• Blasting is not proposed or permitted as per CoA E35

6.1 Construction hours of work

6.1.1 Hours of Works

The construction hours for the Project are defined by the CoA E21 to E25 and E27 and EPL Conditions L4.1 to L4.12. Table 6-2 below consolidates the information provided in the CoA and EPL regarding construction working hours generally for the Project. Permitted exceptions are detailed in CoA E24 through to E27 and EPL Conditions L4.4-L4.12.

Table 6-2: Working hours for PLR Stage 1 SOM Works construction

Construction activity	Project area	Relevant CoA and EPL Condition	Working hours applicable to Project		
			Monday to Friday	Saturday	Sunday/ Public holiday
Standard construction	Project (excluding Eat Street)	E21 & E22 L4.1	7:00am to 7:00pm[3]	8:00am to 6:00pm	No work[1]
	Eat Street	E21 & E22 L4.1	7:00am to 6:00pm	8:00am to 12:00pm	No work[1]
Highly noise intensive works	All locations	E27 L4.2	8:00am to 6:00pm (+ respite[2])	8:00am to 1:00pm (+ respite[2])	No work[1]

Construction activity	Project area	Relevant CoA and EPL Condition	Working hours applicable to Project		
			Monday to Friday	Saturday	Sunday/ Public holiday
Out of Hours Work (OOHW)[6]	Project (excluding Eat Street) (See Note 7)	E21 & E22 L4.6-L4.12	7:00pm to 10:00pm 10:00pm to 7:00am	6:00pm to 10:00pm 10:00pm to 8:00am	8:00am to 6:00pm 6:00pm to 10:00pm 10:00pm to 7:00am
	Eat Street (See Note 4 and 7)	E21 & E22 L4.4, L4.6-L4.12	6:00pm to 10:00pm[4] 10:00pm to 7:00am[4]	12:00pm to 10:00pm[4] 10:00pm to 8:00am[4]	8:00am to 6:00pm[4] 6:00pm to 10:00pm[4] 10:00pm to 7:00am[4]
	Camellia and Rosehill precincts	E23 L4.5-L4.12	7:00pm to 10:00pm 10:00pm to 7:00am[5]	6:00pm to 10:00pm 10:00pm to 8:00am[5]	8:00am to 6:00pm 6:00pm to 10:00pm 10:00pm to 7:00am[5]

Notes:

1. No work unless permitted unless approved in accordance with the CoA.
2. Minimum respite from highly noise intensive works of not less than one (1) hour between each continuous block of works not exceeding three (3)
3. The applicable NML for the 6pm to 7pm standard hours period is based upon the daytime RBL.
4. Construction hours outside of standard construction hours will be established through consultation with affected businesses at per CoA E24 and EPL Condition L4.4.
5. Provided construction noise levels are below the night NML at any residence between 10.00pm and 7.00am (see section 6.1.2).
6. OOHW periods are further broken up into additional time periods. These periods are the ranges shown in the table.
7. OOHW works are permitted subject to the requirements of CoA E37, where if construction noise levels exceed 65 dB(A) $L_{Aeq\ (15\ min)}$ at the façade of the building of a residential receiver, the Proponent must only work 4 nights in any 7 day period.

6.1.2 Works Outside of Standard Hours (OOHW)

Construction outside the standard hours identified in Section 6.1.1 along ‘Eat Street’ (defined as per CoA) will be established through consultation with affected business as outlined in the Business Activation Plan.

Works will also be undertaken in the Camellia and Rosehill precincts (east of James Ruse Drive) and the Carlingford precinct (from Parramatta River to Victoria Road) 24 hours a day, seven days a

week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence in accordance with the ICNG, between 10:00 pm and 7:00 am.

Notwithstanding the approved construction hours, works associated with the CSSI may be undertaken outside the hours specified under those conditions, only if one or more of the following circumstances applies:

- For the delivery of materials required by the NSW Police Force or other authority for safety reasons
- 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 hours of works are permitted or required under an EPL in force in respect of the CSSI or
- Works approved under an Out-of-Hours Work Protocol 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
    - No more than 15 dB(A) above the night-time rating background level at any residence during the night time period, when measured using the LA1(1 minute) noise descriptor, 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
- 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).

In accordance with CoA 28, an Out-of-Hours-Work Protocol (provided in Appendix A) has been prepared for the Project by TfNSW and approved by the Secretary. The Out-of-Hours-Work Protocol provides a process for the consideration for works to be undertaken outside of standard construction hours and identification of mitigation and management measures to be implemented including community notifications prior to out-of-hours works for construction works on the Parramatta Light Rail (PLR). The use of the OOHW protocol would be required for work outside the approved standard hours (with a few exceptions, as detailed above).

6.1.3 Works covered by an EPL

The Project is carried out in accordance with Environment Protection Licence (EPL) 21606, which was granted in December 2021, authorising the Scheduled Activity of Railway activities – railway infrastructure construction. A copy of the EPL can be found at: https://www.parramattalightrail.nsw.gov.au/node/360. The premise to which the EPL relates is defined by the most recent premise maps held on EPA Electronic File SF19/117693 and approved in writing by the EPA, which is the entire extent of the Project.

Hours of operation permitted under the EPL are detailed in Conditions L4.1-L4.12, with other relevant noise requirements covered by Conditions L3.1 (noise limits), M4.5 (noise and vibration complaints), M6.1-M6.3 (noise and vibration monitoring), R4.2-R4.3 (noise and vibration reports), and G3.1 (environmental induction).

6.1.4 Hierarchy of Preferred Working Hours

The Out-of-Hours-Work Protocol (Appendix A) details a hierarchy of preferred working hours, which has been reproduced below.

Where OOHW is planned to take place the following hierarchy of preferred working hours must be considered unless otherwise agreed with affected community through consultation (Section 9.3.3).

1. Saturday afternoon periods between 1pm and 6pm (Standard hours, applicable to HNIW)
2. Sunday and public holiday day periods between 8am and 6pm (Period 1 Day)
3. Weekday evening periods between 7pm and 10pm (Period 1 Evening)
4. Weekend evening periods between 6pm and 10pm (Saturdays Period 1 Evening/Sundays Period 2)
5. Weekend night periods between 10pm and 8am (Period 2)
6. Work during the weekday evening and night and scheduling the noisiest or vibration intensive work first (between 6pm and 10pm) to minimise sleep disturbance impacts in the night period between 10pm and 7am) – read in conjunction with E27 (Period 1 Evening & Period 2)
7. All other times outside recommended standard hours.

For Eat Street, the listed OOHW hierarchy of working hours include:

1. Weekday night periods (Monday-Thursday) between 10pm and 7am (Period 2)
2. Sunday and public holiday day periods between 7am and 11am (Period 1 Day)
3. Weekend night periods (Friday, Saturday and Sunday) between 10pm and 7am (Period 2)
4. Sunday and public holiday day periods between 11am and 6pm (Period 1 Day)
5. All other times outside recommended standard hours as advised by consultation.

The hierarchy of preferred working hours is based upon the TfNSW OOHW Protocol, No specific hierarchy of preferred working hours is specified for the Camellia and Rosehill precincts.

This hierarchy does not apply to emergency work.

6.1.5 Emergency works

Emergency works should be undertaken in accordance with CoA E26 and EPL Condition L4.7; on becoming aware of emergency works the ER,TfNSW, and the EPA (via the Environment Line)must be notified. A report prepared in accordance with Condition L4.7 of the EPL must also be submitted to the EPA by 2pm on the next business day after the emergency works commenced. It is the responsibility of the contractor to use best endeavours to contact affected sensitive receivers and advise of the likely impact and duration of such works.

6.2 Construction noise and assessment objectives

The ICNG provides guidelines for the assessment and management of construction noise. The ICNG focuses on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving numeric noise levels.

The main objectives of the ICNG are to:

- Identify and minimise noise from construction works
- Focus on applying all ‘feasible’ and ‘reasonable’ work practices to minimise construction noise impacts

- Encourage construction during the recommended standard hours only, unless approval is given for works that cannot be undertaken during these hours
- Reduce time spent dealing with complaints at the project implementation stage
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

6.3 Airborne construction noise management levels

6.3.1 Residential receivers

Table 6-3 below shows how NMLs at residences are determined and how they are to be applied during construction of the Project.

Table 6-3: NMLs at Residential Receivers

Time of Day	NML LAeq(15mins)	How to Apply
Standard hours Monday to Friday 7:00am to 7:00pm Saturday 8:00am to 6:00pm No work on Sundays or public holidays (see Note 3)	RBL + 10 dBA	• The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured LAeq(15minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practises to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

	Highly Noise Affected 75 dBA
	(see Note 4)
		• The Highly Noise Affected (HNA) level represents the point above which there may be strong community reaction to noise.
		• Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restructuring the hours that the very noisy activities can occur, considering:
		  • Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools or mid-morning or mid-afternoon for works near residences.
		  • If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
		• CoA E36 requires provision of respite periods for sensitive receivers where construction noise exceeds the HNA level

Time of Day	NML LAeq(15mins)	How to Apply
Outside recommended standard hours	RBL + 5 dBA	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practises have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community.

Notes:

1. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NPfI.
2. Standard construction hours for the project differ from those presented in the ICNG. Refer to Section 6.1.
3. Does not apply to 'Eat Street' as per CoA E22 and EPL Condition L4.1, where construction hours will be established through consultation with affected businesses as outlined in the Business Activation Plan (CoA E110), as per CoA E24 and EPL Condition L4.4.
4. CoA Table 1 (Definitions) defines "High Noise Intensive Works" differently from "Highly Noise Affected" (HNA). As per the glossary "High Noise Intensive works" is defined as "Means rock breaking, rock hammering, sheet piling, pile driving and particularly annoying activities as described in ICNG (Section 4.5)", and as such a noise level is not applicable. As such this is a different from HNA.

NML apply at the property boundary that is most exposed to construction noise, at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence.

Airborne construction NMLs for all NCAs are presented in Appendix C.

6.3.2 Sleep Disturbance

The ICNG recommends that where construction works are planned to extend over more than two consecutive nights, maximum noise levels and the extent and frequency of maximum noise level events exceeding the RBL should be considered for residential receivers. In line with the ICNG, further guidance is taken from the NSW Environmental Criteria for Road Traffic Noise (ECRTN, Environment Protection Authority 1999) (superseded by the RNP).

To assess the likelihood of sleep disturbance, an initial screening level of L_{Amax} or $L_{A1(1min))} \leq L_{A90(15min)} + 15$ dB(A) is used. In situations where this results in an external screening level of less than 55 dB(A), a minimum screening level of 55 dB(A) is set. Note that this is equivalent to a maximum internal noise level of 45 dB(A) with windows open.

Where there are noise events found to exceed the initial screening level, further analysis is made to identify:

- the likely number of events that might occur during the night assessment period
- Whether events exceed an 'awakening reaction' level of 55 dB(A) L_{Amax} (internal) that equates to NML of $L_{A1(1min)}$ 65 dB(A) (assuming open windows).

The ICNG recommends that where construction works are planned to extend over more than two consecutive nights, maximum noise levels and the extent and frequency that maximum noise levels exceed the RBL should be analysed.

Sleep disturbance NMLs for all NCAs are presented in Appendix C.

6.3.3 Other noise sensitive receivers

Noise management levels for various noise-sensitive land use developments, including commercial premises are adopted from the ICNG. Internal (or indoor) noise management levels for land uses not identified in the ICNG are referenced to the 'maximum' internal noise levels presented in Australian Standard AS2107. The noise management levels presented in Table 6-4 are applicable where the premises are in use.

Table 6-4 presents a detailed, but not exhaustive list of typical 'other' land uses identified along the Project route. Where a land use has not been identified in Table 6-4, a suitable noise management level can be determined by taking guidance from Australian Standard AS2107.

As identified for residential receivers, where the predicted or measured $L_{Aeq(15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The Project should also inform all potentially impacted receivers of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

As described within the ICNG, external noise levels in Table 3 of the ICNG (i.e. active and passive recreational areas) are to be assessed at the most affected point within 50 m of the area boundary. Internal noise levels are assessed at the centre of the occupied room. Where internal noise levels cannot be measured, external equivalent noise management levels may be used (see Table 6-4) and are to be assessed at building façade in accordance with AS1055-2018.

A highly-affected noise objective of $L_{Aeq(15min)}$ 75 dB(A) shall also apply at all 'other noise sensitive receivers', as noted in CoA E36. Construction activity noise above this level should be handled as described in Table 6-3.

Table 6-4: NMLs at other noise sensitive receivers

Receiver type	NML $L_{Aeq(15min)}$	Where NML applies	Referenced from:	Assumed façade loss[3] (conservative)	External equivalent NML $L_{Aeq(15min)}$
Studio building (music recording studio)	25 dB(A)	Indoors	AS2107 'upper range'	20 dB(A)	45 dB(A)
Studio building (film or television studio)	30 dB(A)	Indoors	AS2107 'upper range'	20 dB(A)	50 dB(A)
Cinema space	35 dB(A)	Indoors	AS2107 'upper range'	20 dB(A)	55 dB(A)
Theatre, auditorium[4]	30 dB(A)	Indoors	AS2107 'upper range'	20 dB(A)	50 dB(A)
Court / Tribunal[4]	35 dB(A)	Indoors	AS2107 'upper range'	20 dB(A)	55 dB(A)
Hotel (Sleeping areas: Hotels near major roads)	40 dB(A)	Indoors	AS2107 'upper range'	20 dB(A)	60 dB(A)

Receiver type	NML $L_{Aeq(15min)}$	Where NML applies	Referenced from:	Assumed façade loss[3] (conservative)	External equivalent NML $L_{Aeq(15min)}$
Classrooms at schools and other educational institutions	45 dB(A)	Indoors	ICNG	10 dB(A) [5]	55 dB(A)
Childcare centre [internal play area]	60 dB(A)	Indoors	ICNG outdoor passive recreation	10 dB(A) [5]	70 dB(A)
Childcare centre [sleeping areas]	40 dB(A)	Indoors	AS2107 for residential sleeping areas near to major roads[4]	10 dB(A) [5]	50 dB(A)
Hospital wards and operating theatres	45 dB(A)	Indoors	ICNG	20 dB(A)	65 dB(A)
Places of worship	45 dB(A)	Indoors	ICNG	10 dB(A)[5]	55 dB(A)
Library (reading areas)	45 dB(A)	Indoors	AS2107 ‘upper range’	20 dB(A)	65 dB(A)
Hotel (bars and lounges)	50 dB(A)	Indoors	AS2107 ‘upper range’	20 dB(A)	70 dB(A)
Café/ Restaurant/ Bar	50 dB(A)	Indoors	AS2107 ‘upper range’	20 dB(A)	70 dB(A)
Community centres – Municipal Buildings	50 dB(A)	Indoors	AS2107 ‘upper range’	10 dB(A) [5]	60 dB(A)
Public building	50 dB(A)	Indoors	AS2107 ‘upper range’	10 dB(A) [5]	60 dB(A)
Restaurant, bar (Bars and lounges / Restaurant)	50 dB(A)	Indoors	AS2107 ‘upper range’	20 dB(A)	70 dB(A)
Medical facilities	45 dB(A)	Indoors	AS2107 ‘upper range’	20 dB(A)	65 dB(A)
Railway platform and concourse areas	55 dB(A)	Indoors	AS2107 ‘upper range’	20 dB(A)	75 dB(A)
Café/ Restaurant/ Bar (outdoors)	60 dB(A)	Outdoors	AS2107 ‘upper range’	-	60 dB(A)

Receiver type	NML $L_{Aeq(15min)}$	Where NML applies	Referenced from:	Assumed façade loss[3] (conservative)	External equivalent NML $L_{Aeq(15min)}$
Passive recreation areas[1] (e.g. area used for reading, meditation)	60 dB(A)	Outdoors	ICNG	-	60 dB(A)
Active recreation areas[2] (e.g. sports fields)	65 dB(A)	Outdoors	ICNG	-	65 dB(A)
Commercial premises (including offices and retail outlets)	70 dB(A)	Outdoors	ICNG	-	70 dB(A)
Industrial premises	75 dB(A)	Outdoors	ICNG	-	75 dB(A)
Stables[4]	60 dB(A)	Outdoors	ICNG	-	60 dB(A)

Notes:

1. Passive recreation areas are characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion (e.g. reading, meditation).
2. Active recreation areas are characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.
3. The assumed building façade losses are used to determine the preliminary external equivalent noise management levels. These assumptions are conservative and used as screening levels to identify potential noise impacts. Once a sensitive receiver is identified, a building inspection is to be undertaken to determine the specific building façade loss and update, if required, its external noise management level.
4. As per EIS
5. Receiver conservatively assumed to have operable windows and a 10 dB(A) outside to inside façade noise loss.

The internal noise levels are to be assessed at the centre of the most affected occupied room. A conservative estimate of the difference between internal and external noise levels ranges from 10 dB (open window) to 20 dB (where windows are fixed and non-operable).

6.4 Ground-borne noise management levels

Ground-borne noise management levels (GNMLs) are based on the ICNG and Conditions of Approval.

6.4.1 Residential receivers

GNMLs for residences are nominated in the ICNG and CoA E30 and indicate when management actions would be implemented. Mitigation measures must be applied when residential ground-borne noise levels are exceeded in accordance with CoA E30.

GNMLs are only applicable when ground-borne noise levels are higher than airborne noise levels at a receiver. However, it should be noted that situations may occur where the construction airborne noise is shielded from a receiver (e.g. where there are noise barriers, or where a receiver is located on the opposite side of a building or within a building compared to the construction

activity) which will result in reduced airborne noise levels. The GNMLs in the ICNG are based on ground-borne noise levels at residences for evening and night-time periods only, as the ICNG objectives are to protect the amenity and sleep of people when at home.

Table 6-5 below (taken from the ICNG) sets out the ground-borne noise management levels as per CoA E30 and how they are to be applied to residential receivers. GRCLR would inform all potentially impacted receivers of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

Table 6-5: Ground-borne Construction NMLs at Residential Receivers

Assessment Period	Time of Day	Ground-borne NML, $L_{Aeq(15minute)}$
Evening	6:00pm to 10:00pm	40 dB(A) internal
Night	10:00pm to 7:00am	35 dB(A) internal

6.4.2 Other noise sensitive receivers

For other sensitive receivers, including commercial receivers such as offices and retail areas, the ICNG does not provide guidance in relation to acceptable ground-borne noise levels. For the purpose of this CNVMP, a GNML has been derived from the airborne NML presented in the ICNG for commercial premises, assuming a minimum 20 dB(A) noise reduction from outside to inside with closed windows, consistent with the EIS.

For other noise sensitive receivers, such as cinema spaces and recording studios, guidance is taken from the recommended 'maximum' internal noise levels in AS/NZS 2107:2000 'Acoustics - Recommended design sound levels and reverberation times for building interiors' to determine suitable noise management levels. Refer to Table 6-4 for details.

The ground-borne noise objectives for ‘other’ noise sensitive land uses are identified below in Table 6-6.

Table 6-6: Ground-borne Construction NMLs at Other Sensitive Land Uses

Receiver type	Ground-borne NML, $L_{Aeq(15minute)}$	Where NML applies	Referenced from:
Classrooms at schools and other educational institutions	45 dB(A)	Internal noise level	ICNG
Places of worship	45 dB(A)	Internal noise level	ICNG
Commercial premises (including offices)	50 dB(A)	Internal noise level	ICNG
Commercial premises (including retail outlets)	55 dB(A)	Internal noise level	AS/NZS 2107:2000
Industrial premises	55-60 dB(A)	Internal noise level	ICNG and AS/NZS 2107:2000

6.5 Construction-related road traffic noise

The Project has developed a CTTAMP (PLR1SOM-GLR-ALL-PM-PLN-000032) which addresses heavy vehicle driver behaviours and conduct, to assist with managing driver behaviour both within construction works areas and on public roads.

When trucks and other vehicles are operating within the boundary of a construction site, road vehicle noise contributions are included in the overall predicted LAeq(15minute) construction site noise emissions and assessed against the ICNG NMLs.

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 and are assessed under the NSW Road Noise Policy (RNP), which superseded the Environmental Criteria for Road Traffic Noise (EPA 1999) referenced in the ICNG.

The RNP requires an initial screening test to be applied by evaluating whether noise levels would increase by more than 2 dB (an increase in the number of vehicles of approximately 60%) due to construction traffic or where road closure results in a temporary reroute of traffic. This represents a minor impact that is considered barely perceptible to the average person.

Where the road traffic noise levels are predicted to increase by more than 2 dB (i.e. 2.1 dB or greater) as a result of construction traffic, further assessment is required in using the criteria presented in the RNP, reproduced below in Table 6-7.

Table 6-7: RNP criteria for assessing construction vehicles on public roads

Road Category	Type of Project/Land Use	Assessment criteria[1]	
		Day (7am-10pm)	Night (10pm-7am)
Freeway/ arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	60 (external) LAeq(15hour)	55 (external) LAeq(9hour)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	55 (external) LAeq(1hour)	50 (external) LAeq(1hour)

Notes:

1. Criteria applies at 1 metre from the most affected façade.

6.6 Noise relating to stationary operational sources and rail traffic (including during testing and commissioning)

Testing and commissioning (T&C) of LRVs and driver training (prior to first passenger service) is considered part of the 'construction' definition in accordance with the Infrastructure Approval (SSI-8285). However, as T&C has elements of both construction and operational activities (i.e. LRV movements), T&C will need to comply with both the construction noise requirements (as detailed above) and the operational noise requirements (e.g. CoA E52 - E55 of the CSSI).

Operational noise from stationary sources (e.g. SAMF activities, switchgear, etc.) must comply with the noise limits specified in Table 6-8 and Table 6-9.

Table 6-8: Operational noise limits applicable for the SAMF at sensitive receivers

Day	Evening	Night	Night (Sleep Disturbance)
52 dBA LAeq(15 min)	48 dBA LAeq(15 min)	46 dBA LAeq(15 min)	56 dBA LAmax

Table 6-9: Operational noise limits for substations at sensitive receivers

Location	(dBA) LAeq (15 min) at all times	Receiver description
TPS1 – Westmead Station Stop	65 47	Commercial Residential
TPS2 – Factory Street Stop	65 42	Commercial Residential
TPS3 – Barrack Lane	65	Commercial
TPS4 – Camellia Stop	65	Commercial
TPS5 – Dundas Stop	65 40	Commercial Residential
TPS6 – Adderton Road	36	Commercial
TPS7 – Carlingford Stop	65 44	Commercial Residential
TPS8 – Colquhoun Street	65	Commercial

Operational noise from rail traffic (including LRV movements during T&C), must comply with the requirements of CoA E54 and E55.

- CoA E54: Ground-borne noise from rail traffic must not result in increases in existing noise levels by 3 dBA or more and exceedances of the criteria outlined in Table E3 (reproduced below) at the nearest receiver. If exceedances are identified, the Proponent must implement mitigation measures which may include at-receiver property treatments
- CoA E55: Ground-borne noise from rail traffic must not exceed the criteria outlined in Table E4 (reproduced below) as measured at the nearest receiver. If exceedances are identified, the Proponent must implement mitigation measures which may include at-receiver property treatments.

Table E3 Operational Noise Trigger Levels for Sensitive Receivers adjacent to the Carlingford Corridor (dBA)

Receiver Type	Time of day	Internal Noise Trigger Level (dBA)
Residential	Daytime 7.00am to 10.00pm	40 L_{ASmax}[1]
	Night-time 10.00pm to 7.00am	35 L_{ASmax}
Schools, educational institutions, places of worship	When in use	40-45 L_{ASmax}[2]
Medical	When in use	35 L_{ASmax}[1]
Public buildings	When in use	40 L_{ASmax}[1]
Theatres	When in use	NR25 [3]

General Note: Ground-borne noise level values are relevant only where they are higher than the airborne noise from railways and where the ground-borne noise levels are expected to be, or are, audible within habitable rooms (RING, EPA 2013).

Note 1: L_{ASmax} refers to the maximum noise level not exceeded for 95 percent of rail pass-by events and is measured using the 'slow' response setting on a sound level meter.

Note 2: The lower value of the range is applicable where low internal noise levels are expected, such as in areas assigned to studying, listening and praying.

Note 3: NR curves are used for rating noise levels and are a set of octave band curves which provide limiting sound pressure level values. NR 15 is equivalent to approximately 20 dBA and NR 25 is approximately 30 dBA.

Table E4 Operational Noise Trigger Levels for Sensitive Receivers between Camellia and Westmead (dBA)

Receiver Type	Time of day	Internal Noise Trigger Level (dBA)
Residential	Daytime 7.00am to 10.00pm	40 L_{ASmax}[1]
	Night-time 10.00pm to 7.00am	35 L_{ASmax}
Schools, educational institutions, places of worship	When in use	40-45 L_{ASmax}[2]
Medical	When in use	35 L_{ASmax}[1]
Public buildings	When in use	40 L_{ASmax}[1]
Theatres	When in use	NR25 [3]

General Note: Ground-borne noise level values are relevant only where they are higher than the airborne noise from railways and where the ground-borne noise levels are expected to be, or are, audible within habitable rooms (RING, EPA 2013).

Note 1: L_{ASmax} refers to the maximum noise level not exceeded for 95 percent of rail pass-by events and is measured using the 'slow' response setting on a sound level meter.

Note 2: The lower value of the range is applicable where low internal noise levels are expected, such as in areas assigned to studying, listening and praying.

Note 3: NR curves are used for rating noise levels and are a set of octave band curves which provide limiting sound pressure level values. NR 15 is equivalent to approximately 20 dBA and NR 25 is approximately 30 dBA.

6.7 Vibration criteria

The effects of vibration on buildings can be divided into three main categories:

- Human comfort – those in which the occupants or users of the building are inconvenienced or possibly disturbed
- Structural or cosmetic damage – those in which the integrity of the building or the structure itself may be prejudiced (i.e. cosmetic damage)
- Effects on building contents – those where the building contents may be affected (such as vibration sensitive scientific or medical equipment).

6.7.1 Disturbance to buildings occupants

Vibration, with the potential to disturb human occupants of buildings, is managed referencing DECC's Assessing Vibration: a technical guideline (DECC, 2006). This document provides criteria which are based on the British Standard BS 6472-2008 Evaluation of human exposure to vibration in buildings (1-80Hz).

Vibration sources are defined as Continuous, Impulsive or Intermittent. Table 6-10 provides a definition and examples of each type of vibration. It is noted that the EIS: Technical Paper – Noise and Vibration Impact Assessment only presented guidelines values for intermittent vibration. To cover the range of all potential vibration impacts across the project, the three types of vibration have been included.

Table 6-10: Types of vibration

Type of vibration	Definition	Examples
Continuous vibration	Continues uninterrupted for a defined period (usually throughout the day-time and/or night-time)	Machinery, steady road traffic, continuous construction activity (such as road headers).
Impulsive vibration	A rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on frequency and damping). It can also consist of a sudden application of several cycles at approximately the same amplitude, providing that the duration is short, typically less than two seconds.	Occasional dropping of heavy equipment, occasional loading and unloading.
Intermittent vibration	Can be defined as interrupted periods of continuous or repeated periods of impulsive vibration that varies significantly in magnitude. Where the number of vibration events in an assessment period is three or fewer, this would be assessed against impulsive vibration criteria.	Trains, nearby intermittent construction activity, passing heavy vehicles, impact pile driving, rock breaking, jack hammers.

Notes:

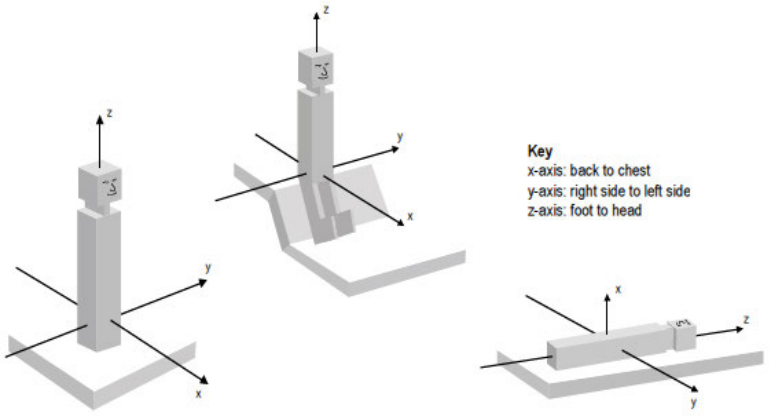
1. Source: AVTG

The criteria are to be applied to a single weighted root mean square (rms) acceleration source level in each orthogonal axis. Section 2.3 of the guideline states:

”Evidence from research suggests that there are summation effects for vibrations at different frequencies. Therefore, for evaluation of vibration in relation to annoyance and comfort, overall weighted rms acceleration values of the vibration in each orthogonal axis are preferred (BS 6472).”

When applying the criteria, it is important to note that vibration may enter the body along different orthogonal axes, i.e. x-axis (back to chest), y-axis (right side to left side) or z-axis (foot to head). The three axes are referenced to the human body. Thus, vibration measured in the horizontal plane should be compared with x- and y-axis criteria if the concern is for people in an upright position, or with the y- and z- axis criteria if the concern is for people in the lateral position.

Figure 6-1: Orthogonal axes for human exposure to vibration



Preferred and maximum values for continuous and impulsive vibration, based on weighted acceleration rms values (m/s^2) are presented in **Table 6-11**.

Table 6-11: Preferred and maximum continuous and impulsive vibration values for human comfort (Weighted RMS Acceleration, m/s2, 1-80Hz)

Location	Assessment period[1]	Preferred values		Maximum values	
		Z-axis	X- and Y-axis	Z-axis	X- and Y-axis
Continuous vibration (rms acceleration, m/s^2)					
Critical areas[2]	Day or night	0.005	0.0036	0.010	0.0072
Residences	Day	0.010	0.0071	0.020	0.014
Residences	Night	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night	0.020	0.014	0.040	0.028
Impulsive vibration (rms acceleration, m/s^2)					
Critical areas[2]	Day or night	0.005	0.0036	0.010	0.0072
Residences	Day	0.30	0.21	0.60	0.42
Residences	Night	0.10	0.071	0.20	0.14

Location	Assessment period[1]	Preferred values		Maximum values	
		Z-axis	X- and Y-axis	Z-axis	X- and Y-axis
Offices, schools, educational institutions and places of worship	Day or night	0.64	0.46	1.28	0.92

Notes:

1. Day is 7.00 am to 10.00 pm and night is 10.00pm to 7.00 am
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specify above.
3. Source: BS 6472-2008

Preferred values for intermittent vibration, based on the weighted Vibration Dose Values (VDV, $m/s^{1.75}$) are presented in **Table 6-12**.

Table 6-12: Preferred and maximum intermittent vibration values for human comfort (VDV, $m/s^{1.75}$, 1-80Hz)

Location	Assessment period[1]	Preferred values X-, Y- and Z-axis	Maximum values X-, Y- and Z-axis
Critical areas[2]	Day or night	0.10	0.20
Residences	Day	0.20	0.40
Residences	Night	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night	0.40	0.80
Workshops	Day or night	0.80	1.60

Notes:

1. Day is 7.00 am to 10.00 pm and night is 10.00pm to 7.00 am
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specify above.
3. Source: BS 6472-2008

To assess the potential for vibration impact on human comfort, an initial screening test will be undertaken during each detailed assessment based on peak velocity units, as this metric is also used for the cosmetic building damage vibration assessment. The screening test is conservative because 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 screening test will be based on the preferred peak values, as shown **Table 6-11**, for pseudo-continuous work activities such as bored piling and on maximum peak values for surface construction works, which are intermittent in nature. This approach has been adopted so that the screening test is not unduly stringent.

The initial screening test limits for vibration disturbance to building occupants, based on the maximum peak particle velocity (ppv, mm/s) are presented in **Table 6-13**. During the detailed

assessment, where 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 6-13: Construction vibration disturbance to building occupants – initial screening test

Location	Assessment period[1]	Maximum values X-, Y- and Z-axis
Critical areas[2]	Day or night	0.28
Residential buildings	Day (16 hour)	0.56
Residential buildings	Night (9 hour)	0.40
Offices, schools, educational institutions and places of worship	Day or night	1.10
Workshops	Day or night	2.20

Notes:

1. Day is 7.00 am to 10.00 pm and night is 10.00pm to 7.00 am
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specify above.

6.7.2 Structural damage to buildings

Potential structural damage of buildings caused by vibration is typically managed by ensuring vibration induced into the structure does not exceed certain limits and standards, including the structural damage vibration limits presented in British Standard 7385 Part 2 (1993) as recommended in are based on Australian Standard AS 2187: Part 2-2006 Explosives - Storage and Use - Part 2: Use of Explosives and adopted in the EIS.

BS7385 suggests levels at which ‘cosmetic’, ‘minor’ and ‘major’ categories of damage might occur.

The cosmetic damage levels set by BS 7385 are considered ‘safe limits’ up to which no damage due to vibration effects has been observed for certain particular building types. Damage comprises minor non-structural effects such as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks and separation of partitions or intermediate walls from load bearing walls. ‘Minor’ damage is considered possible at vibration magnitudes which are twice those given and ‘major’ damage to a building structure may occur at levels greater than four times those values.

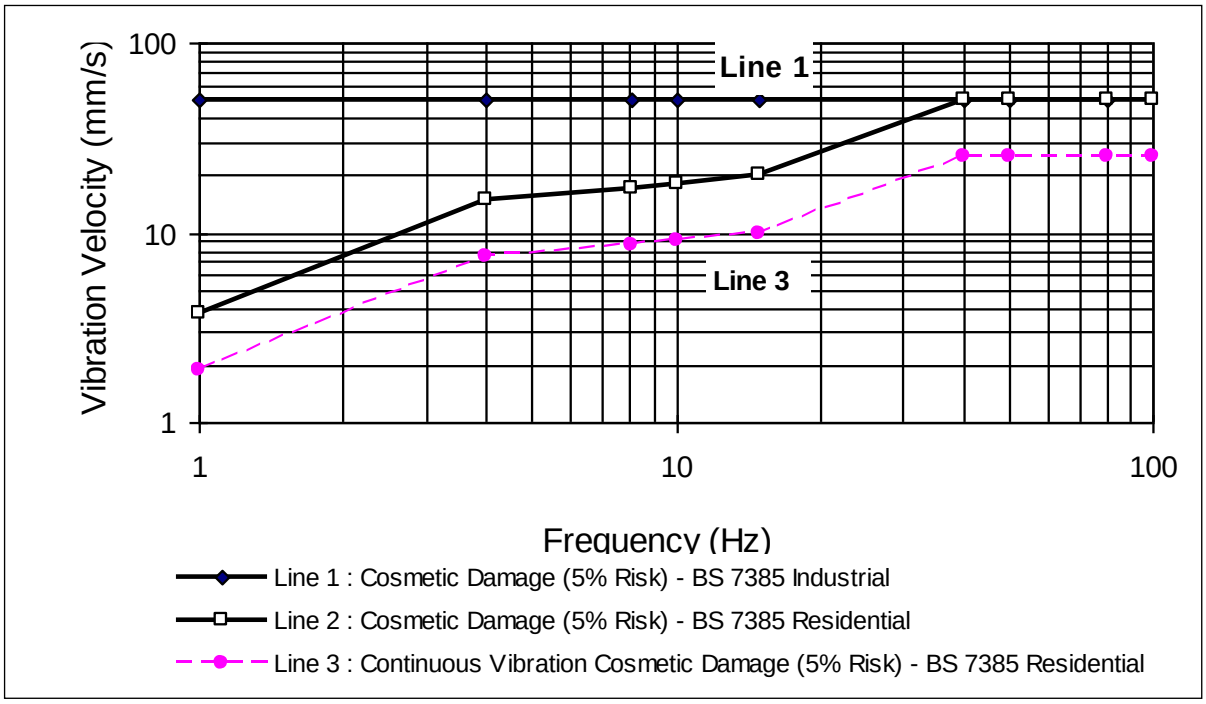
Table 6-14 sets out the recommended limits from BS7385 for transient vibration to ensure minimal risk of cosmetic damage to residential, commercial and industrial buildings. This is shown graphically in **Table 6-14**.

Table 6-14: Transient vibration guide values - minimal risk of cosmetic damage (BS 7385) - peak component particle velocity

Line	Type of structure	Frequency range 4 to 15 Hz	Frequency range 15 to 40 Hz	Frequency range 40 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s	50 mm/s	50 mm/s
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4Hz, increasing to 20 mm/s at 15Hz	20 mm/s at 15Hz, increasing to 50 mm/s at 40Hz	50 mm/s

BS7385 states that the guide values in **Table 6-14** relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in **Table 6-14** may need to be reduced by up to 50%, as shown by Line 3 of **Figure 6-2** for Residential Buildings.

Figure 6-2: Graph of Transient Peak Component Particle Velocity Vibration Guide Values for Cosmetic Damage



The British Standard states that the guide values in **Table 6-14** 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 6-14** may need to be reduced by up to 50%. Rock breaking/hammering and sheet piling activities are considered to have the potential to cause dynamic loading in some structures (e.g. residences) and it may be appropriate to reduce the transient values by 50%.

For most construction activities involving intermittent vibration sources such as rock breakers, piling rigs, vibratory rollers, excavators and the similar, the predominant vibration energy occurs at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range). On this basis, a conservative vibration damage screening level per receiver type is given below:

- Reinforced or framed structures (Line 1, **Figure 6-2**): 25.0 mm/s
- Unreinforced or light framed structures (Line 2, **Figure 6-2**): 7.5 mm/s

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

6.7.3 Heritage structures

For heritage structures, BS7385-2:1993 does not provide numerical vibration levels to prevent structural damage, however, notes that:

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

Heritage buildings will be considered on a case by case basis, and detailed inspections of heritage listed structures should be undertaken for all potentially affected heritage structures prior to the commencement of works.

In accordance with BS 7385, a heritage listed structure should not (unless it is structurally unsound) be assumed to be more sensitive to vibration resulting in application of the 7.5 mm/s screening criterion. Where a historic building is however deemed to be sensitive to damage from vibration (following inspection), a more conservative superficial cosmetic damage criterion of 2.5 mm/s peak component particle velocity (from DIN 4150) should be applied.

The approach to manage potential vibration impact shall be to:

1. Identify heritage items where the 2.5 mm/s peak component particle velocity objective may be exceeded during specific construction activities
2. Structural engineering report to be undertaken on identified heritage items, to confirm structural integrity of the building and confirm if item is 'structurally sound'
3. If item confirmed as 'structurally sound', the screening criteria in Section 6.7.2 shall be adopted, or
4. If item confirmed as 'structurally unsound', the more conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity would be adopted.

This approach is consistent with the EIS.

In accordance with CoA E43, as detailed in the Noise and Vibration Monitoring program (Appendix F), vibration monitoring will also be conducted both before and during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. As per Conditions M6.1-M6-3 of the EPL, construction noise and vibration monitoring must also be undertaken as directed by an authorised officer of the EPA.

In accordance with CoA E44, this would require advice of a heritage specialist when considering the methods and locations for installing vibration monitoring equipment.

6.7.4 Sensitive Scientific and Medical Equipment (guidance only)

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

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 prior to finalisation of the CNVIS. 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 below in **Figure 6-3**.

Figure 6-3: Generic Vibration Criterion (VC) curves

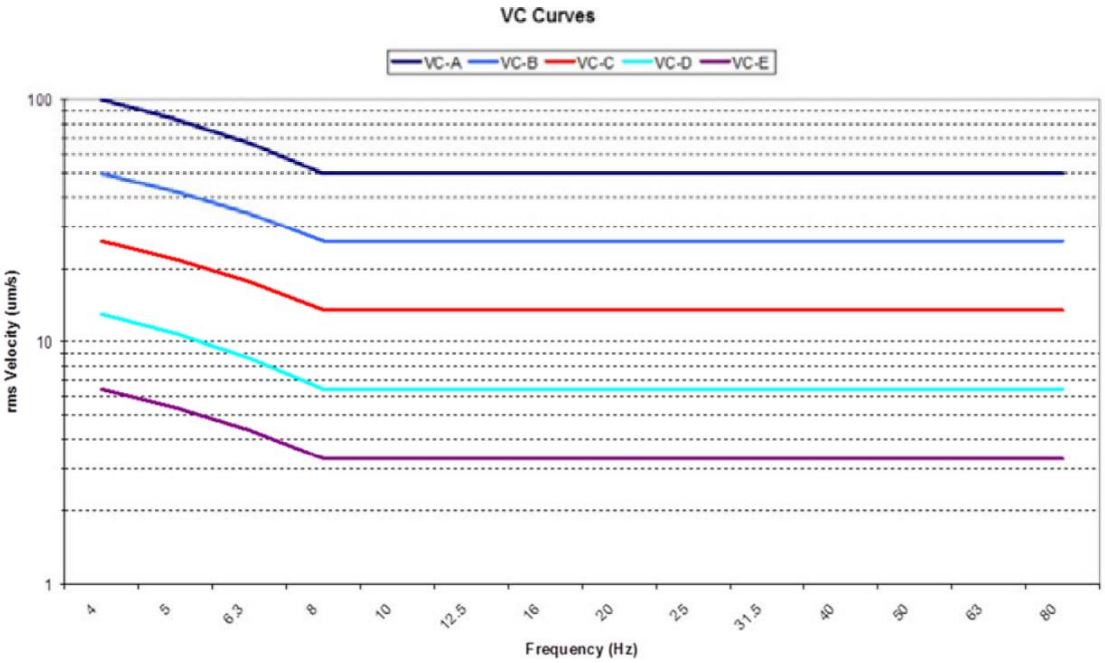


Table 6-15: Application and interpretation of the generic Vibration Criterion (VC) curves

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.

Criterion curve	Max level (µm/sec, rms)[1]	Detail size (microns)[2]	Description of use
CV-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.

Notes:

1. As measured in one-third octave bands of frequency over the frequency range 8 to 100 Hz.
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 consider the observation requirements of many items depend upon the detail size of the process.

6.7.5 Utilities and other vibration sensitive structures

Some structures and utilities located near the Project may be particularly sensitive to vibration. A vibration goal which differs from the cosmetic damage goals presented in Section 6.7.2 or Section 6.7.3 may need to be adopted. Examples of such structures and utilities include:

- Tunnels
- Gas pipelines
- Fibre optic cables

The British Standard BS 7385-2:1993 (page 5) notes that structures below ground are known to sustain higher levels of vibration and are very resistant to damage unless in very poor condition. Further guidance is taken from the German Standard DIN 4150-3:2016. 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 6-16 presents the initial reference guideline for utilities and other buried pipework to evaluate the effects of short-term vibration impact. Specific vibration goals should be determined on a case-by-case basis as part of the CNVIS for each work site in consultation with a vibration engineer and structural engineer.

Table 6-16: DIN 4150-3 Guideline values for vibration velocity to be used when evaluating the effects of short-term vibration on buried pipework

Line	Pipe Material	Guideline values for vibration velocity measured on the pipe
1	Steel (including welded pipes)	100 mm/s
2	Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80 mm/s
3	Masonry, plastic	50 mm/s

Notes:

1. Rock breaking/hammering and sheet piling activities are considered to have the potential to cause dynamic loading in some structures and it may therefore be appropriate to reduce the transient values by 50%.

6.8 Transport for NSW's Construction Noise and Vibration Strategy

Transport for NSW's Construction Noise and Vibration Strategy (CNVS) provides practical guidance on how to minimise, to the fullest extent possible, the impacts of noise and vibration on the community. The document outlines feasible and reasonable mitigation measures that should be considered by the Project to reduce airborne noise, ground-borne noise and vibration during the construction of infrastructure projects.

The CNVS is a key reference document for the development of this Sub-plan and is referred to by the Planning Approval and the Submissions and Preferred Infrastructure Report.

The CNVS provides a framework for the assessment of impacts and standard, source and path mitigation measures that must be implemented relevant to infrastructure construction works.

Construction noise mitigation measures are to be implemented in accordance with Tables 4, 5, 6 and 7 of the CNVS (CoA E33). The mitigation measures in Tables 4, 5, 6 and 7 of the CNVS have been referenced in the development of the mitigation and management measures in Section 9.

6.9 National Standard for exposure to noise

In accordance with CoA E41, worksites will be managed to ensure that noise generated by construction will not exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of LAeq, 8hour, of 85 dB(A) for any employee working at a location near a Project worksite.

7 Environmental aspects and impacts

7.1 Environmental aspects

The Project will involve a range of construction activities incorporating various heavy machinery, plant and equipment that will operate in a number of locations across the Project. In order to assess the level of potential impact on noise and vibration sensitive receivers, the broad categories of construction activity likely to impact these receivers are identified below, based upon the six sets of construction works required as part of the SOM construction works:

- **Stabling and Maintenance (SaM) facility construction works**
  - Installation of environmental controls (temporary fencing/ hoardings etc.)
  - Site clearing
  - Earthworks
  - Establishment of construction facilities including site buildings
  - Drainage
  - Earthworks
  - Concrete works
  - Maintenance building structures
  - Building installation
  - Building fit-out
  - Pavements
  - Furniture
  - Track infrastructure
  - Utility, signals, services works and connections
- **Light rail stops**
  - Integrated Service Cabinets (ISC)
  - Canopy Structures, Wind Break Screens, Fixtures and Finishes
  - LV Cabling, Lighting
  - Drainage
- **Traction Power Substation (TPS)**
  - TPS Substructure
  - Roadworks
  - Combined Services Routes (CSR), Drainage
  - Lighting, Earthing and Bonding
  - Architectural Screening, Fencing and Gates
  - Landscaping

- **Back Up Operating Centre (BOCC)**
  - Building substructure, superstructure, internal fitout and finishing works
  - Roadworks
  - Combined Services Routes (CSR), Drainage
  - Lighting, Earthing and Bonding
  - Architectural Screening, Fencing and Gates
  - Landscaping
- **Corridor OHW and Helper Cable works**
  - Overhead wiring (OHW)
  - Helper Cables.
- **Testing and Commissioning works, including trial running**
  - LRV movements
  - Traffic control.

7.2 Environmental impacts

The potential for noise and vibration impacts on sensitive receivers or structures will depend on a number of factors. Typically, these might include:

- The type of equipment in use
- The number of equipment simultaneously in use
- Proximity to sensitive receivers
- Topography and other physical barriers
- Hours/duration of construction works
- Ground conditions and type around the works
- The condition of sensitive receivers
- Proximity of heavy traffic areas such as the highway
- Presence of existing background noise (e.g. from traffic on major arterial roads or existing industry)
- Proximity of other construction activities nearby to the subject construction works area.

Relevant aspects and the potential for related impacts have been considered in an Environmental Risk Register included in Appendix A4 of the CEMP.

Noise and vibration impacts attributable to the Project are anticipated. Section 8 of this CNVMP provides a framework for the assessment of noise and vibration impacts from the construction stages of the SOM works consistent with CoA E42.

Section 9 provides a suite of mitigation measures that will be implemented to avoid, minimise and/ or manage impacts of the SOM Works on the nearby noise and vibration sensitive receivers and vibration sensitive structures/items.

7.2.1 Airborne noise impacts

A summary of the highest potential construction noise levels (without additional mitigation) in each of the NCAs for the various construction scenarios, as developed in the EIS, is presented in Appendix D. The works that most closely fit with the SOM Works have been selected to provide an indication of the potential noise impacts from the SOM Works construction.

The noise levels are representative of the worst-case impacts within each NCA, at the receiver within the NCA with the highest predicted noise level for each receiver type. For other receivers within each NCA, that are further away or shielded from the construction works the impacts are expected to be lower. These noise levels are intended to give an overview of the likely noise levels from the construction works for variation proposed construction activities.

The tables colour the predicted noise levels based on the exceedance of the NML during that period and for that receiver type.

A qualitative description likely impact of the construction noise, based on the dB level above the RBL, based on the TfNSW Construction Noise and Vibration Strategy and the Out of Hours Works Protocol (see Appendix A).

- Noise levels 10 to 20 dB above RBL – would typically be clearly audible
- Noise levels 21 dB to 30 dB above RBL – would typically be moderate intrusive
- Noise levels >30 dB above RBL – would typically be high intrusive.

The noise levels presented in this CNVMP are based on a realistic worst-case assessment. For most construction activities, it is expected that during actual the construction noise levels experienced by most receivers would frequently be lower than predicted at the most-exposed receiver. The actual noise emissions from the works and resulting noise levels at nearby receiver buildings would be influenced by:

- The location/distance of the plant/equipment with respect to the receiver building
- The on/off time of the plant/equipment
- The intensity with which the plant/equipment is working.

Mitigation and management measures to address potential airborne construction noise impacts are discussed in Section 9.

7.2.2 Ground-borne noise impacts

Minimal ground-borne noise impacts are expected for the SOM Works, as vibration intensive activities are largely completed by the Infrastructure Works contractor. The exception is for the SaMF, where the SOM Works also incorporate civil infrastructure components within the ground. This is not the case for other SOM works locations.

It is noted that there are minimal sensitive receivers surrounding the SaMF. Nonetheless, mitigation and management measures are discussed in Section 9.

7.2.3 Vibration impacts

Minimal vibration impacts are expected for the SOM Works, as the majority of vibration intensive activities would be undertaken by the Infrastructure Works contractor. The exception is for the SaMF, where the SOM Works also incorporate civil infrastructure components within the ground which is not the case for other works locations.

Mitigation and management measures to address potential construction vibration impacts are discussed in Section 9.

8 Construction noise and vibration assessment

8.1 Construction Noise and Vibration Impact Statements

GRCLR will develop Construction Noise and Vibration Impact Statements (CNVIS) as key site management tools providing clear instructions for managing each construction site. In accordance with CoA E42, each CNVIS will be prepared and implemented for each construction site before construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receivers. The CNVIS will be progressively prepared to supplement the CNVMP and refine impact predictions presented in the EIS. All CNVIS will be prepared by an appropriately qualified and experienced acoustic consultant. All CNVIS for construction sites will be reviewed and endorsed by the AA, in accordance with CoA A26.

This CNVMP establishes the minimum requirement for mitigating and managing construction noise and vibration impacts from the project, and how these will be addressed.

The CNVIS will provide detailed construction noise and vibration prediction, assessment, mitigation design outcomes and discussion of management measures to limit impacts to sensitive receivers.

Each CNVIS will be prepared before works that generate noise and vibration impacts commence and will set out the mitigation and management measures required for the construction stage, through consultation with affected sensitive receivers. They will address:

- Scope of construction work covered by CNVIS
    - Details of the proposed construction activities and methodology (including construction associated traffic)
    - Proposed hours for the construction works
- Justification for OOHW in accordance with the project approval (where required)
- Nearest noise and vibration sensitive receivers, based on land use survey
- Construction noise and vibration objectives (outlined in Section 6)
- Construction noise and vibration assessment
- Noise and vibration mitigation options and preferred management measures (including community consultation or notification)
- Internal noise audit systems including recording of daily hours of construction, progressive impact assessments as work proceeds, conducting informal checks by the AA, providing active and communication links to Council and surrounding residents and sensitive receivers
- Noise and vibration monitoring requirements

Monitored noise and vibration levels will be analysed against the predictions made in the relevant CNVIS. This will allow for ongoing review and verification of the predictive model.

Physical noise mitigation measures such as noise barriers, acoustic enclosures around fixed plant and acoustic sheds will be outlined in the site specific CNVIS prepared for each ancillary facility, and compliance with CoA C19 and C20 will be demonstrated in these CNVIS.

Furthermore, alternative methods of construction (E42 (c)) specific management measures such as a staging of works, respite periods (E42 (e)), community consultation and notification (E42(i)) and the details of noise audit systems (E42(g)) will also be summarised and implemented.

The CNVIS will identify the sensitive receivers that GRCLR 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.

The process of assessment of construction noise and vibration impacts is summarised Figure 8-1.

Site-specific or activity-specific noise assessments will be prepared to assess all construction works for the Project.

The key CNVIS to be prepared under the CNVMP are summarised in Table 8-1.

Table 8-1: CNVIS prepared under the CNVMP

Construction works are/ site	Construction activity
Stabling and Maintenance Facility (SaMF)	Civil works, services works and building construction works
Light rail stops	Civil works and electrical works
Traction Power Substation (TPS)	Electrical works, services works, building construction works and landscaping
Back Up Operating Centre (BOCC)	Electrical works, services works, building construction works and landscaping
Corridor OHW and Helper Cable works	Cables and OHW installation works
PLR alignment wide	Testing and Commissioning

8.2 Tools for noise and vibration management

A surface works noise and vibration prediction and management tool will be developed for the purpose of assisting with managing impacts from specific sets of works associated with the construction of the Project. The tool will allow:

- Flexibility in assessing specific scenarios of local area and utility works,
- Assessment at a variety of locations, and
- Assessment of multiple combinations of equipment that may be used during each stage of works in the suburban environment that would be encountered.

The tool will be used to predict daytime and out of hours construction noise levels which will be compared against the Noise Management Level (NML) for each receiver. Appropriate mitigation and management measures can be adopted, as required by this CNVMP.

Verification and adjustment of the prediction tool will occur throughout construction via monitoring. Noise and vibration monitoring data will be collected in accordance with the Noise and Vibration Monitoring Program (Appendix F). This feedback loop will ensure the prediction tool is verified and adjusted as required to ensure accuracy across the various sections of the Project alignment.

8.3 Noise and vibration assessment process

Figure 8-1 sets out the process for assessing construction noise and vibration for the SOM Works. Outcomes of the assessment will be incorporated into a CNVIS, as noted in Section 8.1.

Figure 8-1: Process for assessing construction noise and vibration

1. Determine noise and vibration objectives

For each key construction area:

- Identify noise sensitive receivers
- Determine relevant noise and vibration objectives, with reference to Section 6.

Note: Assessment usually undertaken at locations considered to be representative of a group of receivers with a similar level of exposure to construction works.

2. Identify construction stages

For each key construction area:

- Identify construction aspects or stages and key activities for each stage
- Include:
  - the site location;
  - times of operation;
  - processes involved;
  - plant & equipment (including size / type).
- Identify other construction works in the vicinity of the project. Liaise with Proponent to ensure cumulative noise & vibration impacts are managed, in particular in relation to OOHW.

3. Predict noise and vibration impacts

Airborne construction noise

Determine $L_{Aeq(15\ minute)}$ sound power levels for plant and equipment based on operating scenarios to input into the noise model (see below).

- Establish noise model for construction activity/ component. The noise model should include:
  - Height and location of sources and receivers;
  - Distance attenuation (incorporating noise reflections and ground absorption);
  - Effects of noise shielding (topography, buildings, boundary fences, noise barriers etc);
  - Correction factors for particularly annoying activities, as defined by the ICNG;

	◦ Effects of standard noise mitigation measures; ◦ Where applicable, evaluate façade transmission loss of affected receivers to determine internal noise levels. • Calculate the $L_{Aeq(15minute)}$ noise levels from the proposed construction activities at each receiver and compare these with the construction noise objectives. • For night-time activities, calculate the $L_{A1, 1\ minute}$ noise levels and compare with the $L_{A90(15min)}$ + 15 dB(A) and $L_{A1, 1\ minute}$ 65 dB(A) sleep disturbance screening levels, applied at the external facade. • Identify areas near the CSSI where an employee may be exposed to construction generated noise that exceeds the LAeq,8h, of 85dB(A).
Ground-borne construction noise	• Determine the location of each plant or equipment item in relation to each receiver. • Determine the level of ground-borne noise at each building location based on ground-borne noise levels versus distance prediction curves for each plant item. For highly sensitive building occupancies, the assessment may need to incorporate the acoustic properties of the building space and the structural response of the building.
Construction vibration	• Determine the location of each plant or equipment item in relation to each receiver. • Where vibration intensive equipment could potentially be operating in close proximity to receivers, determine whether this is within the minimum working distances (Section 9.5). Minimum working distances may differ for heritage items; • Where plant & equipment may operate within minimum working distances: ◦ Use vibration level vs distance prediction curves for each plant item ◦ Determine the vibration likely to occur at each building location • For highly sensitive equipment, assessment may need to incorporate structural response of building & particular sensitivities of equipment.
Construction related road traffic noise	• Identify construction vehicle routes to be used to access site and confirm hourly construction traffic volumes (light and heavy vehicles) for day (7am to 10pm) and night (10pm to 7am).

	• Confirm existing traffic volumes on public roads accessed for truck haulage. • Predict traffic noise levels on public roads used by construction vehicles, both with and without construction traffic, for comparison against road traffic noise management levels. • Review and confirm sleep disturbance impacts from truck entry/ egress points and on public roads.

4. Assess noise and vibration impacts

Where predicted noise and vibration exceeds the objectives identified in Step 1:	• Identifying key hours of impact for affected sensitive receivers (see Section 6.1) • Implement appropriate reasonable and feasible standard mitigation and management measures (see Section 9) • Review the potential for cumulative noise impacts other construction works in the vicinity of the project and any implications for the adopted reasonable and feasible standard mitigation measures. • Examination of alternative methods of construction that would potentially reduce noise and vibration. • Predicted noise / vibration at receivers, incorporating nominated mitigation measures, based on the expected noise reduction from mitigation measures. • Additional mitigation measures may need to be considered Note: Assessment usually undertaken at locations considered to be representative of a group of receivers with a similar level of exposure to construction works.

9 Environmental control measures

9.1 Noise and vibration mitigation and management measures

In accordance with CoA E42, reasonable and feasible noise mitigation measures (such as those listed within Chapter 6 of the ICNG and Section 8 of the TfNSW CNVS) will be implemented with the aim of achieving the noise and vibration criteria specified in Section 6 of this CNVMP, as part of the CNVIS process.

Site and / or activity specific mitigation measures are documented in noise and vibration assessments (CNVIS) for each worksite, as outlined in Section 8.1. If required, the CNVMP will be progressively updated to account for changes in noise and vibration management issues and strategies, following the process outlined in Section 9.2 of the CEMP.

This information may be developed as design and construction planning progresses. The noise and vibration assessments will be document controlled separately from this CNVMP. Therefore, an update to these plans will not require this CNVMP to be updated.

Specific measures and requirements to address contract specifications, CoA, REMMMs, and EPL Conditions in relation to impacts from noise and vibration are outlined in Table 9-1.

Table 9-1: Noise and vibration management and mitigation measures

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	General					
NV1	A register of most affected noise and vibration sensitive receivers will be kept on site. The register will include the following details for each sensitive receiver: • Address of receiver • Category of receiver (e.g. residential or commercial etc.) • Contact name and phone number	Project wide Land Use Survey to record sensitive receivers	Pre-construction Construction	Environment and Sustainability Manager Environmental Coordinator to maintain register	CoA E33 EPO-NV-2	Register of receivers
NV2	Training will be provided to relevant Project personnel, including relevant sub-contractors on noise and vibration requirements from this CNVMP through inductions, toolboxes, Environmental Control Plans (ECP) or targeted training.	Training materials	Prior to construction Construction	Environmental Advisor	CoA E33 GRCLR Practice	Training records
NV3	All employees, contractors and subcontractors will receive an induction, including: • All relevant noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work	Induction materials, toolbox or specific training Environmental Control Maps (ECMs)	Construction	Environmental Coordinator	CoA E33 EPL G3.1	Site induction records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	• Any limitations on noise generating activities with special audible characteristics • Location of all relevant sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures • EPL requirements to minimise noise and vibration impacts on receivers					
NV4	No swearing or unnecessary shouting or loud stereos / radios on site. Dropping of materials from height, throwing of metal items and slamming of doors will also be avoided.	Induction materials, toolbox or specific training	Construction	Supervisor/ Foreman	GRCLR Practice	Site inspection records
	General Construction Hours					
NV5	Construction activities associated with the Project will be carried out in accordance with the hours in Section 6.1 of this CNVMP.	CNVIS	Construction	Construction Project Managers	CoA E21 to E25 and E27 REMMM NV-2 EPL L4.1-L4.12	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV6	Where feasible and reasonable, noise or vibration generating construction works will be carried out during the standard daytime working hours.	CNVIS	Construction	Environmental Advisor	CoA E33	Construction program
NV7	Where feasible and reasonable, noise generating works on Eat Street would be scheduled to minimise impacts to adjacent businesses and commercial properties during lunch and dinner periods.	CNVIS	Construction	Construction Project Managers Environmental Advisor	REMMM NV-2	Site inspection records
NV8	Excavation, demolition or rock breaking activities that are concentrated in a single area (i.e. activities that do not move along the alignment, and do not require out-of-hours activities for safety reasons or to minimise disruption to road networks) would be scheduled to take place during daytime construction hours where feasible and reasonable.	CNVIS	Construction	Construction Project Managers Environmental Advisor	REMMM NV-2	Site inspection records
NV9	Where OOHW is required to take place, it would be scheduled in accordance with the hierarchy of preferred working hours detailed in the OOHW Protocol and in accordance with the community consultation outcomes (CoA E39). The predicted impacts determined through the CNVIS process would determine the potential impacts at nearby sensitive receivers, in order to then establish the appropriate scheduling,	CNVIS OOHW Protocol	Construction	Construction Project Managers Environmental Advisor	REMMM NV-5 CoA E39	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	respite and mitigation and management measures. Additionally, particular care will be taken during the CNVIS process to schedule works to be completed before 11pm where they are to occur during the night-time and would result in high noise levels at residential receivers located in: • NCA04 in the Westmead precinct • NCA06 and NCA07 in the Parramatta North precinct • NCA11 in the Rosehill and Camellia precinct.					

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV10	Except as permitted by an EPL, or through the Out-of-Hours Work Protocol, Highly Noise Intensive Works (as defined by the CoA) that result in an exceedance of the applicable NML at the same sensitive 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.	CNVIS	Construction	Construction Project Managers Environment and Sustainability Manager	CoA E27 REMMM NV-2 EPL L4.2	Site inspection records
NV11	Construction noise with special audible characteristics at the impacted noise sensitive receiver and vibration generating activities that will result in disturbance to building occupants at nearby occupied sensitive receivers (including jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling) will only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block. 'Continuous' includes any period during which there is less than a 1-hour respite between ceasing and recommencing any of the work.	CNVIS Construction noise monitoring or inspections for verification	Construction	Construction Project Managers Environment and Sustainability Manager	CoA E33 REMMM NV-2	Site inspection records Construction noise and vibration monitoring records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV12	OOHW is to be carried out in accordance with: • The Project's Out-of-Hours-Works Protocol (Appendix A); or • The Project's EPL .	OOHW Protocol EPL 21606	Construction	Construction Project Managers Environment and Sustainability Manager	CoA E28 CoA E29 CoA E30 REMMM NV-2 EPL L4.6-L4.12	OOHW Permits Site inspection records
	Consultation and Complaints Management					
NV13	Periodic notification (monthly letterbox drop and website notification) detailing all upcoming construction activities delivered to sensitive receivers at least 7 days prior to commencement of relevant works in addition to a range of additional communication and consultation measures which are further detailed in Section 9.4.	CCS CEMP	Prior to construction Construction	Construction Project Managers/ Environment and Sustainability Manager	CoA E33 REMMM NV-3	Community notifications Website
NV14	Residences / sensitive receivers will be notified of construction activities that are likely to affect their noise and vibration amenity in accordance with the CoA E24, CoA E31, CoA E37 and as detailed in the OOHW Protocol CoA E39. Information provided will include: • The types of activities to be undertaken,	CCS OOHW Protocol CEMP	Prior to construction Construction	Construction Project Managers/ Environment and Sustainability Manager/	CoA E24, E31, E33, E37 REMMM NV-2 GRCLR Practice EPL L4.12	Community notifications

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	• The timing of activities including expected start and finish, • The location of activities, and • Details of the community information line and how to make an enquiry and / or complaint.			Community Relations Manager Place Manager		
NV15	Consultation will be carried out with the following noise sensitive receivers where there is potential for noise intensive works to be above the relevant noise management level, to determine periods of use of these facilities that would be particularly sensitive to noise or vibration impacts in order to program works to away from sensitive time periods and ensure impacts are minimised during these sensitive periods. • Places of worship • Educational institutions (eg. school exam periods) • Childcare centres (rest periods)(where possible) • Noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories, operating theatres, and mental health services, Rosehill Racecourse and accommodation)	CNVIS CNVMP Section 9.4.	Prior to construction Construction	Construction Project Managers/ Environment and Sustainability Manager/ Community Relations Manager Place Manager	CoA E31 REMMM NV-2 REMMM NV-4	Consultation records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV16	For sensitive receivers that operate outside standard construction hours, for example hospitals which operate on a 24-hour basis, feasible and reasonable noise mitigation options and measures will be developed in consultation with the sensitive receiver.	CNVIS CNVMP Section 9.4.	Prior to construction Construction	Construction Project Managers/ Environment and Sustainability Manager/ Community Relations Manager Place Manager	REMMM NV-4	Consultation records
NV17	Prior to the commencement of construction works that could result in noise or vibration impacts on sensitive receivers within the Westmead Research Zone, consultation would take place with the noise or vibration identified as potentially affected receivers/facilities within the Westmead Research Zone will be carried out. This will determine periods when noise and/or vibration intensive works can occur with least impact and any appropriate mitigation or management measures that could be implemented (eg. relocation or vibration isolation of vibration sensitive equipment).	CNVIS	Prior to construction Construction	Construction Project Managers/ Environment and Sustainability Manager/ Community Relations Manager Place Manager	REMMM NV-8	Consultation records
NV18	Blasting will not be undertaken at any time.	No blasting is proposed.	Construction	Environmental Coordinator	CoA E35	-

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	Construction Traffic Noise					
NV19	Project-related heavy-vehicle movements required to occur within the Parramatta CBD and Rosehill and Camellia precincts would only occur during the periods determined in consultation with the Sydney Coordination Office and Roads and Maritime Services.	Traffic and Transport and Access Management Sub-Plan	Construction	Environment and Sustainability Manager/ Construction Project Managers	REMMM TT-28	Vehicle movement plans
NV20	Drivers will be advised of designated vehicle routes, parking locations, acceptable delivery hours specific to the site and other relevant practices (i.e. minimising the use of engine brakes, no extended periods of engine idling, No excessive revving of plant and vehicle engines, and controlled release of compressed air.).	Traffic and Transport and Access Management Sub-Plan	Construction	Supervisor/ Foreman / Site Engineer	GRCLR practice	Vehicle movement plans Training records
NV21	The Project will implement the CTTAMP to assist with managing driver behaviour both within construction works areas and on public roads.	Training materials Traffic and Transport and Access Management Sub-Plan	Construction	Supervisor / Foreman / Site Engineer Traffic Manager	GRCLR practice	Training records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV22	The Project will implement the CTTAMP to assist with managing driver behaviour both within construction works areas and on public roads.	Training materials	Construction	Supervisor / Foreman / Site Engineer Traffic Manager	GRCLR practice	Training records
NV23	Vehicles associated with the construction works would use arterial roads as far as practicable. Opportunities to reduce the impact of traffic noise on the sensitive receivers adjacent to the access routes will be considered during the design process, including options such as selecting route options with fewer noise sensitive receivers and restricting use of local roads with sensitive residential receivers to daytime construction hours where feasible and reasonable.	Traffic and Transport and Access Management Sub-Plan	Pre-construction Construction	Supervisor/ Foreman / Site Engineer Traffic Manager	REMMM NV-6 GRCLR practice	Vehicle movement plans Training records
NV24	Out-of-hours deliveries will be minimised where possible, with heavy vehicle movements limited to daytime hours where feasible and reasonable. Where out of hours deliveries are required, due care will be taken to minimise impacts (ie no extended periods of engine idling, use of radios instead of shouting, non-tonal reversing beepers where possible).	CNVIS	Construction	Supervisor/ Foreman/ Site Engineer	CoA E33 GRCLR practice	Vehicle movement plans
NV25	Limit the speed of vehicles and avoid the use of engine compression brakes.	CNVIS	Construction	Supervisor/ Foreman/ Site Engineer	CoA E33 GRCLR practice	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV26	Ensure vehicles are fitted with a maintained Original Equipment Manufacturer exhaust silencer or a silencer that complies with the National Transport Commission's 'In-service test procedure' and standard. Heavy vehicle vehicles using the sites should have RMS compliant silencer/muffler to control engine breaking noise.	CNVIS	Construction	Supervisor/ Foreman/ Site Engineer	CoA E33 GRCLR practice	Site inspection records Plant inspection records
NV27	Maximise on-site storage capacity to reduce the need for truck movements during sensitive times.	CNVIS	Construction	Supervisor/ Foreman/ Site Engineer	CoA E33 GRCLR practice	Site inspection records
NV28	Air brake silencer/muffler should be installed and fully operational for any heavy vehicles regularly used at worksite. This will reduce potential sleep disturbance impacts, especially at OOHW site exits.	CNVIS	Construction	Supervisor/ Foreman/ Site Engineer	CoA E33 GRCLR practice	Site inspection records Plant inspection records
	Source Controls					
NV29	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.	CNVIS	Design Construction	Design Manager Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records Vehicle Movement Plans

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV30	Use quieter and less vibration emitting construction methods where feasible and reasonable, for example, wherever practicable use excavator with pulveriser instead of rockhammer; operate vibratory rollers with the vibratory mode switched off to reduce vibration impact.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records
NV31	Piling activities that affect sensitive receivers will be reviewed for quieter and less vibration emitting construction methods where feasible and reasonable. Where quieter alternative methods than impact or percussion piling, such as bored piles or vibrated piles, are to be investigated and implemented where practicable, feasible and reasonable.	CNVIS	Construction	Environmental Advisor Foreman	CoA E34 REMMM NV-2	Site inspection records
NV32	Non-tonal movement alarms (or equivalent warning mechanism) will be used in place of tonal reversing alarms for GRCLR owned plant and subcontract plant used at night or during the day for more than two weeks. As part of equipment hiring, preference would be given to equipment fitted with non-tonal alarms.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33	Site inspection records
NV33	Avoid the coincidence of noisy plant working simultaneously close together and adjacent to sensitive receivers to reduce noise levels at these receivers.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV34	Plant used intermittently to be throttled down or shut down.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records
NV35	Directional noise-emitting plant to be directed away from sensitive receivers where feasible and reasonable.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records ECMs
NV36	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. Delivery vehicles to be fitted with or use straps rather than chains for unloading, wherever feasible and reasonable	CNVIS Induction materials, toolbox or specific training	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records Vehicle Movement Plans
NV37	The minimising of noise emissions from mobile plant by fitting residential grade mufflers on all mobile plant regularly used at worksites. Ensure plant including the silencer is well maintained.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records Plant inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV38	Ensure plant is regularly maintained, and repair or replace equipment that becomes noisy	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records Plant inspection records
NV39	Where practicable, materials will be pre-fabricated/prepared off-site to reduce noise with special audible characteristics occurring on site. Materials will then be delivered to site for installation.	CNVIS	Design	Design Manager	CoA E33 REMMM NV-2	Site inspection records
NV40	Where vibration intensive construction activities are proposed within 100 metres of sensitive receivers, these works will be confined to the less sensitive daytime periods where feasible and reasonable.	CNVIS	Construction	Environmental Advisor Foreman	REMMM NV-7	Site inspection records
NV41	The construction methodology of vibration intensive works (including for demolition of existing buildings and/or structures) would be developed to minimise direct and indirect impacts on adjacent and/or adjoining heritage items.	CNVIS	Design Construction	Design Manager Environmental Advisor Foreman	HE-22 REMMM NV-2	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	Path Controls					
NV42	Use site sheds and other structures within the worksite to provide additional noise barriers to receivers.	CNVIS	Design Construction	Design Manager Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records
NV43	The offset distance between noisy plant items and nearby sensitive receivers should be as large as possible	CNVIS	Design Construction	Design Manager Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records
NV44	For construction concentrated in a single area, such as at the stops, worksites, substation construction sites, bridge sites and the stabling and maintenance facility location, temporary acoustic fencing/barriers around the site perimeter will be considered where feasible and reasonable to mitigate off-site noise levels.	CNVIS	Construction	Environmental Advisor Foreman	REMMM NV-2	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV45	Construction work areas would use hoarding or temporary noise screens to shield noise sensitive receivers from noise generating works where reasonable and feasible. The height of noise screens would nominally be 2.4 metres, with noise screens heights and locations confirmed as part of the CNVIS process.	CNVIS	Design Construction	Design Manager Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records
NV46	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Site inspection records
	Sensitive receivers					
NV47	A register of most affected noise and vibration sensitive receivers will be kept on site. The register will include the following details for each sensitive receiver: • Address of receiver • Category of receiver (e.g. residential or commercial etc.) • Contact name and phone number	Project wide Land Use Survey to record sensitive receivers	Construction	Community Relations Manager	CoA E33 EPO-NV-2	Project wide Land Use Survey (Appendix B)
NV48	As part of the CNVIS process, where noise and/or vibration levels are still predicted to exceed the applicable noise or vibration management levels at sensitive receivers the	CNVIS	Design Construction	Design Manager Environmental Advisor	CoA E33 REMMM NV-3	Site inspection records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	additional mitigation measures detailed in the TfNSW CNVS will be implemented, as detailed in Section 9.7.			Foreman		
	Survey, Monitoring and Reporting					
NV49	Noise and vibration monitoring will be carried out in accordance with the Project's Construction Noise and Vibration Monitoring Program, as described in Section 10.3 and detailed in the Noise and Vibration Monitoring program included in Appendix F, as well as at the direction of an authorised officer of the EPA.	Noise and Vibration Monitoring Program	Construction	Environmental Coordinator	CoA E9 to E17 EPA M6.3	Monitoring records
NV50	Vibration testing will be undertaken before and during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and monitoring shows that the preferred dose values for vibration are likely to be exceeded, review the construction methodology and, if necessary, implement additional mitigation measures.	Noise and Vibration Monitoring Program	Construction	Environmental Coordinator	CoA E43 EPO-NV-2	Monitoring records
NV51	If vibration intensive works are required within the safe working distances, vibration monitoring or attended vibration trials would be undertaken to ensure that levels remain below the cosmetic damage criterion.	Noise and Vibration Monitoring Program	Construction	Environmental Coordinator	REMMM NV-7 CoA E33 EPO-NV-2	Monitoring records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
	Where vibration monitoring identifies works may exceed the required vibration levels, then mitigation and management measures that would be implemented, such as: • Relocate vibration generating plant and equipment to areas within the site in order to lower the vibration impacts. • Rescheduling the hours of operation of major vibration generating plant and equipment. • Alternative methodologies, using plant and equipment with lower vibration levels. • Minimise consecutive works in the same locality • Review size and methodology of rock-breakers to minimise impacts.					
NV52	The advice of a heritage specialist will be used on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage-listed structures.	Noise and Vibration Monitoring Program	Construction	Environmental Coordinator	CoA E44 EPO-NV-2	Monitoring records
NV53	Building condition surveys should be completed, where necessary with the consideration of the minimum safe working distances for vibration intensive activities for cosmetic damage, both before and after the works to identify existing damage and any damage due to the works.	CNVIS Noise and Vibration Monitoring Program	Construction	Environmental Coordinator	REMMM NV-7 CoA E45	Monitoring records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV54	The noise levels of plant and equipment, including rental equipment, must have operating Sound Power Levels compliant with the maximum noise levels in Appendix C of the TfNSW CNVS. 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.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Monitoring records
NV55	Prior to the applicable construction works, the noise levels of plant and equipment, including rental equipment, would be checked against the levels included in the CNVIS to ensure that equipment will operate at or below the assumed noise levels, noting that they may be below maximum operating Sound Power Levels in Appendix C of the TfNSW CNVS.	CNVIS	Construction	Environmental Advisor Foreman	CoA E33 REMMM NV-2	Monitoring records
NV56	Ongoing noise monitoring would be carried out during construction in accordance with the Project's Construction Noise and Vibration Monitoring Program, as described in Section 10.3, at sensitive receptors to ensure that noise levels are consistent with the applicable CNVIS.	CNVIS	Construction	Environmental Advisor Foreman	REMMM NV-2	Monitoring records

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference	Evidence
NV57	Unattended noise and vibration monitoring would be used to verify noise and vibration impacts for sensitive receivers within the Westmead Research Zone facilities.	CNVIS	Construction	Construction Project Managers/ Environment and Sustainability Manager/	REMMM NV-8 EPO-NV-2	Monitoring records Consultation records
NV58	At no time can noise generated by construction exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of LAeq,8h, of 85dB(A) for any employee working at a location near the Project construction works.	CNVIS	Construction	Environmental Coordinator	CoA E41	Monitoring records

9.2 Early implementation of operational noise mitigation measures

In accordance with CoA E49, construction noise impacts will be minimised by implementing operational noise mitigation measures identified in the Project's Operational Noise and Vibration Review (ONVR), within eighteen (18) months of the commencement of construction in the vicinity of the impacted receiver, where operational noise mitigation measures will not be physically affected by works.

In accordance with CoA E69, before installing acoustic treatment at any heritage item identified in the documents listed in CoA A1 the advice of a suitably qualified heritage architect or heritage engineer with specific experience in built heritage must be obtained and implemented to ensure any such work does not have an adverse impact on the heritage significance of the item.

9.3 Respite periods

9.3.1 Sensitive receivers

CNVIS will be prepared to predict the noise and vibration impacts at sensitive receivers. CNVIS outcomes will be used to inform programming of works. This is included in mitigation measures presented in Section 9.1.

The CoA and EPL Conditions relevant to respite are presented in **Table 9-2** and **9.3**. Where the provision of respite is required to be incorporated into construction works, this will be identified and addressed in the site or activity specific CNVISs and the associated programming of works.

As per CoA E36, respite periods would be provided for sensitive receivers where any construction activity during the hours specified in CoA E21 results in noise levels that exceed the Highly Noise Affected Level of 75 dB (LAeq,15 minute).

All OOHW, as per CoA E25 (d), that are required for the Project would be undertaken in accordance with the Project OOHW Protocol developed in accordance with CoA E28. This would include addressing the respite and scheduling requirements outlined in CoA E37.

Table 9-2: CoA relevant to respite

Measure / Requirement	Resource needed
A29 The AA must: … (c) consider and recommend, to the Proponent, improvements that may be made to work practices to avoid or minimise adverse noise and vibration impacts; (d) consider consultation outcomes with affected receivers to determine the adequacy of noise mitigation and management measures including work hours and respite periods;	Applicable to all works. The AA will review and comment through the CNVIS process on the work practices, to ensure that sufficient respite is provided to sensitive receivers, in accordance with the CoA requirements.
E27	Applicable to all works.

Measure / Requirement	Resource needed
Except as permitted by an EPL, or through the Out-of-Hours Work Protocol, Highly Noise Intensive Works that result in an exceedance of the applicable NML at the same sensitive receiver 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; and (c) 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. ….	Respite is to be provided to all sensitive receivers, in accordance with CoA E36 and EPL Condition L4.10. Respite periods would be informed by consultation and coordination with other PLR contract works (including those undertaken by third parties) and nearby SSD/SSI projects. The hours of works and respite will be programmed to comply with the Out of Hours Works Protocol and EPL requirements.
E32 The Proponent must consult with proponents or applicants of other State Significant development and infrastructure works near the CSSI and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers.	Applicable to all works.
E36 The Proponent must provide respite periods for sensitive receivers where any construction activity during the hours specified in Condition E21 results in noise levels that exceed the Highly Noise Affected Level of 75 dB (LAeq,15 minute).	Applicable to all works. Applicable for the hours as identified in CoA E21.

Measure / Requirement	Resource needed
E37 Where works are undertaken outside hours specific in Condition E21 and E22 and construction noise levels exceed 65 dB(A) LAeq (15 mins) at the façade of the building of a residential receiver, the Proponent must only work 4 nights in any 7 day period. The 4 nights worked must be informed by community consultation referenced in Condition E39. Outcomes of the community consultation, the identified works and respite periods and the scheduling of the likely out-of-hour works must be provided to the AA, ER and the Secretary for information. Relocation of work following 4 nights of works in any 7 day period must be sufficiently removed so as to provide clear respite of 3 days. Works in areas of respite must be subject to noise levels of no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009). The requirements of this condition may be varied with the approval of the Secretary following the Secretary's review of community consultation outcomes, construction noise and vibration impacts and the implementation of noise management and mitigation measures.	Applicable to all works. Applicable for OOHW periods as presented in **Table 6-2**.
E38 All work undertaken for the delivery of the CSSI, including those undertaken by utility contractors, must be coordinated to ensure respite, including the respite required by Condition E37. The Proponent must: schedule any works to provide respite to impacted noise sensitive receivers so that all respite periods are achieved; or consider the provision of alternative mitigation, including the provision of at receiver treatments and alternative accommodation to impacted noise sensitive receivers; and provide documentary evidence to the AA in support of any decision made by the Proponent in relation to respite or mitigation.	Applicable to all works during all periods.
E39 In order to undertake out-of-hours work described in Condition E25 (c) and (d), the Proponent must identify appropriate work and respite periods for the works in consultation with the community at each affected precinct at three monthly intervals. This consultation must be ongoing and include (but not be limited to) providing the community with:	Applicable to all works. Applicable for OOHW periods as presented in **Table 6-2**

Measure / Requirement	Resource needed
(a) a schedule of likely out-of-hours work for a period of no less than two (2) months for medium to high risk work (as defined in the Out of Hours Works Protocol (Condition E28); (b) a schedule of likely out-of-hours work for a period of no less than seven (7) days for low risk work (as defined in the Out-of-Hours Works Protocol (Condition E28) (c) the potential works, location and duration; (d) the noise characteristics and likely noise levels of the works; and (e) likely mitigation and management measures. The Proponent shall consider and respond to the affected community's preference for alternative hours and/or durations. The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour works must be provided to the AA, ER and the Secretary.	
E40 The provision of respite periods does not preclude the application of other construction noise management measures, including the provision of at receiver treatments and or alternate accommodation.	Applicable to all works. Applicable for OOHW periods as presented in Table 6-2.

Table 9-3: EPL Conditions relevant to respite

Measure / Requirement	Resource needed
L4.2 High noise impact activities and works Any high noise impact works and activities must only be undertaken: • between 8:00 am and 6:00 pm Monday to Friday; • between 8:00 am and 1:00 pm Saturday; and • in continuous blocks of no more than 3 hours, with at least a 1 hour respite between each block of work generating high noise impact, where the location of the works and activities is likely to impact the same noise sensitive receivers; except as expressly permitted by another condition of the EPL. For the purposes of this section, 'continuous' includes any period during which there is less than a 1 hour respite between ceasing and recommencing any of the work that is the subject of this condition.	Applicable to all works. Respite is to be provided to all sensitive receivers, in accordance with CoA E36 and EPL Condition L4.10. Respite periods would be informed by consultation and coordination with other PLR contract works (including those undertaken by third parties) and nearby SSD/SSI projects. The hours of works and respite will be programmed to comply with the Out of Hours Works Protocol and EPL requirements.
L4.10 Works outside of standard construction hours – Respite For all works undertaken in accordance with Condition L4.8, the licensee must: a) ensure that works are undertaken on a maximum of 4 nights in any 7 day period; b) ensure that noise sensitive receivers are provided with 3 respite nights following 4 nights of work in any 7 day period; c) coordinate works (including those undertaken by third parties) permitted by Condition L4.7 with concurrent construction works licensed by the EPA and utility providers to ensure the respite nights required by Condition L4.10 b) are not compromised; and d) undertake community consultation to inform which evenings or nights work will be undertaken.	Applicable to all works. Applicable for OOHW periods as presented in **Table 6-2**.
L4.11 Work outside of standard construction hours – Utility Works If works are undertaken by a utilities provider during a scheduled respite period identified by Condition L4.10, and those works are related to the scheduled activity permitted by this licence, the licensee must:	Applicable to all works during all periods.

a) where feasible, reschedule any works permissible by Condition L4.10 to provide respite to impacted noise sensitive receivers so that the minimum number of respite periods in any 7 day period can be achieved; or b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and c) provide documentary evidence to an Authorised Officer on request in support of any decision made by the licensee in relation to the provision or refusal of any respite or mitigation.	

9.3.2 Coordination with other construction works

A number of construction and infrastructure projects will be active along the Project alignment concurrently with the PLR SOM Works. In addition, various areas of the PLR SOM Works will be occurring concurrently.

In accordance with CoA E32 and E38 GRCLR will

a) schedule any works to provide respite to impacted noise sensitive receivers so that all respite periods are achieved; ***or***

b) consider the provision of alternative mitigation, including the provision of at receiver treatments and alternative accommodation to impacted noise sensitive receivers; and

c) provide documentary evidence to the AA in support of any decision made by the Proponent in relation to respite or mitigation.

GRCLR will also consult and coordinate with other works – such as PLR contract works, other State Significant development and infrastructure construction projects (including those undertaken by third parties such as utility contractors, as per CoA E38 and EPL L4.10), or concurrent EPL-licensed construction works – to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers.

The level of coordination required to manage cumulative impacts will be dependent on the level of concurrent works within each precinct. When concurrent works are occurring within a precinct, GRCLR will coordinate information sharing through regular meetings, sharing of OOHW schedules, sharing stakeholder information (sensitivity awareness) and combining community notifications.

Measures to coordinate the GRCLR works with other PLR contract works, or other construction and infrastructure projects, will be included in the CNVIS to address CoA and EPL Conditions relevant to respite as presented in **Table 9-2** and **Table 9-3**. Where relevant, the activities of other contractors that will be known to be working concurrently with in the same precinct will be addressed in CNVISs and or the programming of works. To aid with the required contractor coordination, GRCLR will participate in the TfNSW Out of Hours Working Group(s) to coordinate with other PLR Package Works when required. The AA will assist with managing periods of concurrent works across all work packages, through participation in the Out of Hours Working Group and fulfilling their role as set out in A29.

GRCLR will ensure respite is coordinated with other contractors, including those undertaken by utility contractors, for the delivery of the CSSI. The provision of respite periods should not preclude the application of other construction noise management measures, including the provision of at receiver treatments and or alternate accommodation. Any further mitigation or management measures that are to be implemented would be identified in the specific CNVIS for the works.

9.3.3 Community consultation and respite

CoA E25 (c) and (d), as well as EPL Condition L4.10 require appropriate work and respite periods for the works to be developed in consultation with the community at each affected precinct. Consultation would occur at three monthly intervals throughout the works and would include (but not be limited to) providing the community with:

- A schedule of likely out-of-hours work for a period of no less than two (2) months for medium to high risk work (as defined in the Out of Hours Works Protocol)
- A schedule of likely out-of-hours work for a period of no less than seven (7) days for low risk work (as defined in the Out-of-Hours Works Protocol)
- The potential works, location and duration
- The noise characteristics and likely noise levels of the works
- Likely mitigation and management measures.

To satisfy CoA E37, where construction noise levels exceed 65 dB(A) LAeq (15 mins) at the façade of the building of a residential receiver, work must only occur for four nights in any seven day period. The four nights worked must be informed by community consultation required by CoA E39. The requirements of this condition may only be varied with the approval of the Secretary following the Secretary's review of community consultation outcomes, construction noise and vibration impacts and the implementation of noise management and mitigation measures.

The affected community's preference for alternative hours and/or durations will be considered when confirming the schedule. Consultation reports will be prepared for each precinct on a quarterly basis, or as the nature of the works in each precinct changes. These reports will document the outcomes of consultation, including the identified respite periods and the scheduling of the likely out-of-hour works. These reports will be provided to the ER, AA and the Secretary as required by CoA 39.

9.4 Communication and consultation

9.4.1 Proactive and responsive community consultation

GRCLR will develop positive, cooperative relationships with community stakeholders including businesses, schools, childcare centres, local residents and building owners, building on the relationships and processes initiated by Transport for NSW and the Infrastructure Contractor.

The methods and timeframes for community consultation are detailed within the Communication and Engagement Plan (PLR1SOM-GLR-ALL-PM-PLN-000007).

Consultation will be established with businesses along 'Eat Street' affected by construction works outside standard construction hours, to satisfy CoA E24 and EPL Condition L4.4, as outlined in the Business Activation Plan required by CoA E110.

Community consultation will be undertaken with potentially-affected places of worship, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories, operating theatres, and mental health services and accommodation) during construction to determine periods of sensitivity. Where practicable, noise generating works would not be timetabled within sensitive periods, unless otherwise agreed with the affected institutions, and at no cost to the affected institution, to satisfy CoA E31.

Community consultation in relation to construction activities and circumstances during which noise and vibration objectives will be exceeded are detailed below to ensure compliance with CoA E37,

E39 and E42. Outcomes of the community consultation, the identified works and respite periods and the scheduling of the likely out-of-hours works would be provided to the AA, ER and the Secretary for information.

Using multiple communication channels, GRCLR will provide clear points of contact and face-to-face communication for those most affected by construction noise and vibration. With the scale of construction currently underway in Parramatta, the Project stakeholders and the community will be affected by multiple sources of impacts and information. When affected, stakeholders and the community may not understand which Project or contractor should be contacted to address their issues.

A key feature of GRCLR's communication strategy is collaboration with agencies and interface contractors to investigate opportunities to minimise cumulative impacts. Coordinated communications will serve to guide the community to the right points of contact for information and complaints, aiming to minimise frustration. GRCLR has dedicated Place Managers to disseminate information to businesses and residents affected by construction work.

Some of the key means of informing the community of the Project construction works, and receiving feedback will be through the following means:

- **Construction notifications –** Notifications outlining information about construction work will be provided to businesses and residents nearby construction work zones.
- **Website updates** – The Project website will form a resource for members of the community to seek further information, including current and upcoming construction activities.
- **Project info-line and construction response line** – Transport for NSW will operate a construction response line and a project info-line (1800 775 465). The number will provide a dedicated 24-hour contact point for any complaints regarding construction works and for any project enquiries. All complaints require a verbal response within two hours. All enquiries require a verbal response within 24 hours during standard construction hours, or on the next working day during out-of-hours work (unless the enquirer agrees otherwise).
- **Email distribution list** – An email distribution list will be used to disseminate project information to interested stakeholders.
- **Signage** – Signage on construction sites will be provided to notify stakeholders of project details and project emergency or enquiry information.

9.5 Vibration impacts screening

Properties at risk of cosmetic damage will be identified through the vibration screening process prepared based upon the limits presented in Section 6.6 to determine if construction activities may result in vibration levels at sensitive receivers above these vibration limits.

Presented in **Table 9-4** are the minimum working distances for typical items of vibration intensive plant. The minimum working distances are quoted for both "cosmetic" damage (refer BS 7385) and human comfort (refer OEH's Assessing Vibration – a technical guideline).

These minimum working distances are to be used to determine if there is the potential for vibration impacts on nearby vibration sensitive receivers or buildings/structures. As per CoA E43,and in accordance with REMMM NV-7, further investigation, including vibration monitoring and trials would be considered to ensure that levels remain below the require vibration limits. Where vibration monitoring identifies works may exceed the required vibration levels then further mitigation and management measures that would be implemented.

Table 9-4: Recommended minimum working distances from vibration intensive equipment

Plant item	Approximate Size / Weight / Model	Minimum distance – Cosmetic damage (BS 7385)[2]	Minimum distance – Human response (AVTG)
Vibratory roller	1-2 tonne	5 m	15 m
	2-4 tonne	6 m	20 m
	4-6 tonne	12 m	40 m
	7-13 tonne	15 m	100 m
	13-18 tonne	20 m	100 m
	>18 tonne	25 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 tonne excavator)	7 m	23 m
Large Hydraulic Hammer	1600 kg (18 to 34 tonne excavator)	22 m	73 m
Pile Driver – Vibratory	Sheet piles	2 to 20m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominally)	n/a
Piling Rig – Hammer	12 tonne down force	15m	50 m
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure

Notes:

1. Table adapted from the TfNSW Construction Noise and Vibration Strategy
2. More stringent conditions may apply to heritage or other sensitive structures

9.6 Property surveys and issues rectification

GRCLR will offer and undertake building condition surveys prior to the commencement of any construction, and with the agreement of the landowners on all buildings identified as being at risk of cosmetic damage from construction vibration impacts. This will be undertaken by a suitably qualified structural engineer. Buildings will be considered as being at risk of vibration damage and would qualify for a building survey if they are located within the minimum safe working distances for vibration intensive activities for cosmetic damage considering the structural integrity of the building/structure/item.

As per CoA E45, the results of the surveys will be documented in a Building Condition Survey Report for each building surveyed. Copies of the reports will be provided to the landowners of the buildings surveyed, and if agreed by the landowner, the relevant council within four weeks of completing the survey and no later than one month before the commencement of construction.

Non-heritage buildings will be identified as being at risk of cosmetic damage if they are located within the recommended safe working distances for vibration intensive plant (based on BS7385:2 Evaluation and Measurement for Vibration in Buildings Part 2: Guide to Damage Levels from Ground-borne Vibration, 1993). For most sources of intermittent vibration during construction, such as rock breakers, the predominant vibration energy occurs at frequencies usually in the 10 Hz to 100 Hz range. On this basis, and with reference to BS7385:2, a vibration damage screening level of 7.5 mm/s has been adopted for assessing potential impacts from continuous vibration. Heritage building will undertake the process identified in Section 6.7.3 to determine the suitable vibration limits for the structure, and the minimum working distance will be based upon that vibration level.

After completion of construction and with the agreement of the landowner, building condition surveys of all buildings for which building condition surveys were undertaken in accordance with CoA E45 (as above) will be undertaken by a suitably qualified structural engineer.

The results of the surveys will be documented in a Building Condition Survey Report for each building surveyed. Copies of Building Condition Survey Reports will be provided to the landowners of the buildings surveyed, and if agreed by the landowner, the relevant Council within four weeks of completing the surveys and no later than three months following the completion of construction.

In the case that issues are identified through these surveys, GRCLR will review the pre-construction and post-construction Building Condition Survey Reports and prepare a root cause analysis for each damage claim received.

As per CoA E47, GRCLR will be responsible for the repair or compensation to the owner for any physical property damage determined to be caused by the SOM construction works. Repair or compensation shall occur within a timeframe agreed to by the property owner with the costs borne by GRCLR. Where the damage is not attributable to the SOM construction works and the outcome is disputed by the property owner, an independent structural engineer will be engaged to assist in resolving the dispute, as part of the complaints escalation process outlined in Appendix A to the TfNSW PLR Community Communications Strategy.

9.7 Additional noise and vibration mitigation measures

In instances where noise levels are still predicted to exceed the NML at receivers, after the application of noise mitigation and management measures (refer to Section 9.1), the CNVS directs that the Project should consider implementing the additional mitigation measures such as those presented in **Table 9-5** (refer to Section 8.2 of the TfNSW CNVS for more detail).

Table 9-5: Additional management measures

Additional management measures	Description
Periodic notification (letterbox drop or equivalent)	These include regular newsletters, letterbox drops, notification via an email distribution list or equivalent, to provide an overview of current and upcoming works and other topics of interest. For receivers that may be impacted by works this includes detailing work activities, time periods when these will occur, and potential impacts and mitigation measures.
Verification monitoring	Measurement (unattended or attended) of the background noise level and construction noise level at the affected or nominated receiver location. The purpose of the monitoring is to determine the construction noise/vibration level from the Project, and that they are consistent with the levels detailed in the CNVIS, that the mitigation and management measures are appropriate. Noise monitoring would be carried out by a person appropriately trained in the measurement and assessment of construction noise and vibration.
Specific notification	Specific notifications would be provided to give additional information about proposed Works to identified receivers potentially more highly affected than those covered by periodic notifications. These would be provided to the identified receivers no later than seven calendar days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works. Specific notification would include details of the construction activities, time periods of when these will occur, and potential impacts and mitigation measures. These can take at minimum one of the following forms: • Specific notification letter, which provide additional information when relevant and informative to more highly affected receivers than covered in periodic notifications • Phone call, which detail relevant information to identified/affected stakeholders and provide personalised contact, tailored advice and the opportunity to comment on the proposed work • Individual briefing, which inform stakeholders about the impacts of high noise activities and mitigation measures, and provide personalised contact, tailored advice and the opportunity to comment on the proposed work. This should take place at least 48 hours ahead of the works that would potentially impact the receiver.
Alternative construction methodology	Where vibration impacts are identified as potentially resulting in structural damage to a nearby building/item/structure, then alternative construction methodologies are to be considered in order to achieve the identified structural damage vibration levels.

Additional management measures	Description
Respite offer	This is to provide receivers impacted by lengthy periods of construction noise/vibration from the Project with a specific offer to provide respite from the impacts. An example of a respite offer might be pre-purchased movie tickets, but would be determined on a case-by-case basis. Noting that the feasible and reasonable nature of different respite offers could vary depending upon the number of impacted receivers.
Respite periods	Respite periods would be provided to impacted receivers as detailed in the Project Out-of-Hours Works Protocol. The idea is to provide impacted receivers a clear periods without construction impacts in order to provide a period of respite. For HNA receivers, this is in accordance with CoA E36.
Duration reduction	Duration respite is which is where the work duration, number of evenings or nights is increased so that the Project can be completed more quickly. This would require consultation with the potentially impacted receivers.
Alternative accommodation	Provision of alternative accommodation for residents would be considered in accordance with the CNVS for receivers where highly intrusive noise impacts are predicted during the night-time period (between 10:00 pm and 7:00 am).

The standard hours and OOHW periods are depicted in Figure 9-1. The OOHW periods are further defined as OOHW Period 1 and 2, based on the CoA.

Figure 9-2, Figure 9-3 and Figure 9-4 detail the additional mitigation measures for airborne noise, ground-borne noise and vibration respectively, as recommended in the CNVS, for standard hours and out-of-hours work (OOHW). Where feasible and reasonable, this approach will be implemented.

Figure 9-1: Construction hours

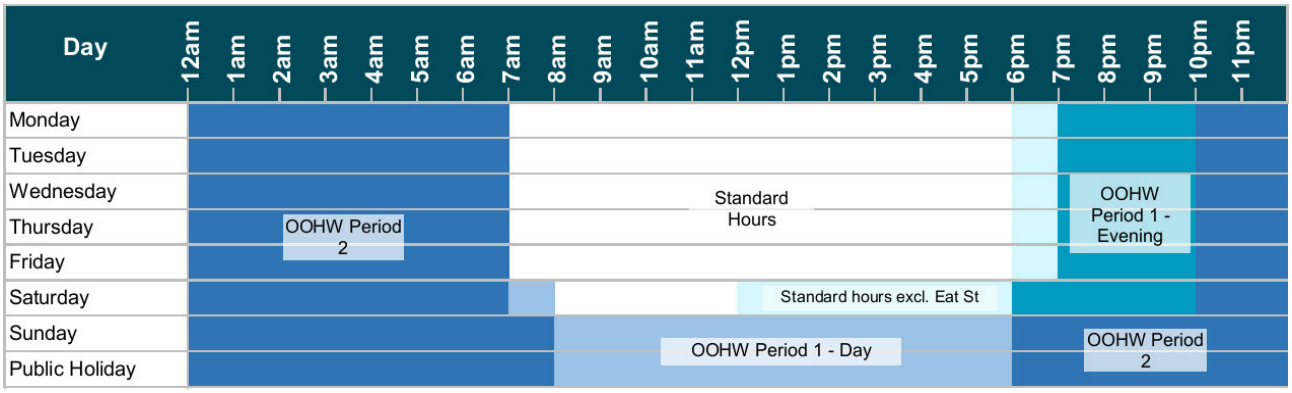
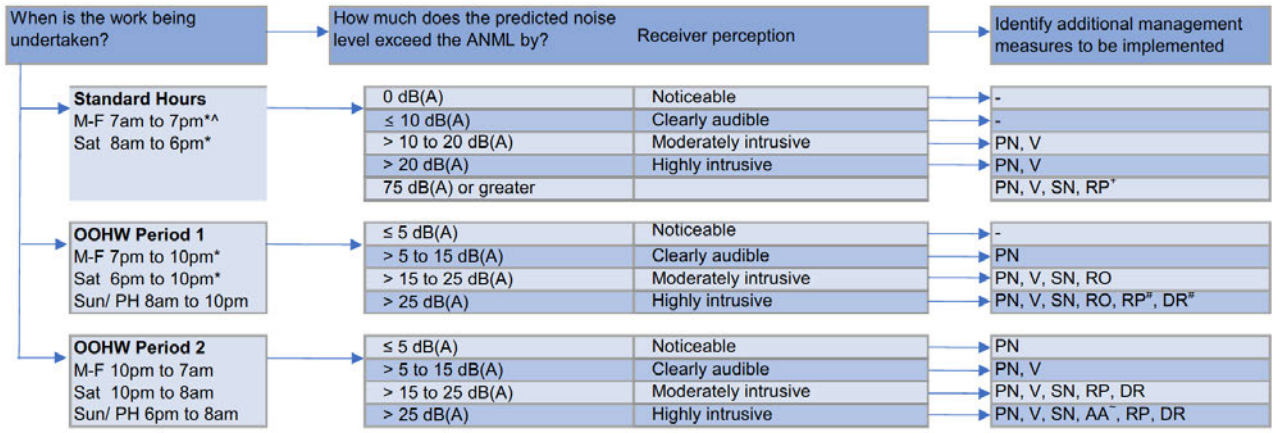


Figure 9-2: Triggers for Additional Mitigation Measures – Airborne Noise



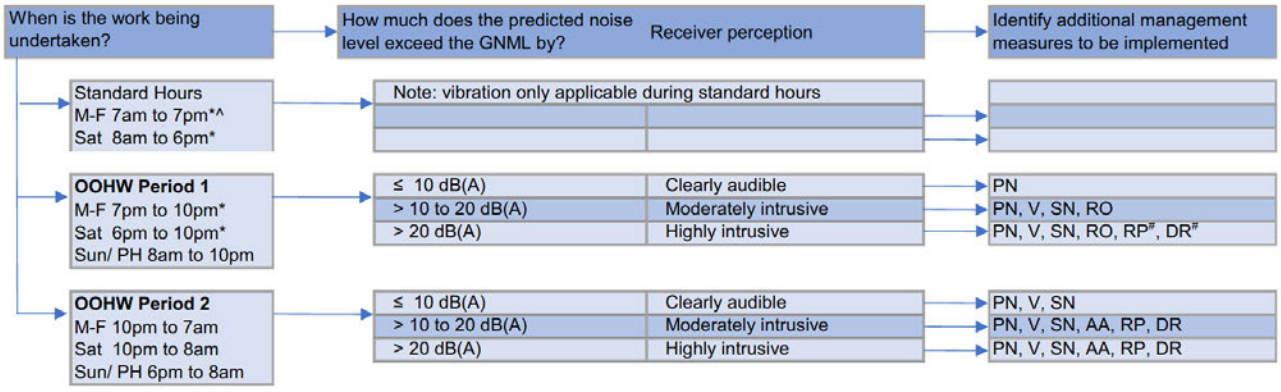
When is the work being undertaken?	How much does the predicted noise level exceed the ANML by?	Receiver perception	Identify additional management measures to be implemented
Standard Hours M-F 7am to 7pm*^ Sat 8am to 6pm*	0 dB(A)	Noticeable	-
	≤ 10 dB(A)	Clearly audible	-
	> 10 to 20 dB(A)	Moderately intrusive	PN, V
	> 20 dB(A)	Highly intrusive	PN, V
	75 dB(A) or greater		PN, V, SN, RP+
OOHW Period 1 M-F 7pm to 10pm* Sat 6pm to 10pm* Sun/ PH 8am to 10pm	≤ 5 dB(A)	Noticeable	-
	> 5 to 15 dB(A)	Clearly audible	PN
	> 15 to 25 dB(A)	Moderately intrusive	PN, V, SN, RO
	> 25 dB(A)	Highly intrusive	PN, V, SN, RO, RP#, DR#
OOHW Period 2 M-F 10pm to 7am Sat 10pm to 8am Sun/ PH 6pm to 8am	≤ 5 dB(A)	Noticeable	PN
	> 5 to 15 dB(A)	Clearly audible	PN, V
	> 15 to 25 dB(A)	Moderately intrusive	PN, V, SN, RP, DR
	> 25 dB(A)	Highly intrusive	PN, V, SN, AA~, RP, DR

Notes: Use the abbreviation codes in the table above to confirm management measures required

PN = Project notification
V = Verification monitoring of predicted noise levels
SN = Specific notifications (personalised letter, phone call, email, individual briefing)
RO = Project specific respite offer
AA = Alternative accommodation
RP = Respite period
DR = Duration reduction

Respite periods and duration reduction are not applicable when works are carried out during OOHW Period 1 Day only
* This applies across the Project with the exception of Eat Street, as per CoA E21 to E24, and clairified in the OOHW Protocol Section 2.
^ The applicable ANML for the the 6pm to 7pm standard hours period Monday to Friday, is based upon the daytime RBL.
+ Respite periods for sensitive receivers to be provided in accordane with CoA E36
~ Where AA (Alternative accomodation) cannot be feasibly provided, and noise impacts are above the sleep disturbance criteria or are moderately intrusive for more than two consecutive nights, respite is required to be provided.

Figure 9-3: Triggers for Additional Mitigation Measures – Ground-borne noise



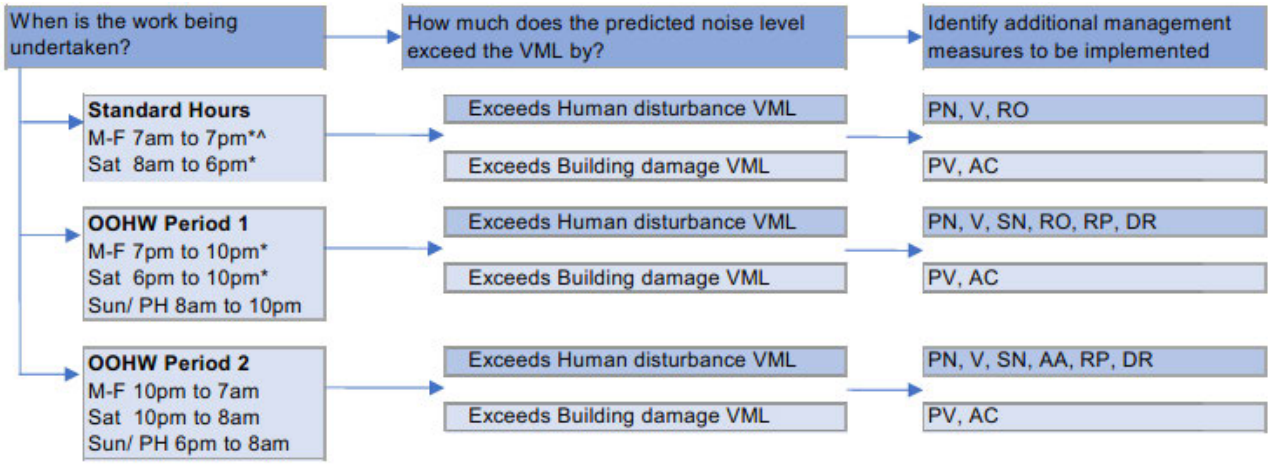
When is the work being undertaken?	How much does the predicted noise level exceed the GNML by?	Receiver perception	Identify additional management measures to be implemented
Standard Hours M-F 7am to 7pm*^ Sat 8am to 6pm*	Note: vibration only applicable during standard hours		
OOHW Period 1 M-F 7pm to 10pm* Sat 6pm to 10pm* Sun/ PH 8am to 10pm	≤ 10 dB(A)	Clearly audible	PN
	> 10 to 20 dB(A)	Moderately intrusive	PN, V, SN, RO
	> 20 dB(A)	Highly intrusive	PN, V, SN, RO, RP#, DR#
OOHW Period 2 M-F 10pm to 7am Sat 10pm to 8am Sun/ PH 6pm to 8am	≤ 10 dB(A)	Clearly audible	PN, V, SN
	> 10 to 20 dB(A)	Moderately intrusive	PN, V, SN, AA, RP, DR
	> 20 dB(A)	Highly intrusive	PN, V, SN, AA, RP, DR

Notes: Use the abbreviation codes in the table above to confirm management measures required

PN = Project notification
V = Verification monitoring of predicted noise levels
SN = Specific notifications (personalised letter, phone call, email, individual briefing)
RO = Project specific respite offer
AA = Alternative accommodation
RP = Respite period
DR = Duration reduction

Respite periods and duration reduction are not applicable when works are carried out during OOHW Period 1 Day only
* This applies across the Project with the exception of Eat Street, as per CoA E21 to E24, and clairified in the OOHW Protocol Section 2.
^ The applicable ANML for the the 6pm to 7pm standard hours period Monday to Friday, is based upon the daytime RBL.

Figure 9-4: Triggers for Additional Mitigation Measures – Vibration



Notes: Use the abbreviation codes in the table above to confirm management measures required

PN = Project notification
V = Monitoring of predicted vibration levels
SN = Specific notifications (personalised letter, phone call, email, individual briefing)
AC = Alternative construction methodology
RO = Project specific respite offer
AA = Alternative accommodation
RP = Respite period
DR = Duration reduction

* This applies across the Project with the exception of Eat Street, as per CoA E21 to E24, and clairified in the OOHW Protocol Section 2.

^ The applicable ANML for the the 6pm to 7pm standard hours period Monday to Friday, is based upon the daytime RBL.

10 Compliance management

10.1 Roles and responsibilities

The GRCLR Project Team's organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of aspects of this Plan are detailed below.

10.1.1 GRCLR Environment and Sustainability Manager

The Environment and Sustainability Manager is a member of the GRCLR Senior Management Team and is accountable for the environmental and sustainability performance of the SOM Works. Key responsibilities associated with this Sub-plan are detailed as follows:

- Oversee development and implementation of the Construction Noise and Vibration Management Sub-plan
- Oversee noise and vibration monitoring in accordance with this Sub-plan
- Oversee the preparation of CNVISs
- Oversee compliance tracking and reporting
- Oversee keeping of all environmental records
- Engage suitably qualified consultants to develop and support implementation of this Sub-plan
- In consultation with the Project Director and Construction Manager, oversee the investigation and reporting of environmental incidents arising from noise and/or vibration
- Regularly engage with the Parramatta Connect consortium and other interface contractors to achieve environmental alignment (e.g. out of hours works, cumulative impacts) in accordance with the Interface Management Plan

10.1.2 Acoustics Advisor

As required by CoA A26 through A29, a suitably qualified and experienced Acoustics Advisor (AA), who is independent of the design and construction personnel, has been engaged for the duration of construction of the Project and for no less than six (6) months following the completion of the construction of the Project.

The nominated AA has been engaged by TfNSW and approved by DPE.

In relation to noise and vibration the AA must:

- Receive and respond to communication from the Secretary about GRCLR performance
- Consider and inform the Secretary on matters specified in the terms of this approval
- Consider and recommend improvements that may be made to GRCLR work practices to avoid or minimise adverse noise and vibration impacts
- Consider consultation outcomes with affected receivers to determine the adequacy of mitigation and management measures including work hours and respite periods
- Review documents prepared under the terms of CSSI-8285 and, where they are consistent, endorse them before submission to the Secretary (if required to be submitted to the Secretary) or before implementation (if not required to be submitted to the Secretary)

- Regularly monitor the implementation of noise and vibration documents prepared under CSSI-8285 to ensure implementation is in accordance with what is stated in the document and the approval terms

In conjunction with the ER, the AA must:

- Help plan, attend or undertake audits of noise and vibration management of the CSSI including briefings, and site visits, as requested by the Secretary
- If conflict arises between GRCLR and the community in relation to the noise and vibration performance during construction of the CSSI, follow the procedure in the Community Communication Strategy approved under CSSI-8285 Condition B3 to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary;
- Consider relevant minor amendments made to the CEMP, relevant sub-plans and noise and vibration monitoring programs that require updating or are of an administrative nature, and are consistent with the CSSI-8285 terms of approval and the management plans and monitoring programs approved by the Secretary and, if satisfied such amendment is necessary, endorse the amendment. This does not include any modifications to the approval terms of CSSI-8285;
- Assess the noise impacts of minor construction ancillary facilities; and
- Prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Noise and Vibration Report detailing the AAs actions and decisions on matters for which the AA was responsible in the preceding month (or another timeframe agreed with the Secretary).

GRCLR will cooperate with the AA by:

- Providing access to noise and vibration monitoring activities as they take place
- Providing noise and vibration plans, assessments, monitoring reports and data analyses undertaken for review and
- Considering any recommendations made by the AA to improve practices. Where recommendations are not adopted, this will be demonstrated to satisfy the AA.

10.1.3 Environmental Representative (ER)

The primary role of the ER is to independently oversee compliance with the CSSI-8285 CoA and act as the principle point of advice in relation to environmental performance. Engaged by the Independent Certifier, the role of the ER is specified in Schedule 2, Part A of the CSSI-8285 Approval, specifically CoA A19 to A25.

The responsibilities of the approved ER as related to this Sub-plan, as required by CSSI-8285 CoA A23 (a-i) and CoA C7), are:

- Receive and respond to communication from the Secretary in relation to the environmental performance of the CSSI
- Consider and inform the 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 the community
- Review documents identified in Table 2 of the Planning Approval CSSI-8285 and any other documents that are identified by the Secretary, for consistency, in the opinion of the ER, with requirements in or under this approval
- Regularly monitor the implementation of the documents listed in Table 2 of the Planning Approval CSSI-8285 to ensure implementation is being carried out in accordance with the document and the terms of this approval

- Assist the Department in the resolution of community complaints
- Endorse the CEMP (CoA C7) which is then submitted to the Secretary for approval no later than one month before the commencement of construction
- Endorse the Construction Monitoring Program (Noise and Vibration Monitoring) (CoA C9(b)) in accordance with CoA C13, which is then submitted to the Secretary for information no later than one month before the commencement of construction
- Approve low and moderate risk out of hours activities in consultation with the AA.

10.1.4 Specialist Consultants

Renzo Tonin & Associates (RT&A) has been engaged to provide specialist noise & vibration advice and services in the preparation of this Plan.

GRCLR will ensure on-going noise and vibration services are provided by a qualified consultant in the development and implementation throughout the SOM Works to ensure that impacts can be avoided, minimised or appropriately mitigated, including:

- Undertaking noise and vibration modelling
- Preparing Construction Noise and Vibration Impact Statements
- Undertaking noise and vibration monitoring when required
- Assisting in stakeholder meetings when required
- Assisting in community consultation when required

10.1.5 Heritage specialist

SOM has engaged Artefact Heritage Consultants to advise on all matters relating to heritage and archaeology for the SOM scope of work. Heritage structures potentially impacted by works associated with the SOM scope of work will be identified in the CNVISs prepared as detailed in Section 8. Where noise or vibration monitoring is required on or within the heritage structure, the advice of the heritage specialist would be sought regarding methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage-listed structures. This may be undertaken via site visit, or by desktop review of photographs, to be determined on a case by case basis.

10.2 Training

All personnel, including employees, contractors, sub-contractors and utility staff working on site will undergo site induction training relating to construction noise and vibration management issues.

The induction training or toolboxes will address elements related to noise and vibration management including:

- Existence and requirements of this CNVMP,
- Relevant legislation and guidelines,
- Normal construction hours and exemptions,
- The process for seeking approval for out-of-hours works in accordance with the OOHW Protocol, including consultation,
- Location of all relevant sensitive receivers,
- Complaints reporting and recording,
- How to implement noise and vibration management measures as outlined in Section 9 along with site specific measures developed as part of the CNVIS process,

- Specific responsibilities to minimise impacts on the community and built environment from noise and vibration associated with the works, and
- EPL requirements to minimise noise and vibration impacts on receivers.

Further details regarding staff induction and training are outlined in Section 5 of the CEMP.

10.3 Inspection and monitoring

Inspections of sensitive areas and activities with the potential to generate noise and vibration impacts will occur for the duration of the Project. Requirements and responsibilities in relation to monitoring and inspections are documented in Section 8 of the CEMP.

Noise and vibration monitoring will also occur routinely for the duration of the Project, in accordance with the Project's Noise and Vibration Monitoring Program (refer to Appendix F).

Monitored noise and vibration levels will be analysed against the predictions made in the relevant CNVIS or using the Project's construction noise and vibration management tools. Where monitored noise levels are found to be above modelling predictions or vibration goals are exceeded, the following actions will be undertaken:

- Cease the noise generating source which causes the exceeded predictions
- Confirm the monitored levels are not being impacted by other noise or vibration sources
- Confirm if the exceedance is due to an uncharacteristically loud or vibration intensive piece of equipment
- Identify if the equipment can be swapped out for another piece of equipment or alternative equipment or plant, or if additional mitigation can be included in the site design
- Confirm that the modelling reflects the actual activity being undertaken
- Implement other feasible and reasonable measures which may include reducing plant size, modifying time of works, changing operational settings (such as turning off the vibratory function of the machine), and utilising alternative construction methodology or a combination of these
- Review work practices to ensure compliance with the management levels set out in the relevant CNVIS and this CNVMP
- Ensure that the learnings from the above are fed back into the noise modelling assessment process for fine-tuning
- Continue work where impacts can be reduced and
- Communicate lessons learnt to relevant personnel.

GRCLR will review the work or activity or combination of simultaneous works or activities as soon as practicable and where possible, modify the work or activity to prevent any recurrence. In the case of above prediction monitoring results, the need for modelling to be reviewed will also be considered. Lessons learnt will be communicated to relevant personnel in toolbox talks.

10.4 Complaints

Complaints will be recorded and managed as detailed in Section 6.4 of the CEMP.

10.5 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA, EPL and other relevant approvals, licences and guidelines and in accordance with GRCLR procedures (see **Table 3-2**).

Audit requirements are detailed in Section 8.3 of the CEMP.

10.6 Reporting

Reporting requirements and responsibilities are documented in Section 8 of the CEMP. Additional reporting will also be generated as required in assessment documents and as part of the Construction Noise Monitoring Program (presented in Appendix F).

Specific reports prepared in response to noise and vibration will include:

- Reporting required in accordance with the POEO Act and Regulations,
- Monthly Noise and Vibration Reports, prepared by the AA and submitted to the Secretary and other relevant regulatory agencies for information, which will detail the AA's actions and decisions on matters for which the AA was responsible in the preceding month,
- Construction Noise and Vibration Monitoring reports identified in the Noise and Vibration Monitoring Program (refer to Appendix F),
- Daily complaints report to be submitted to the EPA in accordance with Condition R4.1 of the EPL, if complaints about noise and/or vibration are received,
- Preliminary Investigation Report (Noise and Vibration) if requested by an authorised officer of the EPA, in accordance with Condition R4.2 of the EPL, and
- Follow-Up Investigation Report (Noise and Vibration) if exceedance(s) are detected during monitoring, in accordance with Condition R4.3 of the EPL.

10.7 Licences and permits

The Project is carried out in accordance with Environment Protection Licence (EPL) 21606, which was granted in December 2021, authorising the Scheduled Activity of Railway activities – railway infrastructure construction.

This CNVMP has been updated (as Revision 3) to reflect the requirements of the EPL, which was issued post-development of the original CNVMP.

11 Review and improvement

11.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

11.2 Update and amendment

The processes described in Section 9.2 of the CEMP may result in the need to update or revise this CNVMP. This will occur as needed, in accordance with the process outlined in Section 9.2 of the CEMP.

In addition to these requirements, this Plan will be updated as required during the Delivery Phase to ensure it remains relevant, and reflects any:

- Changes to the operational or regulatory environment (i.e. variations to the EPL or modifications of the Project Approval)
- Updates to the SOM Program
- Feedback from key stakeholders.

As per CoA A29, the AA is to consider relevant minor amendments made to the CNVMP and noise and vibration monitoring program that require updating or are of an administrative nature, and are consistent with the terms of the CoA and the corresponding management and monitoring programs, and if satisfied such amendment is necessary, endorse the amendment.

A copy of the updated CNVMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure, refer to Section 9 of the CEMP.

Appendix A – Out of Hours Work Protocol

NSW GOVERNMENT

Parramatta Light Rail (Stage 1)
Westmead to Carlingford via Parramatta CBD and Camellia

Out-of-Hours Work Protocol (Project Wide)

November 2019

Out-of-Hours Work Protocol

Parramatta Light Rail – Stage 1

PLR-TFNSW-CBD-PE-FRM-000002

Revision 8.8

November 2019

NSW GOVERNMENT

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Document control

Approval and authorisation

Title	Parramatta Light Rail –Stage 1 Out-of-Hours Work Protocol
Document Reference	PLR-TFNSW-CBD-PE-FRM-000002
Applicable to	Parramatta Light Rail
Date of Issue	25 November 2019

Version status

Revision	Date	Description	Approver / Reviewer
1	24 Aug 2018	Draft for ER Review	TfNSW Senior Manager Environment
2	2 Oct 2018	Incorporating ER comments and for AA review	TfNSW Senior Manager Environment
3	12 Oct 2018	Incorporating AA comments	TfNSW Senior Manager Environment
4	21 Nov 2018	Incorporating AA comments	TfNSW Senior Manager Environment
5	22 Nov 2018	Amendments to compliance table	TfNSW Senior Manager Environment, AA and ER
6	7 Jan 2019	Incorporating DPIE comments and administrative modification changes to Conditions.	TfNSW Senior Manager Environment
7	25 Jan 2019	Incorporating DPIE comments and editorial revisions	TfNSW Senior Manager Environment
7.1	4 Feb 2019	Implementing conditions provided by Secretary. Approved for use by Secretary	DPIE TfNSW Senior Manager Environment
8.6	7 Nov 2019	Revised protocol submitted to the AA and ER for review and endorsement	TfNSW Senior Manager Environment AA Endorsement
8.7	8 Nov 2019	Revised protocol submitted to the AA and ER for review and endorsement	TfNSW Senior Manager Environment ER Endorsement
8.8	25 November 2019	Revised protocol submitted to the DPIE for approval	Department of Planning, Industry and Environment and TfNSW Senior Manager Environment

Glossary / Abbreviations

Abbreviations	Expanded text
AA	The independent Acoustics Advisor for the CSSI
Annoying activities	Referred to as Special Audible Characteristics in the Transport for NSW Construction Noise and Vibration Strategy
CNVIS	Construction Noise and Vibration Impact Statement
CNVS	Transport for NSW Construction Noise and Vibration Strategy (2018)
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
DPIE	NSW Department of Planning, Industry and Environment (previously known as the NSW Department of Planning and Environment)
Eat Street	A section of Church Street, between Palmer Street and George Street in Parramatta
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
ER	The independent Environmental Representative for the CSSI
Highly Noise Intensive Works	Rock breaking, rock hammering, sheet piling, pile driving and any similar activity. Referred to as activities with Special Audible Characteristics in the CNVS
OOHW	Out-of-hours work (i.e. outside of standard construction hours stipulated in the planning approval conditions)
PLR	Parramatta Light Rail – Stage 1
POEO Act	*Protection of the Environment Operations (POEO) Act 1997* (NSW)
Rating background level (RBL)	The overall single-figure background noise level for each assessment period. Determination of the rating background level is by the method described in the *NSW Noise Policy for Industry* (EPA 2017). This approach aims to result in the noise management level being met for at least 90% of their time periods (15 minute each) over which reactions of annoyance can occur.
REMMM	Revised Environmental Mitigation and Management Measure (as documented in the SPIR).
Secretary	The Secretary of the New South Wales Department of Planning, Industry and Environment
Sensitive receiver	Includes residences, temporary accommodation such as caravan parks and camping grounds, and health care facilities (including nursing homes, hospitals). Also includes the following , when in use: educational institutions (including preschools, schools, universities, TAFE colleges), religious facilities (including church), child care centres, passive recreation areas, commercial premises (including film and television studios, research facilities, entertainment spaces, restaurants, office premises and retail spaces), and others as identified by the Secretary [DPIE].
SPIR	Submissions and Preferred Infrastructure Report

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1 Introduction

1.1 Context

This Out-of-Hours Work Protocol (the Protocol) outlines the process for consideration, management and approval of work on the Parramatta Light Rail (PLR) that is carried out outside of standard construction hours (e.g. out-of-hours) where an Environmental Protection Licence (EPL) does not apply. The Protocol has been prepared to comply with the Infrastructure Approval for the Parramatta Light Rail – Stage 1 (PLR) (also known as CSSI 8285), and is to be read in conjunction with the TfNSW Construction Noise and Vibration Strategy (CNVS) (TfNSW, 2019).

1.2 Purpose of the Out-of-Hours Work Protocol

This Protocol has been developed to comply with the Infrastructure Approval in particular Condition of Approval (CoA) E28, Out-of-Hours Work Protocol. A description of how this Condition, and other Conditions that relate to Out-of-Hours Work (OOHW), are addressed is provided in **Table 1-1**. Further details on how the relevant Revised Environmental Mitigation and Management Measures (REMMMs) and Environmental Performance Outcomes (EPOs) are addressed is provided in **Appendix B**.

The Protocol applies for work associated with PLR required outside the approved standard working hours (as defined in **Section 2.1**). There are some exemptions to this, as outlined in **Section 4.1**. This Protocol also only applies for works that are not subject to an EPL.

OOHW that may be regulated through the Protocol (or an EPL) as per Condition E29 includes, but are not limited to:

a) Carrying out works that during standard hours would 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”; or

b) The relevant road authority has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to road network operational performance and a road occupancy licence will not be issued; or

c) The relevant utility service operator has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to the operation and integrity of the utility network; or

d) Where the TfNSW 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 works or activities during the hours specified in Condition E21 and Condition E22; or

e) Where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required.

The exemptions to using the Protocol outside standard working hours are described in Condition E25. This Condition allows for works to be undertaken outside of the hours defined in Conditions E21 to E22, as applicable, but only if one or more of the following applies:

a) For the delivery of materials required by the NSW Police Force or other authority for safety reasons; or

b) 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

c) Where different hours of works are permitted or required under an EPL in force in respect of the CSSI; or

d) Works approved under an Out-of-Hours Work Protocol (this document – and Appendix A) for works not subject to an EPL; or

e) Construction that causes LAeq(15 minute) noise levels:

   i. No more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009).

   ii. 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.

   iii. No more than 15dB(A) above the night-time rating background level at any residence during the night time period, when measured using the $L_{A1(1\ minute)}$ noise descriptor.

   iv. 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).

   v. 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).

Condition E23, also permits OOHW within the Camellia and Rosehill precincts (east of James Ruse Drive) and the Carlingford precinct (from Parramatta River to Victoria Road) 24 hours a day, seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence in accordance with the *Interim Construction Noise Guideline* (DECC, 2009), between 10.00pm and 7.00am.

Table 1-1 PLR Out of Hours Work Infrastructure Approval Conditions

Condition Number	Condition	How Addressed
CoA A29(e)	The AA must review all noise and vibration documents required to be prepared under the terms of this approval and, should they be consistent with the terms of this approval, endorse them before submission to the Secretary (if required to be submitted to the Secretary) or before implementation (if not required to be submitted to the Secretary)	This Protocol was prepared in consultation with the AA (**Section 1.3**). The AA will be consulted when defining the risk factor (**Section 3**) and in endorsing OOHW applications (**Section 1.6**).
CoA E21	Works must be undertaken during the following hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 12:00pm Saturdays; and (c) at no time on Sundays or public holidays.	**Section 2.1** identifies the standard hours of work in accordance with CoA E21.
CoA E22	Notwithstanding **Condition E21**, and with the exception of 'Eat Street', works may be undertaken during the following hours: (a) 6:00pm to 7:00pm Mondays to Fridays, inclusive; and (b) 12:00pm to 6:00pm Saturdays.	**Section 2.1** identifies the extended standard hours of work in accordance with CoA E22.

Condition Number	Condition	How Addressed
CoA E23	Notwithstanding **Condition E21**, works may be undertaken in the Camellia and Rosehill precincts (east of James Ruse Drive) and the Carlingford precinct (from Parramatta River to Victoria Road) 24 hours a day, seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), between 10.00pm and 7.00am.	**Section 4.1** addresses these works as exemptions to standard working hours.
CoA E24	Construction outside the hours identified in **Condition E21** along 'Eat Street' must be established through consultation with affected businesses as outlined in the Business Activation Plan required by **Condition E110**.	**Section 4.3.1** identifies these works as an Agreed OOHW.
CoA E25	Works may be undertaken outside of the hours defined in **Conditions E21 to E22,** as applicable, but only if one or more of the following applies: (a) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (b) 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 (c) where different hours of works are permitted or required under an EPL in force in respect of the CSSI; or (d) works approved under an Out-of-Hours Work Protocol for works not subject to an EPL; or (e) construction that causes $L_{Aeq(15\ minute)}$ noise levels: i) 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 ii) 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 iii) no more than 15dBA above the night-time rating background level at any residence during the night time period, when measured using the LA1(1 minute) noise descriptor, and iv) 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 v) 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).	**Section 4.1** addresses clauses a, b, and e as exemptions to standard working hours. **Section 4.2** addresses clauses c and d as Approved OOHW. This will be incorporated into the PLR Out-Of-Hours Work Application Form (**Appendix A**).

Condition Number	Condition	How Addressed
CoA E26	On becoming aware of the need for emergency construction works, the Proponent must notify the ER of the need for those activities or works. The Proponent must also use best endeavours to notify all affected sensitive receivers of the likely impact and duration of those works.	**Section 5.4** outlines the notification process for Emergency Work.
CoA E27	**Highly Noise Intensive Works** Except as permitted by an EPL, or through the **Out-of-Hours Work Protocol,** Highly Noise Intensive Works that result in an exceedance of the applicable NML at the same sensitive receiver 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; and (c) 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. *Note: A trial period of the Highly Noise Intensive Work undertaken with the approval of the Out of Hours Work Protocol may be established.*	**Section 2.3** identifies the approved standard hours for highly noise intensive works.
CoA E28	**Out of Hours Works Protocol** An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of works which are outside the permitted hours defined in **Conditions E21 to E22**, where an EPL does not apply.	This Protocol outlines the process for consideration, management and approval of works outside the permitted hours. **Section 8** identifies the approval pathway for OOHW.
CoA E28	The Protocol must be approved by the Secretary before commencement of out-of-hours works. The Protocol must be prepared and implemented in consultation with AA.	Refer to **Section 1.3.2**. Revision 7 of this Protocol was approved by the Secretary prior to the commencement of OOHW. Updates to the Protocol (Revision 8) was prepared in consultation with the Acoustic Advisor (AA) as outlined in **Section 1.3**.
CoA E28(a)	The Protocol must: provide a process for the consideration of out-of-hours works against the relevant noise and vibration criteria;	This Protocol, in conjunction with TfNSW CNVS, sets out the process for the consideration of OOHW against the relevant noise and vibration criteria.
CoA E28(b)	provide a process for the identification and implementation of mitigation and management measures for residual impacts,	This Protocol, in conjunction with TfNSW CNVS, sets out identification of mitigation measures.

Condition Number	Condition	How Addressed
CoA E28(b)	in consultation with the community at each affected location, consistent with the requirements of **Condition E39**;	**Section 6.1** outlines how the PLR Community Communication Strategy (CCS) (PLR-TFNSW-CBD-PE-PLN-000001) will be implemented for OOHW. The PLR Out-Of-Hours Work Application Form (**Appendix A**) requires demonstration that appropriate consultation has been carried out.
CoA E28(c)	identify an approval process that considers the risk level of activities (in accordance with AS/NZS ISO 31000:2009 "Risk Management"), proposed mitigation, management, and coordination, including where: i) low and moderate risk activities can be approved by the ER in consultation with the AA, and ii) high risk activities that are approved by the Secretary; and	**Section 3** outlines the process for identifying and evaluating risks in accordance with AS/NZS ISO 31000:2009 "Risk Management". **Section 8.2** provides a flow chart of the OOHW approval process based on risk level.
CoA E28(d)	identify Department and community notification arrangements for approved out of hours works, which will be detailed in the Communication Strategy. *Note: this condition does not apply where work is required for an emergency (as defined in condition E25 (b)).*	The CCS identifies the requirements for notifications for both Department and the community. **Appendix A** requires consultation to be attached when seeking OOHW approval. The CNVS identifies additional mitigation measures dependent on predicted exceedances.

Condition Number	Condition	How Addressed
CoA E29	Out-of-hours works that may be regulated through an EPL or the **Out of Hours Work Protocol** as per **Condition E28** include, but are not limited to: (a) carrying out works that during standard hours would 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"; or (b) the relevant road authority has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to road network operational performance and a road occupancy licence will not be issued; or (c) the relevant utility service operator has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to the operation and integrity of the utility network; or (d) where the TfNSW 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 works or activities during the hours specified in Condition E21 and Condition E22; or (e) where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required.	**Section 4.2** addresses these works as Approved OOHW. The PLR Out-Of-Hours Work Application Form (**Appendix A**) includes the requirement to provide justification for why OOHW are required.
CoA E30	Mitigation measures must be applied to construction activities that are predicted to result in the following residential ground-borne noise levels being exceeded as a result of the CSSI: (a) Evening (6.00pm to 10.00pm) – internal LAeq (15 minute): 40 dBA; and (b) Night (10.00pm to 7.00am) – internal LAeq(15 minute): 35 dBA. The mitigation measures must be outlined in the **Construction Noise and Vibration Management Sub-Plan** and the **Out of Hours Works Protocol**.	**Section 7** outlines the standard and additional mitigation measures that must be implemented to manage noise, including ground-borne noise in accordance with Condition E30. Further detail on mitigation and the applicability of mitigation measures can be found in Section 8 of the CNVS.
CoA E31	Noise generating works near places of worship, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories, operating theatres, and mental health services and accommodation) must not be timetabled within sensitive periods, unless otherwise agreed with the affected institutions, and at no cost to the affected institution. This must be determined through ongoing consultation with the community during construction.	This Protocol outlines the assessment of out of hours works and includes noise and vibration risk identification based on sensitive receiver type. Details of the consultation process are also outlined.

Condition Number	Condition	How Addressed
CoA E33	Construction noise mitigation measures must be implemented in accordance with Tables 4, 5, 6 and 7 of TfNSW's *Construction Noise and Vibration Strategy* (2018), regardless of the number of sensitive receivers impacted.	**Section 1.5.1** outlines this requirement which relates to impact assessment procedures and standard mitigation for management of noise and vibration, including from source and source pathway.
CoA E37	Where works are undertaken outside hours specific in **Condition E21 and E22** and construction noise levels exceed 65 dB(A) $L_{Aeq\ (15\ mins)}$ at the façade of the building of a residential receiver, the Proponent must only work 4 nights in any 7 day period. The 4 nights worked must be informed by community consultation referenced in **Condition E39**.	**Section 5.2** outlines the requirements for respite periods.
CoA E37	Outcomes of the community consultation, the identified works and respite periods and the scheduling of the likely out-of-hour works must be provided to the AA, ER and the Secretary for information.	The PLR Out-Of-Hours Work Application Form (**Appendix A**) include a requirement for these details to be provided (Section N) when submitted for OOHW approval.
CoA E37	Relocation of work following 4 nights of works in any 7 day period must be sufficiently removed so as to provide clear respite of 3 days. Works in areas of respite must be subject to noise levels of no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009).	**Section 5.2** outlines the requirements for respite periods.
CoA E37	The requirements of this condition may be varied with the approval of the Secretary following the Secretary's review of community consultation outcomes, construction noise and vibration impacts and the implementation of noise management and mitigation measures.	**Section 5.2** outlines the process for seeking modifications to the standard respite requirements of Condition E37.
CoA E38	All work undertaken for the delivery of the CSSI, including those undertaken by utility contractors, must be coordinated to ensure respite, including the respite required by **Condition E37.** The Proponent must: (a) Schedule any works to provide respite to impacted noise sensitive receivers so that all respite periods are achieved; or (b) Consider the provision of alternative mitigation, including the provision of receiver treatments and alternative accommodation to impacted noise sensitive receivers; and (c) Provide documentary evidence to the AA in support of any decision made by the Proponent in relation to respite or mitigation.	**Section 1.6** discusses the accountabilities of key Project staff involved in the delivery of the Parramatta Light Rail including co-ordination of OOHW. **Section 5.3** provides further details on the coordination of OOHW to achieve respite and/or alternative mitigation, including providing evidence of any decisions to the AA.

Condition Number	Condition	How Addressed
CoA E39	In order to undertake out-of-hours work described in **Condition E25(c) and (d)**, the Proponent must identify appropriate work and respite periods for the works in consultation with the community at each affected precinct at three monthly intervals. This consultation must be ongoing and include (but not be limited to) providing the community with: (a) a schedule of likely out-of-hours work for a period of no less than two (2) months for medium to high risk work (as defined in the **Out-of-Hours Work Protocol** (**Condition E28**)); (b) a schedule of likely out-of-hours work for a period of no less than seven (7) days for low risk work (as defined in the **Out-of-Hours Work Protocol** (**Condition E28**)); (c) the potential works, location and duration; (d) the noise characteristics and likely noise levels of the works; and (e) likely mitigation and management measures.	**Section 6.1** identifies where in the CCS that this information is documented as being required by the community. The PLR Out-Of-Hours Work Application Form (**Appendix A**) include a requirement for these details to be provided when submitted for OOHW approval.
CoA E39	The Proponent shall consider and respond to the affected community's preference for alternative hours and/or durations. The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour works must be provided to the AA**,** ER and the Secretary.	**Section 6.1** addresses the requirement to consider and respond to the affected community's preference for alternative hours and/or durations. The PLR Out-Of-Hours Work Application Form (**Appendix A**) requires consultation evidence provided including outlining community preference and respite periods. **Section 1.6** outlines TfNSW role in coordinating OOHW, including respite and alternative mitigation in consideration of any community consultation outcomes.

Note: Refer to **Appendix B** for compliance with relevant REMMMs and EPOs.

1.3 Protocol Consultation, Endorsement and Approval

The Protocol has been prepared to meet the following consultation, endorsement and approval requirements in accordance with the Infrastructure Approval:

- Be prepared in consultation with the Acoustic Advisor (AA)
- Be endorsed by the AA
- Be endorsed by the Environmental Representative (ER)
- Be approved by the Secretary of the NSW Department of Planning, Industry and Environment (the Secretary).

These requirements were complied with as outlined in **Sections 1.3.1** and **1.3.2**.

1.3.1 AA / ER consultation and endorsement

Both the ER and AA have reviewed and left comments the draft versions of this Protocol. Comments have been satisfactorily addressed in this revision of the Protocol. Copies of the AA and ER endorsements are provided in **Appendix D**.

1.3.2 Secretary Approval

In accordance with the Infrastructure Approval, OOHW subject to CSSI-8285 must not be undertaken before approval of the Protocol by the Secretary. Version 7 of the Protocol was approved by the Secretary on 1 February 2019 with OOHW subject to CSSI-8285 commencing in March 2019. The Protocol has since been updated to incorporate the main works packages. The Secretary approval of this Protocol is provided in **Appendix E**.

Following approval from the Secretary, all works of the CSSI-8285 that are not subject to an EPL (irrespective of whether the works are defined as 'construction' in accordance with the Infrastructure Approval) will be subject to this Protocol.

1.3.3 Protocol amendments

Any minor amendments to the Protocol may be approved by the ER and submitted to the Secretary for information. What constitutes a "minor" amendment is subject to the discretion of the ER, but includes changes that:

- Are editorial in nature
- Do not increase the type or magnitude of impact on the environment or community when considered individually or cumulatively
- Do not compromise the ability of the Project to meet approval or legislative requirements.

In accordance with Condition A37(g) details of any review of, and minor amendments made to, the Protocol will be detailed in the following Construction Compliance Report submitted to DPIE.

Changes to the Protocol that are not defined as minor must be reviewed by the ER in accordance with Condition A23(d) and submitted to the Planning Secretary for approval.

1.4 Accountabilities

The TfNSW Senior Manager, Environment, is accountable for this Protocol. Accountability includes authorising the document, monitoring its effectiveness and performing a formal document review.

Roles reporting to the TfNSW Senior Manager, Environment are accountable for ensuring the requirements of this document are implemented within their area of responsibility. The roles that are accountable for specific projects (e.g. TfNSW Project Managers) include ensuring associated contractors comply with the requirements of this document.

1.5 Governance

This Protocol is to be used in conjunction with the CNVS, the relevant package specific Construction Noise and Vibration Management Plans (CNVMPs) and Construction Noise and Vibration Impact Statements (CNVIS), and any applicable EPLs. These documents establish minimum requirements for managing noise and vibration impacts on the PLR. All construction noise and vibration documentation including CNVMP and CNVIS that discuss OOHW must be aligned and consistent with this Protocol.

1.5.1 TfNSW Construction Noise and Vibration Strategy

Parramatta Light Rail will be implemented in accordance with the TfNSW Construction Noise and Vibration Strategy (CNVS) 7TP-ST-157/4.0 (April 2019). Cross-references to the CNVS occur throughout the document to avoid duplication of content. The CNVS is available online at:

https://www.transport.nsw.gov.au/system/files/media/documents/2019/Planning-Environment-Sustainability-Construction-Noise-and-Vibration-Strategy-ST-157.pdf

Some discrepancies between the Infrastructure Approval (CSSI 8285) and the CNVS exist. This Protocol, which specifically aligns to the project-specific Conditions of Approval, takes precedence over the CNVS where inconsistencies occur (refer to **Sections 2 and 3**).

All relevant Standard and Additional Mitigation Measures of the CNVS will apply to OOHW to minimise impacts to the local community and stakeholders, which are identified within Sections 8.1 and 8.2 of the CNVS. Construction noise mitigation measures must be implemented in accordance with Tables 4, 5, 6 and 7 of the CNVS, regardless of the number of sensitive receivers impacted. Additional Mitigation Measures that specifically relate to OOHW and residual impacts are described in **Section 7.2** of this Protocol.

1.5.2 Construction Noise and Vibration Management Plan(s)

A Construction Noise and Vibration Management Plan (CNVMP) will be prepared for each key package of work in accordance with Condition C3, as outlined in the PLR Staging Report. The CNVMP will provide package specific controls and management process to minimise potential noise and vibration impacts during construction. The CNVMP may include a Noise and Vibration Monitoring Program, required in accordance with Condition C9, which typically outline how noise and vibration monitoring will be undertaken, how the results of monitoring will be reported and procedures to identify and implement additional mitigation measures as necessary.

1.5.3 Construction Noise and Vibration Impact Statement(s)

A Construction Noise and Vibration Impact Statement (CNVIS) is a location and activity specific document that provides an assessment of the anticipated noise and vibration impacts at sensitive receivers of proposed construction activities. In accordance with Condition E42 of the Infrastructure Approval, a CNVIS is to be prepared for each construction site before construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receivers.

All OOHW, including those requiring the approval by DPIE or EPA (where relevant), must be supported by a CNVIS or other acoustic assessment prepared in accordance with Condition E42, the guidance in Section 7 of the CNVS and relevant EPL conditions. A standard application form has been developed in consultation with the AA to achieve these requirements. The PLR Out-Of-Hours Work Protocol Form is provided in **Appendix A**.

During development of the CNVIS to support proposed OOHW, the contractor must consider the assessment steps provided in Sections 6, 7 and 8 of the CNVS, including the identification of all applicable mitigation measures such as those required by the Conditions of Approval (including REMMMs) and the Standard and Additional Mitigation Measures outlined in Section 8.1 and 8.2 of the CNVS. The aim of this assessment is to minimise the impact of noise and vibration on sensitive receivers because of OOHW. It is noted that applied Standard and Additional Mitigation Measures may be modified as a result of community consultation outcomes and detailed in the OOHW Application (see **Section 6.1** for more details).

1.5.4 Environmental Protection Licence

An EPL is a regulatory approval issued to strategically control the localised, cumulative and acute impacts of pollution. The NSW Environment Protection Authority (EPA) is responsible for issuing EPLs for 'scheduled activities' under the *Protection of the Environment Operations (POEO) Act 1997* (NSW).

The proposed construction and operational activities of PLR as assessed in the Environmental Impact Statement did not constitute 'scheduled activities' under the POEO Act and therefore not subject to an EPL. Amendments to the way that railway systems activities are regulated under Schedule 1 of the *Protection of the Environment Operations Act 1997* however were passed creating new scheduled activities including Railway activities – railway infrastructure construction (clause 33).

The new railway infrastructure construction scheduled activity applies to the construction of all types of railway infrastructure, including infrastructure for light rail, heavy rail and Metro systems that meet specified limits.

Construction activities include the widening or rerouting of existing railway infrastructure and any related tunnels, earthworks and cuttings. It also includes any on site extraction of materials necessary for the construction as well as any on-site processing such as crushing, grinding or separating of extracted materials or other materials used in that construction.

Railway construction projects that, over the life of the construction, exceed specific material extraction or processing levels or new railway track lengths are required to obtain a railway infrastructure construction Environment Protection Licence. These limits are:

- Extraction or processing of more than:
    - 50,000 tonnes of materials in Bega Valley, Eurabodalla, Goulburn Mulwaree, Queanbeyan-Palerang Regional or Snowy Monaro Regional local government or regulated areas, or
    - 150,000 tonnes of materials in any other area.

or

- Construction of new railway track that is:
    - 3 kilometres or more in length in the metropolitan area, or
    - 5 kilometres or more in length outside the metropolitan area.

As such, PLR Infrastructure Works (Package 4) will trigger the newly formed Railway construction scheduled activity and require an EPL for construction. The minor works (Package 1, 2 and 3) and Supply Operate and Maintain (SOM) Works (Package 5) however will not trigger the Railway construction scheduled activity and will not likely require an EPL for construction.

The process for approving OOHW outside of those already permitted in accordance with an EPL, is governed by the conditions of the EPL. For these types of OOHW to be approved, an application to vary the EPL is to be prepared and submitted to the EPA for approval. The application is to be in accordance with the CNVS and EPL requirements.

OOHW that are subject to an EPL do not require approval in accordance with Condition E28 of the Infrastructure Approval (and therefore this Protocol).

1.6 Roles and Responsibilities

Key roles and responsibilities associated with this Protocol are summarised in **Table 1-2**.

Table 1-2 Roles and Responsibility

Role	Responsibility
TfNSW Senior Manager Community Engagement	The TfNSW Senior Manager Community Engagement is responsible for ensuring that all PLR communication requirements with the community are being complied with. For each precinct traversed by PLR, a TfNSW Place Manager will be allocated who reports to the TfNSW Senior Manager Community Engagement in relation to the outcomes of consultation for their precinct including in relation to OOHW.
Contractor Community Engagement Manager	The Contractor Community Engagement Manager(s) are accountable for the implementation of communication and stakeholder engagement requirements relevant to each of the respective contract delivery packages. The Contractor Community Engagement Manager(s) will be supported by area specific Contractor Place Managers, who will be responsible for coordination and preparation of community consultation and notifications.
TfNSW Senior Manager, Environment	TfNSW Senior Manager, Environment, is accountable for this Protocol. Accountability includes authorising the document, monitoring its effectiveness and performing a formal document review.
TfNSW Environment and Planning Manager	A TfNSW Environment and Planning Manager will be allocated to each contract delivery package for PLR. The TfNSW Environment Manager will be responsible for ensuring that all environmental management requirements associated with their contract delivery package are being complied with.
Contractor Environment Manager	The Contractor Environment Manager(s) is accountable for the preparation and implementation of noise and vibration assessments, plans and protocols including: • Construction Noise and Vibration Management Sub-plan (Condition C3) • Land Use Survey (Condition E20) • Out-of-Hours Work Protocol (Condition E28) • Construction Noise and Vibration Impact Statements (Condition E42) • Building Condition Reports (Condition E45). The Contractor Environment Manager(s) is also responsible for implementation of this Protocol, including: • Preparation of CNVIS for works proposed outside of the standard hours • Submission of the PLR Out-Of-Hours Work Protocol Form (**Appendix A**) to ER with AA as applicable.
Independent Environmental Representative	Condition A19 of the Infrastructure Approval requires an ER to be appointed to the project to represent the NSW Department of Planning, Industry and Environment (DPIE). The ER is to act as the Secretary's independent point of contact for all environmental and planning approval compliance matters. Condition A23 of the Infrastructure Approval provides a comprehensive list of the ER's responsibilities. **Section 8** and **Appendix A** include descriptions of the ER's responsibilities with respect to reviewing, endorsing and approving OOHW.

Role	Responsibility
Independent Acoustics Advisor	Condition A26 of the Infrastructure Approval requires an Acoustics Advisor (AA) to be appointed to the project. The AA is to act as the Secretary's independent point of contact for all noise and vibration matters on the project. Conditions A29 of the Infrastructure Approval provides a comprehensive list of the AA's responsibilities. **Section 8** and **Appendix A** include descriptions of the AA's responsibilities with respect to reviewing, confirming risk level, endorsing and deferring OOHW.
Secretary of the NSW Department of Planning, Industry and Environment	The Secretary is responsible for approval of this Protocol, and for high risk OOHW applications submitted in accordance with this Protocol. **Section 8** and **Appendix A** include descriptions of the ER's responsibilities with respect to reviewing and approving OOHW.

2 Hours of work

2.1 Standard Hours of Works

Conditions E21 and E22 identifies the standard hours of work for PLR as:

f) 7:00am to 6:00pm Mondays to Fridays, inclusive

g) 8:00am to 12:00pm Saturdays

h) at no time on Sundays or public holidays.

With the exception of Eat Street works may also be undertaken during the following extended standard hours:

a) 6:00pm to 7:00pm Mondays to Fridays, inclusive

b) 12:00pm to 6:00pm Saturdays.

These hours take precedent from the standard construction hours identified in CNVS (Section 1.4). There are a number of exemptions to these standard hours of work as outlined in **Section 4.1**.

2.2 Out of Hours Works Periods

Work outside of standard construction hours is defined as Out-of-Hours Work (OOHW) and can be divided into two periods of sensitivity, namely 'OOHW Period 1' and 'OOHW Period 2'.

OOHW Period 1 is defined as:

a) 7:00pm to 10:00pm (evenings) Monday to Friday

b) 7:00am to 8:00am (day) and 6:00pm to 10:00pm (evening) on Saturday

c) 8:00am to 6:00pm (day) on Sunday and public holidays.

OOHW Period 2 is defined as:

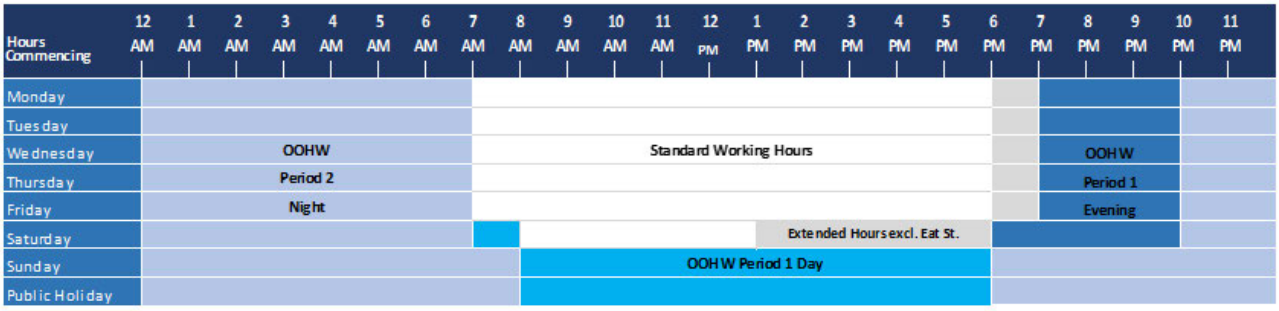
a) 12:00am to 7:00am and 10:00pm to 12:00am (nights) Monday to Friday

b) 12:00am to 8:00am and 10:00pm to 12:00am (nights) Saturdays

c) 12:00am to 8:00am and 6:00pm to 12:00am (nights) Sundays and public holidays.

The standard works hours and OOHW periods are summarised in **Table 2-1**. Note in accordance with Condition E22, the extended standard construction hours for 6:00pm to 7:00pm Mondays to Fridays, inclusive and 12:00pm to 6:00pm Saturdays exclude works in Eat Street. Work activities in Eat Street within these hours are defined as OOHW Period 1.

Table 2-1 Construction Work Periods – Standard Hours of Works



2.3 Highly Noise and Vibration Intensive Works Periods

Condition E27 sets restricted hours of work for Highly Noise Intensive Works as:

a) 8:00am to 6:00pm Monday to Friday

b) 8:00am to 1:00pm Saturday

c) 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.

Highly Noise Intensive Work is only permitted outside of these hours by an EPL, or through this Protocol. No blasting activities are permitted under the Infrastructure Approval.

The definition of Highly Noise Intensive Work is provided in Table 1 in the Infrastructure Approval, however the following additional considerations also apply:

- Definition of ‘Special Audible Characteristics’ of the CNVS (Section 2)
- The list of ‘particularly annoying activities’ in Section 4.5 of the Interim Construction Noise Guidelines (ICNG) (DEC 2009)
- Any other activity of concern nominated by the AA (e.g. as a result of ongoing complaints).

These activities include rock breaking and hammering, sheet piling, pile driving, milling & profiling, jack hammering, vibratory rolling, cutting of pavement, concrete or steel or other work that generates noise with impulsive, intermittent, tonal or low frequency characteristics that result in an exceedance of the applicable NML at the same sensitive receiver.

Highly Noise Intensive Work is to be considered as part of noise assessments used to determine the risk level in accordance with **Section 3**. These activities will not always be considered ‘high risk’, but if the noise from a particular plant item is considered Highly Noise Intensive Work a 5 dBA penalty is to be added to the noise source sound power level in the noise assessment. The noise assessment will determine the likely impact to sensitive receivers and inform the corresponding risk level.

High vibration impact is defined as any work that will exceed the human comfort vibration criteria (HVML) provided in Table 15 of the CNVS and recreated in **Table 3-2** of this Protocol (**Section 3.1**).

3 Assessment of risk factors

3.1 Noise and Vibration Criteria

The noise and vibration criteria of CNVS, Appendix A applies to PLR and will be used in the assessment of risk for OOHW as defined in **Section 4**. The key criteria is provided in **Table 3-1** and **Table 3-2** for ease of reference.

Table 3-1 Noise Criteria

Receiver Type	OOH Noise Management Level	Relevant Key Precincts
Residential	Air-borne noise RBL + 5dB(A)[4]; (ICNG, Table 2) or Ground-borne noise 35-40dB(A) - internal[4] (ICNG, Section 4.2) Sleep disturbance criteria[1]	All precincts and as advised by Landuse Surveys of CNVMPs
Educational institutions	Internal noise 45dB(A) (ICNG, Table 3) Sleep disturbance criteria, where relevant[1]	North Parramatta, CBD & Camellia to Carlingford
Medical (hospital wards and operating theatres)	Internal noise 45dB(A) (ICNG, Table 3) Sleep disturbance criteria[1,2]	Westmead and Cumberland Hospital (east and west campuses)
Places of worship	Internal noise 45dB(A) (ICNG, Table 3)	All precincts and as advised by Landuse Surveys of CNVMPs
Active recreation areas	External noise 65dB(A) (ICNG, Table 3)	CBD and Robin Thomas Reserve[3]
Passive recreation areas	External noise 60dB(A) (ICNG, Table 3)	North Parramatta to Robin Thomas Reserve[3]
Community centres, Child care, Cinema, Hotel	To be determined on a case-by-case basis (ICNG, Table 3, Section 4.1.3)	All precincts and as advised by Landuse Surveys of CNVMPs
Commercial – Office/retail	External noise 70dB(A) (ICNG, Table 3)	All precincts and as advised by Landuse Surveys of CNVMPs
Commercial – Industrial	External noise 75dB(A) (ICNG, Table 3)	North Parramatta and Camellia
Commercial – sensitive to noise (e.g. Acoustic Space, such as sleep lab)	To be advised by consultation and Acoustic Assessment. Sleep disturbance criteria[1], where relevant (e.g. temporary accommodation)	All precincts and as advised by Landuse Surveys of CNVMPs

Notes:

1. The potential for sleep disturbance is assessed using the sleep disturbance "screening criterion", as noted in the Section A.1.2 of the CNVS. The screening criteria is taken as $L_{AF1,\ 1\ minute}$ >RBL + 15 dB(A) (the screening criteria) and 65 dB(A) (maximum) during night period. Where sleep disturbance criteria exceedance for more than 2 consecutive nights cannot be avoided due to reasonable and feasible justification, the Delivery Partner must consult with the community and consider further mitigation prescribed under CNVS, Table 8: Additional Management Measures such as Duration Reduction or Alternative Accommodation.
2. These could be applicable 24 hours a day for hospital wards.
3. Robin Thomas Reserve may be considered an active or passive recreation area depending on the time of day or location.
4. Receiver perception for airborne noise levels as per Table 12 of the TfNSW CNVS; receiver perception for ground borne noise levels as per Table 14 of the TfNSW CNVS.

Table 3-2 Vibration Criteria (Human Comfort Criteria)

Location	Period	Preferred Values (m/s^2)		Maximum Values (m/s^2)	
Continuous vibration	Period	Z axis	X&Y axes	Z axis	X&Y axes
Critical areas (e.g. medical)	Day or night time	0.005	0.036	0.010	0.072
Residences (including hotels)	Daytime	0.010	0.071	0.020	0.014
Residences (including hotels)	Night-time	0.007	0.005	0.014	0.010
Educational institutions, child care, cinema, places of worship	Day or night time	0.020	0.014	0.040	0.028
Industrial, recreation	Day or night time	0.040	0.029	0.080	0.058
Impulsive vibration	Period	Z axis	X&Y axes	Z axis	X&Y axes
Critical areas (e.g. medical)	Day or night time	0.005	0.0036	0.010	0.0072
Residences (including hotels)	Daytime	0.300	0.210	0.600	0.420
Residences (including hotels)	Night-time	0.100	0.071	0.200	0.140
Educational institutions, child care, cinema, places of worship	Day or night time	0.640	0.460	1.280	0.920
Industrial, recreation	Day or night time	0.640	0.460	1.280	0.920
Intermittent vibration	Period	Z axis	X&Y axes	Z axis	X&Y axes
Critical areas (e.g. medical)	Day or night time	0.100	0.100	0.200	0.200
Residences (including hotels)	Daytime	0.200	0.200	0.400	0.400
Residences (including hotels)	Night-time	0.130	0.130	0.260	0.260
Educational institutions, child care, cinema, places of worship	Day or night time	0.400	0.400	0.800	0.800
Industrial, recreation	Day or night time	0.800	0.800	1.600	1.600

Notes: For continuous and impulsive vibration, the preferred and maximum values are weighted acceleration values (Wg for z axis and Wd for x and y axes). For intermittent vibration, the preferred and maximum values are Vibration Dose Values (VDVs), based on the weighed acceleration values.

3.2 Risk assessment factors

Approval of works which are outside the permitted hours defined in Conditions E21 to E22, where an EPL does not apply, requires a process that considers the risk level of activities (in accordance with AS/NZS ISO 31000:2009 “Risk Management”), proposed mitigation, management, and coordination of out of hours works including where:

i) low and moderate risk activities can be approved by the ER in consultation with the AA, and

ii) high risk activities that are approved by the Secretary.

Low risk activities are characterised by works that result in noise or vibration impacts that are below the relevant noise and vibration criteria (refer to **Table 3-1** and **Table 3-2**) during sensitive periods (as defined for each receiver type) or exceedances of the criteria outside of sensitive periods. Low risk activities should result in no or minimal negative impact to the sensitive receivers / land use during sensitive periods. Low risk activities may be perceptible, but the degree of impact, and likelihood of annoyance resulting in complaints or other escalation are low.

Moderate risk activities are characterised by works that result in noise or vibration impacts that may exceed the relevant noise and vibration criteria during sensitive periods, however can be managed through consultation, scheduling, respite or additional mitigation measures to prevent significant impacts to affected receivers. Moderate risk activities should not generally result in impacts that affect the receiver from being used for its intended land use (e.g. teaching a school lesson in a classroom).

High risk activities are characterised by works that result in noise or vibration impacts that are likely to exceed the relevant noise and vibration criteria during sensitive periods resulting in impacts that may affect the receiver from being used for its intended land use despite consultation, scheduling, respite or additional mitigation measures. Activities where the sleep disturbance criteria are exceeded for more than two consecutive nights and alternate accommodation is not considered feasible would also be classified as high risk.

The intent of noise and vibration risk categories for each receiver type is summarised in **Table 3-3**. The defined intent is to be utilised as an overarching guide in the application of the prescriptive and quantitative risk assessment matrices provided in **Appendix C** to assist with determining a risk for each receiver type.

In developing a noise assessment (e.g. CNVIS) to determine the predicted impacts on sensitive receivers, if the noise from a particular plant item is considered to meet the definition of Highly Noise Intensive Works (see **Section 2.3**) these items are to be clearly identified in the assessment and a 5 dBA penalty is to be added to the noise source sound power level. Highly Noise Intensive Works are to be considered as part of the cumulative noise impact in determining risk. It is noted that Highly Noise Intensive Works will not always be considered ‘high risk’ but will form part of the assessment in determining the impact to sensitive receivers.

The conclusion of the risk assessment may not apply in all instances as other additional factors to be considered on a case by case basis may include:

- Duration of proposed activities
- Number and type of sensitive receivers impacted – standard residential, medium density receivers; or residential home for the elderly, high density unit blocks, persistent complainers, residents deemed to have ‘construction noise fatigue’
- Past experience undertaking activity – the nature of works are new, in a new location or have not been undertaken by the contractor on the project already
- Special events – the timing and location of special events in the area of the proposed OOH works may be scheduled at the same time or immediately before or after the special event (e.g. festivals, public gatherings, etc.)
- TfNSW Place Manager Feedback – feedback from the Place Manager for the area will provide the project, contractor and AA an understanding of the types and requirements of surrounding sensitive receivers
- Potential for structural damage to buildings or equipment through vibration (e.g. heritage)
- Obtaining a Community Agreement or Business Agreement (through **Section 4.3**)
- Other concurrent activities impacting the receiver
- Other specific considerations determined through consultation, baseline studies or acoustic investigation of individual receivers (such as façade treatments).

As such, the risk level must be agreed to by the AA based on information presented or requested in relation to each proposed Out of Hours Work Application. In all cases the onus is on the applicant to demonstrate the relevant objective (adopted as per the criteria presented in **Table 3-1** and **Table 3-2**) is likely to be achieved.

Table 3-3: PLR Out-of-Hours Work risk level[1,2]

Receiver Type	Low	Moderate	High	Notes
Childcare	Impacts below the noise and vibration objective periods during operating hours or Impacts above the noise and vibration objective outside of operating hours	Impacts above the noise and vibration objective during operating hours that would not prevent the operation of the facility (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective during day period that would cause significant disturbance to the facility	Sensitive periods during centre operating hours Periods such as day sleep times should be considered in the assessment
Cinema	Impacts below the noise and vibration objective during session times or Impacts above the noise and vibration objective outside of session times	Impacts above the noise and vibration objective during session times that would not significantly disrupt customers (as demonstrated through monitoring outside of session times and consultation)	Impacts above the noise and vibration objective during session times that would significantly disrupt customers (as demonstrated through monitoring outside of session times and consultation)	Sensitive periods during session times only
Commercial – Office / Retail	Impacts below the noise and vibration objective during trading / business hours or Impacts above the noise and vibration objective outside of trading / business hours	Impacts above the noise and vibration objective during trading / business hours that would not prevent trading / business (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective during trading / business hours that would prevent trading / business (such as through agreed scheduling or respite periods)	Sensitive periods during business or trading hours as defined for each premise.
Commercial - Industrial	Impacts below the noise and vibration objective during operating periods or Impacts above the noise and vibration objective outside of operating periods	Impacts above the noise and vibration objective during day period that would not impact operation of surrounding industrial receivers (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective during day period with potential to impact operation of surrounding industrial receivers (i.e. exceedance of the industrial noise limits >85dBA)	Sensitivity of surrounding industrial premises to be confirmed through consultation

Receiver Type	Low	Moderate	High	Notes
Commercial – Sensitive (Acoustic Space)	Impacts below the noise and vibration objective or Impacts outside of operating hours	Impacts above the noise and vibration objective during operating hours that would not prevent the operation of facility (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective during operating hours that would prevent the operation of facility	Sensitive periods during operational periods as agreed with facility through consultation
Educational institutions	Impacts below the noise and vibration objective during teaching and study hours or Impacts above the noise and vibration objective outside of teaching and study hours	Impacts above the noise and vibration objective during teaching and study hours that would not significantly disrupt teaching or study (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective during teaching and study hours that would significantly disrupt teaching or study (such as through agreed scheduling or respite periods)	Sensitive periods during core teaching and study hours
Hotel	Impacts below the noise and vibration objective at any time	Impacts above the noise and vibration objective at any time that would not significantly disrupt Hotel occupants (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective at any time that would significantly disrupt Hotel occupants (such as through agreed scheduling or respite periods)	Alternate criteria may be proposed on case by case basis based on consultation and / or review of prevalent facade performance. Internal criteria to be agreed to by AA[3]
Medical	Impacts below the noise and vibration objective during any operational time period	Impacts above the noise and vibration objective at any time that would have minimal to no impact on operation of surrounding medical facilities (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective that would impact the operation of facility	Sensitive periods to be confirmed through the baseline study or consultation

Receiver Type	Low	Moderate	High	Notes
Place of Worship	Impacts below the noise and vibration objective at any time or Impacts above the noise and vibration objective outside or periods of worship, congregation or passive occupation	Impacts above the noise and vibration objective during periods of worship, congregation or passive occupation that would not significantly disrupt occupants (such as through agreed scheduling or respite periods)	Impacts above the noise and vibration objective during periods of worship, congregation or passive occupation likely to significantly disrupt occupants	Sensitive periods (routine and non-routine periods of worship or congregation) to be determined in consultation on a case by case basis
Recreation (Active)	Impacts below the noise and vibration objective during day, day (OOH), evening or night period or Impacts level above the noise and vibration objective during night period	Impacts above the noise and vibration objective during day, day (OOH) or evening period, however not preventing the utilisation of the area intended / zoned use	Impacts significantly above the noise and vibration objective during day, day (OOH) or evening period that prevent the utilisation of the area for intended / zoned use	Sensitive periods during normal periods of use and review of special events calendar
Recreation (Passive)	Impacts below the noise and vibration objective during day, day (OOH), evening or night period or Impacts level above the noise and vibration objective during night period	Impacts above the noise and vibration objective during day, day (OOH) or evening period, however not preventing the utilisation of the area for intended / zoned use	Impacts significantly above the noise and vibration objective during day, day (OOH) or evening period that prevent the utilisation of the area for intended / zoned use	Sensitive periods during normal periods of use and review of special events calendar

Receiver Type	Low	Moderate	High	Notes
Residential[4]	Impacts below the noise and vibration objective for the applicable time period	Impacts that are clearly audible - moderately intrusive during the day (OOH) and evening period or Impacts that are clearly audible night time works (no sleep disturbance) within the agreed respite periods (4 consecutive nights followed by 3 nights respite) or Impacts that exceed the sleep disturbance criteria for more than two consecutive nights where alternate accommodation is offered	Impacts that exceed the sleep disturbance criteria for more than two consecutive nights without feasible alternate accommodation	Risk subject to complaints management. Respite periods to be observed for Highly Noise Intensive Works
Sensitive Equipment	Impacts below the criteria established in Assessment System and Baseline Study (as applicable to Cumberland and Westmead Health Precincts) or Impacts below criteria established in consultation with affected receivers (applicable to other parts of the Project area)	Impacts above the appropriate criteria (e.g. as established in the Assessment System and Baseline Study) that would not prevent the operation of facility (such as through agreed scheduling or respite periods) or risk damage to the equipment or space	Impacts above the appropriate criteria (e.g. as established in the Assessment System and Baseline Study) that would be likely to prevent the operation of facility (such as through agreed scheduling or respite periods) or risk damage to the equipment or space	Risk subject to complaints management.

Notes:

1. Noise and vibration objectives refers to the relevant noise criteria in **Table 3-1** and vibration criteria in **Table 3-2**.
2. The intent of noise and vibration risk categories for each receiver type is summarised in this table (**Table 3-3**). The defined intent is to be utilised as an overarching guide in the application of the prescriptive and quantitative risk assessment matrices provided in **Appendix C** to assist with determining a risk for each receiver type.
3. In accordance with Australian Standard, *AS2107:2016.*
4. The application of risk categorisation should be completed factoring in the hierarchy of potential impacts and management measures of the CNVS.

4 Out of Hours Works

4.1 Exemptions to standard working hours

Condition E25 allows works to be undertaken outside of the standard working hours defined in Conditions E21 to E22 (standard hours of works in **Section 2.1**), if one or more of the following applies:

a) For the delivery of materials required by the NSW Police Force or other authority for safety reasons;

b) 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;

e) Construction that causes LAeq(15 minute) noise levels:

   i) 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

   ii) 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

   iii) no more than 15dBA above the night-time rating background level at any residence during the night time period, when measured using the LA1(1 minute) noise descriptor, and

   iv) 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

   v) 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).

Condition E23 allows works to be undertaken in the Camellia and Rosehill precincts (east of James Ruse Drive) and the Carlingford precinct (from Parramatta River to Victoria Road) 24 hours a day, seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence in accordance with the ICNG, between 10.00pm and 7.00am.

4.2 Approved Out-of-hours Work

Condition E29 allows out-of-hours work to be regulated through an EPL or this Protocol to include, but are not limited to:

a) Carrying out works that during standard hours would 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";

b) The relevant road authority has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to road network operational performance and a road occupancy licence will not be issued;

c) The relevant utility service operator has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to the operation and integrity of the utility network;

d) Where the TfNSW 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 works or activities during the hours specified in Condition E21 and Condition E22;

e) Where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required.

These works may be undertaken outside of standard working hours following approval in accordance with the OOHW application process outlined in **Section 8**.

4.3 Agreed Out-of-hours Work

OOHW that are not subject to an EPL which cannot be carried out through the *Exemptions to standard working hours* outlined in **Section 4.1**, or the *Approved OOHW* in **Section 4.2**, may be undertaken if one or more of the following circumstances are satisfied. Agreements for OOHW may also be considered to modify standard respite periods (**Section 5.2**) or implement duration reduction works (**Section 5.3**). Approval for carrying out *Agreed OOHW* is through the process outlined in **Section 8**, following the assessment of risk factors outlined in **Section 3**.

4.3.1 Business (and other non-residential) Agreements

The following conditions require construction times, including OOHW, to be established through consultation with affected businesses:

- Condition E24 requires construction outside the hours identified in Condition E21 along 'Eat Street' must be established through consultation with affected businesses as outlined in the Business Activation Plan required by Condition E110.
- Condition E31 requires noise generating works near places of worship, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories, operating theatres, and mental health services and accommodation) must not be timetabled within sensitive periods, unless otherwise agreed with the affected institutions, and at no cost to the affected institution. This must be determined through ongoing consultation with the community during construction.

OOHW based on consultation with Business Agreements are to be approved through the process outlined in **Section 8**.

4.3.2 Community Agreements

OOHW may be undertaken where a Community Agreement between a contractor and a substantial majority of noise sensitive receivers has been reached in consideration of the requirements of Conditions E31, E37 and E39, and approval received through process outlined in **Section 8**. Any Community Agreement to permit works to be undertaken outside of standard construction hours (OOHW) must:

a) Be prepared in writing and implemented in accordance with the relevant sections of the TfNSW CNVS, ICNG, Noise Policy for Industry (EPA, 2017) and AS2346-2010 "Guide to noise and vibration control on construction, demolition and maintenance sites";

b) Detail the following:

   i) the actual works proposed;

   ii) any expected impacts in clear, simple English based on noise modelling;

   iii) the expected duration of the works;

   iv) any expected benefits for receivers;

v) any other concurrent OOHW that will be occurring as a result of PLR activities; and

vi) any other OOHW as a result of PLR activities that will be occurring on the nights preceding and following the proposed works or, if the proposed work precedes or follows a weekend period, any other OOHW that will be occurring on the weekend.

c) Demonstrate that the noise sensitive receivers party to the Community Agreement understand the nature of the works and any predicted impacts;

d) Community Agreements will be used to support an OOHW Application where they are intended to be used to provide justification for OOHW with approval for implementation sought through the process outlined in **Section 8**;

e) Be kept for the duration of the Community Agreement and made available to AA, ER and DPIE on request.

In relation to consulting and engaging with noise sensitive receivers for a Community Agreement, the following applies:

a) All noise sensitive receivers predicted by modelling to be impacted by noise greater than 5 dB(A) above RBL must be consulted on any proposed Community Agreement. This includes noise sensitive receivers that have declined to participate in previous agreements;

b) All proposed agreements must include details for interpreting services for languages other than English where required;

c) If the contractor is unable to contact a noise sensitive receiver after three attempts, including leaving "sorry I missed you" cards explaining the reason for the visit and requesting a return phone call, then the contractor will note that the receiver could not be contacted and the receiver will not be considered to have either agreed or disagreed;

d) Records of the attempts to contact the receiver will be kept by the contractor.

Agreement Thresholds

The following agreement thresholds will be observed when considering if a substantial majority of the affected community have agreed to OOHW (note both apply):

a) Noise sensitive receivers predicted by the contractor to be impacted by noise levels exceeding those specified in Condition E25 (e);

b) Noise sensitive receivers predicted by the contractor to be impacted by noise levels above a highly noise affected level of 75dB(A).

Agreements by Phone

Where a Community Agreement has been reached with noise sensitive receivers over the phone, the following applies:

a) The phone script used to describe the proposed agreement (including information required under Condition E39 is to be provided to DPIE with the Community Agreement for approval;

b) The script must include a clear question requesting receiver agreement to the proposal;

c) Detailed records are to be maintained by the contractor of all Community Agreement phone conversations and must be maintained for the duration of the Community Agreement; and

d) Any noise sensitive receiver who requests a copy of the phone agreement must be supplied with one.

Notification

All noise sensitive receivers must be advised of any Community Agreement that has been attained in writing within seven calendar days of the agreement being finalised and must:

a) Include a website link to the project website, specifically to a summary of the approved project agreement;

b) Include details of the PLR 24-hour complaints line.

The notification requirements in Section 7 also apply to Community Agreements and must comply with the PLR CCS.

4.3.3 ER Agreement

The ER may approve other low or moderate risk OOHW activities, in consultation with the AA, that are not specifically subject to Condition E25. This may be required in the following circumstances:

- The outcome of consultation with noise or vibration affected institutions (Condition E24 and E31) preference out of hours works that impact residential receivers
- OOHW are proposed that cannot be completed with the standard respite periods (**Section 7.2**) for engineering justifications (e.g. large concrete pours that cannot be staged)
- Duration reduction works as identified through compliance with Condition E39 where respite periods (outlined in Condition E37) are considered to be counterproductive to reducing noise and vibration impacts as determined on a case-by-case basis.

5 Scheduling Works and Respite

5.1 Hierarchy of Preferred Working Hours

Where OOHW is planned to take place the following hierarchy of preferred working hours must be considered unless otherwise agreed with affected community through consultation (**Section 6.1**).

1. Saturday afternoon periods between 1pm and 6pm (Standard hours, applicable to HNIW)
2. Sunday and public holiday day periods between 8am and 6pm (Period 1 Day)
3. Weekday evening periods between 7pm and 10pm (Period 1 Evening)
4. Weekend evening periods between 6pm and 10pm (Saturdays Period 1 Evening/Sundays Period 2)
5. Weekend night periods between 10pm and 8am (Period 2)
6. Work during the weekday evening and night and scheduling the noisiest or vibration intensive work first (between 6pm and 10pm) to minimise sleep disturbance impacts in the night period between 10pm and 7am) – read in conjunction with E27 (Period 1 Evening & Period 2)
7. All other times outside recommended standard hours.

For Eat Street, the listed OOHW hierarchy of working hours include:

1. Weekday night periods (Monday-Thursday) between 10pm and 7am (Period 2)
2. Sunday and public holiday day periods between 7am and 11am (Period 1 Day)
3. Weekend night periods (Friday, Saturday and Sunday) between 10pm and 7am (Period 2)
4. Sunday and public holiday day periods between 11am and 6pm (Period 1 Day)
5. All other times outside recommended standard hours as advised by consultation.

This hierarchy does not apply to emergency work. This should be undertaken in accordance with Condition E26; on becoming aware of emergency works the ER and TfNSW must be notified. It is the responsibility of the contractor to use best endeavours to contact affected sensitive receivers and advise of the likely impact and duration of such works. See **Section 5.4** for more details.

Road Traffic Noise

When planning OOHW, consideration must be given to minimising road traffic noise caused by construction of PLR, including but not limited to:

- Restricting heavy vehicle movements to standard hours (**Section 2.1**); and/or
- Planning heavy vehicle haulage routes that have fewer sensitive receivers.

As required by the RMS Road Noise Policy (RNP), an initial screening test should first be applied by evaluating whether noise levels would increase by more than 2 dB (an increase in the number vehicles of around 60%) due to construction traffic or a temporary reroute due to a road closure.

Where noise levels increase by more than 2 dB (i.e. 2.1 dB or greater) further assessment is required using the criteria presented in the RNP.

5.2 Standard Respite

Condition E37 outlines the standard respite periods for Approved OOHW (**Section 4.2**).

Where construction noise levels exceed 65 dB(A) LAeq (15 mins) at the façade of the building of a residential receiver, work must only occur for four nights in any seven day period. The four nights worked must be informed by community consultation required by Condition E39 (**Section 6.1**).

Outcomes of the community consultation, the identified works and respite periods and the scheduling of the likely out-of-hour works must be provided to the AA, ER and the Secretary for information.

Relocation of work following four nights of works in any seven day period must be sufficiently removed so as to provide clear respite of three days. Works in areas of respite must be subject to noise levels of no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009).

The requirements of Condition E37 may be varied with the approval of the Secretary following the Secretary's review of community consultation outcomes, construction noise and vibration impacts and the implementation of noise management and mitigation measures.

Where there is a community or business preference for modifying the standard respite requirements of Condition E37 (e.g. duration reduction), a Business Agreement (**Section 4.3.1**) and/or Community Agreement (**Section 4.3.2**) will be obtained and approval sought through the submission of an OOHW Application (**Section 8**), where the AA/ER approves low/moderate risk activities and the Planning Secretary approves high risk activities.

Condition E38 requires all works undertaken for the delivery of the CSSI, including those undertaken by utility contractors, must be coordinated to ensure respite, including the respite required by Condition E37. The coordination of respite must:

a) Schedule any works to provide respite to impacted noise sensitive receivers so that all respite periods are achieved; or

b) Consider the provision of alternative mitigation, including the provision of at receiver treatments and alternative accommodation to impacted noise sensitive receivers; and

c) Provide documentary evidence to the AA in support of any decision made by the Proponent in relation to respite or mitigation.

5.3 Coordination & Respite

Coordination of OOHW will occur to provide respite, minimise the duration and impact on sensitive receivers, and to respond to community consultation at a project-wide level.

TfNSW's Project Manager and Senior Manager Environment will be accountable for coordinating OOHW in a manner that minimises the cumulative noise impacts, considers the outcomes of community and stakeholder consultation, ensures compliance with conditions of approval including mitigation measures and aligns with the best practice management principles of the CNVS. The AA will be consulted on coordination of OOHW.

The principles of coordination of OOHW will be:

- Contractors are responsible for interfacing between delivery packages to work collaboratively to programme OOHW to minimise cumulative noise and vibration impacts;
- Providing respite to impacted sensitive receivers so that standard respite periods of the Conditions of Approval are achieved;

- As nominated by the OOHW application applicant and confirmed in consultation with the AA, alternative mitigation will be provided to reduce impacts to sensitive receivers such as property treatments, alternative accommodation or any other additional mitigation measures of the CNVS (see **Figure 1** for the OOHW Approval Process including AA consultation process);
- Consult and advise the AA of decisions relating to respite and mitigation, including any documentary evidence as necessary; and
- Where reasonable and feasible, works shall be coordinated with other construction projects to manage respite in noise catchments.

Coordination will be achieved through Coordination and Interface Meetings with Contractors, affected Stakeholders (including other construction project parties) and Utility Service Providers as well as maintaining and reviewing a register of OOHW applications and proposals before approving/endorsing any OOHW application.

Other State Significant development and infrastructure works near PLR

In accordance with Condition E32 contractors undertaking OOHW for PLR are responsible for consultation with proponents or applicants of other State Significant development and infrastructure works near PLR and taking reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers. The Contractor Community Engagement Manager and/or Interface Manager will typically be responsible for this consultation which will be provided to those responsible for the scheduling of OOHW.

Utility Contractors

The impacts to respite resulting from works undertaken by utility contractors must be considered in the scheduling of out of hours work to ensure feasible and reasonable efforts are taken to achieve the standard respite periods.

5.4 Emergency Works

Occasionally there may be a need to undertake emergency works outside of standard work hours. In this situation, works are permitted to proceed without prior approval, provided that the works are:

- An emergency (i.e. an unforeseen occurrence; a sudden and urgent occasion for action); and
- Required to avoid injury, loss of life, damage or loss of property or prevent environmental harm.

On becoming aware of the need for emergency construction works in accordance with Condition E26, contractors must notify TfNSW and the ER and the EPA (if it is required under an EPL if relevant) of the need to undertake the works. This notification should be in the form of a written email or text message to TfNSW and the ER. The requirements for notifying the EPA will be dictated in the conditions of the EPL if relevant.

As a form of mitigation, the contractor will use best endeavours to notify all affected sensitive receivers of the likely impact and duration of the emergency works. These notifications will generally be prepared by the contractor using a small hand-completed information card for distribution to properties immediately adjacent to or impacted by the emergency works. These cards should include the following details as a minimum:

- Scope
- Location
- Hours
- Duration

- Types of equipment to be used
- Likely impacts
- PLR project 24-hour Telephone Contact Number, postal address and email address.

The day after any emergency works, the applicant is to provide a written emergency works report to TfNSW in accordance with *Environmental Incident Classification and Reporting – 9TP-PR-105*.

The emergency works report is to include as a minimum:

- Date, time, duration and cause of the emergency
- Description of emergency works undertaken
- Mitigation measures implemented to address the impacts of the emergency works
- Actions/Measures taken or to be taken to prevent or mitigate recurrence of the emergency. If there are no appropriate actions/measures to be taken, explanation is to be provided as to why.
- Review of programmed works schedule following an occurrence of emergency works with the aim of achieving the required standard respite requirements (**Section 5.2**).

6 Consultation

6.1 Community Consultation

Notwithstanding the standard respite periods (**Section 5.2**), appropriate work and respite periods must be identified in consultation with the community at each affected precinct at three monthly intervals (at a minimum) for the Approved out-of-hours work (i.e. works through Condition E25(c) and (d)). Condition E39 requires that this consultation must be ongoing and include (but not be limited to) providing the community with:

a) A schedule of likely out-of-hours work for a period of no less than two (2) months for moderate to high risk work (as defined in the Out-of-Hours Work Protocol (Condition E28);

b) A schedule of likely out-of-hours work for a period of no less than seven (7) days for low risk work (as defined in the Out-of-Hours Work Protocol (Condition E28));

c) The potential works, location and duration;

d) The noise characteristics and likely noise levels of the works; and

e) Likely mitigation and management measures.

Consultation mechanisms will be consistent with those nominated in the PLR Community Communication Strategy (CCS) and tailored to the affected community as advised by the Contractor Community Engagement Manager and TfNSW Place Managers. Given the scale of the project and the unique characteristics of each precinct along the route, a variety of communication and engagement tools and techniques are required to achieve adequate engagement objectives. These tools include (but are not limited to) a project website, a 24 hour toll-free project information line, information brochures, fact sheets, face-to-face interaction and community information sessions, and will be used to achieve the consultation outcomes required for Condition E39 and to inform respite preferences in accordance with Condition E37.

One form of community consultation outcome is the obtaining of a Business Agreement (**Section 4.3.1**) and/or Community Agreement (**Section 4.3.2**). These can be used as a justification for carrying out OOHW and for seeking modification of the standard respite requirements outlined in Condition E37 where there is a community or business preference (**Section 5.2**).

The CCS identifies additional consultation required for out-of-hours work and noisy work. The contractor, TfNSW Environment Manager, AA and ER shall consider and respond to the affected community's preference for alternative hours and/or duration reductions. Table 8 of the CNVS identifies additional management measures (consultation based) that will be implemented in accordance with REMMM NV-3. The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour works must be provided to TfNSW, AA, ER and the Secretary as part of OOHW Applications.

6.2 Community Notification

Community notifications are used as a mitigation measure for receivers of noise and vibration impacts from OOHW. Community notifications usually comprise of letterbox-dropped or hand-distributed notification letters to identified stakeholders prior to the commencement of works. Communities are more likely to understand and accept the impacts from noise and vibration if they are provided with honest detailed information and commitments on mitigation measures to be implemented that are adhered to by the project prior to the works commencing.

Community notification requirements are outlined in the CNVS and PLR CCS. Community notifications are to be implemented in accordance with these documents.

6.3 Transport Management Centre and Roads and Maritime Services

Much of the work associated with Parramatta Light Rail requires access and occupation of the road network. Occupation of the road network is a key constraint which often limits the ability of construction activities to be undertaken during standard working hours to minimise impacts on traffic and transport. To allow occupation of the road network, a Road Occupancy Licence (ROL) must be applied for and granted by the Transport Management Centre (TMC), to occupy a portion of the road network, e.g. one lane of two for a set time over a set number of days. TMC are part of the Sydney Coordination Office within Roads and Maritime Services (RMS).

The road authorities responsible for roads affected by PLR include Local Councils (CoPC, Cumberland Council) and RMS. Contractors are responsible for liaising with these authorities and key stakeholders (if required) during construction. The ROL scheme applies to all roads impacted by PLR, other than private roads within the Cumberland Hospital campus. Within Cumberland Hospital campus, contractors will liaise with NSW Health representatives, and provide notices as required.

Consultation with TMC and RMS is required to manage ROL access schedules with demonstrable evidence to be gathered by contractors (such as area specific traffic data) to assist in supporting ROL applications to allow occupation of the road network earlier in the evening/night to minimise noise and vibration impacts being required out of standard working hours.

Hours when construction deliveries and spoil removal would be undertaken within the Parramatta CBD and Rosehill and Camellia precincts would be determined in consultation with the TMC and RMS, and approved through the process outlined in **Section 8**.

7 Determining mitigation

7.1 Standard Mitigation Measures

The CNVMP prepared for each PLR contract delivery package must include standard mitigation and management measures that apply to works for that package with reference to the CNVS, the ICNG and in accordance with the Infrastructure Approval. These standard mitigation measures apply to PLR works and will be implemented as appropriate.

7.2 Additional Mitigation Measures

Additional mitigation measures specifically relating to OOHW and residual impacts are outlined in **Table 7-1**. Details of how these additional mitigation measures will apply to a specific activity will be outlined in the OOHW Application and associated documents for AA and ER endorsement.

Table 7-1 Additional mitigation measures

Action required	Applies to	Details
Implementation of any project specific mitigation measures required	Airborne noise Ground-borne noise & vibration	In addition to the measures set out in this table, any project specific mitigation measures identified through consultation, AA recommendations and/or approval or licence conditions must be implemented.
Implement stakeholder consultation measures	Airborne noise Ground-borne noise & vibration	Stakeholder consultation to be completed in compliance with the PLR CCS and as noted in **Section 6** of this Protocol.
Construction hours and scheduling	Airborne noise Ground-borne noise & vibration	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Highly noise intensive works and/or vibration intensive activities should be scheduled during less sensitive time periods. Refer to the hierarchy of preferred working hours in **Section 5.1**.
Shield sensitive receivers from noisy activities	Airborne noise	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; hoarding; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.
Periodic Notification	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by the AA.	Stakeholder consultation to be completed in compliance with the PLR CCS and as noted in **Section 6** of this Protocol.

Action required	Applies to	Details
Verification Monitoring	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by the AA.	Verification monitoring of noise and/or vibration during construction may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver has been identified). Monitoring can be in the form of either unattended logging (i.e. for vibration provided there is an immediate feedback mechanism such as SMS capabilities) or operator attended surveys (i.e. for specific periods of construction noise). The purpose of monitoring is to confirm that: • Construction noise and vibration from the project are consistent with the predictions in the noise assessment; and/or • Identifying actual impacts of activities on sensitive receivers, such as: ◦ noise levels after implementation of noise reducing mitigation (mufflers, baffles, screens). ◦ vibration during construction in close proximity to structures; and/or • Mitigation and management of construction noise and vibration is appropriate for receivers affected by the works Where noise monitoring finds that the actual noise levels exceed those predicted in the noise assessment then immediate refinement of mitigation measures may be required and the CNVIS amended. Refer to Section 8.4 of the CNVS for more details.
Specific Notification	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by AA.	Stakeholder consultation to be completed in compliance with the PLR CCS and as noted in **Section 6** of this Protocol.
Respite Offer	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by AA.	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. The offer could comprise pre-purchased movie tickets, bowling activities, meal vouchers or similar offer. This measure is determined on a case-by-case basis.

Action required	Applies to	Details
Alternative Accommodation	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by AA.	Alternative accommodation options may be provided where reasonable and feasible for residents impacted by construction works that are likely to exceed sleep disturbance criteria for more than two consecutive nights. Where it is identified that works will likely exceed the sleep disturbance criteria for more than two consecutive nights without feasible alternate accommodation being available, the OOHW Application will be considered high risk and require submission to the DPIE for approval with a justification as to why it is not considered reasonable or feasible (e.g. logistics, availability).
Respite Period	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by AA.	Respite is to be completed in compliance with this Protocol (as noted in **Sections 1.6** and **Section 2** and **Table 3-1**) and the CNVS.
Duration Reduction	OOHW causing: • Airborne noise • Ground-borne noise & vibration Where triggered by Tables 9, 10 & 11 of the CNVS or recommended by AA.	Where Respite Periods (see management measure above) are considered to be counterproductive to reducing noise and vibration impacts to the community it may be beneficial to increase the number of consecutive evenings and/or nights through Duration Reduction to minimise the duration of the activity. This measure is determined on a case-by case basis and would only be implemented through the community agreement processes outlined in **Section 4.3**. Evidence of community support for the Duration Reduction must be provided as justification for the Duration Reduction as part of an OOHW Application if it is to be used as a mitigation strategy. A community engagement strategy must be agreed with and implemented in compliance with the PLR CCS.

Note: Further detail on mitigation and the applicability of mitigation measures can be found in Section 8 of the CNVS.

The additional management measures in **Table 7-1** may become less effective over time. At-receiver noise mitigation may be considered where feasible and reasonable, where all options for at-source noise mitigation and management measures have been exhausted. At-receiver mitigation may include temporary window and door screens, temporary localised shielding or permanent forms of mitigation.

Feasible and reasonable considerations for providing at-receiver treatments should include: Time of day where construction noise exceeds the ANML; Time of use of affected receivers; Amount construction noise exceeds the ANML; How long the mitigation will provide benefit to the receiver during the project; Optimal design of acoustic sheds and noise barriers/hoardings.

8 Approval of Out-of-Hours Work

8.1 Applying for OOHW

All applications for OOHW must be made on the approved OOHW Application Form (that has been prepared and implemented in consultation with the AA) and accompanied by the required information (refer to **Appendix A**). The approval pathway will be determined on a risk-based approach on a case-by-case basis to ensure that OOHW are approved by the appropriate delegate. Activities are required to consider the risk levels in accordance with TfNSW's Environmental Risk Assessment Procedure (3TP-PR-206/3.0) which has been developed in accordance with AS/NZS ISO 31000 Risk Management. The requirements of these conditions are to be specifically addressed in each OOHW application (refer to **Appendix A** and **Section 4**) as relevant. It is noted that any recommendations by the AA on proposed OOHW must be implemented as far as it is reasonably practical to do so.

8.2 Exemptions to standard working hours

Exemptions to standard working hours (**Section 2.1**) may be approved by the Contractor Environment Manager. Notification to the relevant TfNSW Project Manager, TfNSW Environment and Planning Manager, TfNSW Senior Manager Community Engagement, AA and ER must be provided prior to these works occurring. Supporting evidence demonstrating compliance with the exemptions to standard working hours criteria must be maintained and available on request. Summary details of approved Exempt OOHW are to be reported to TfNSW by the Contractor Environment Manager at least monthly.

8.3 Out-of-Hours Work Approval Process

The process for the endorsement and approval of OOHW application on Parramatta Light Rail is summarised in **Figure 1**. This includes a requirement to prepare an application that covers the assessment of noise and vibration impacts, mitigation measures (including community notification requirements), review and approval for all proposed OOHW.

8.3.1 Out-of-Hours Work not subject to an EPL

For OOHW that are not subject to an EPL, the approval process is dictated by the requirements of Condition E28 of the Infrastructure Approval. Contractors are required to prepare an OOHW application using:

- A form consistent with the *PLR OOHW Application Form* (PLR-TFNSW-CBD-PE-FRM-000001) for proposed OOHW. See **Appendix A**.

This form requires a noise and vibration impact assessment to be undertaken. This facilitates simpler consideration of applicable additional noise and vibration mitigation measures to implement. The form also require demonstration of how additional noise and vibration mitigation measures have been considered for implementation (including community notifications) in accordance with the CNVS and Infrastructure Approval.

All OOHW applications that are not subject to an EPL will be submitted to the TfNSW Project Manager, TfNSW Environment and Planning Manager, TfNSW Communications team, AA and ER for review and comment. These reviews will take into consideration a range of aspects, including reviewer experience and expert understanding, local knowledge of the area, current understanding of sensitive receiver requirements and other relevant documents (for example, the applicable Business Activation Plan detailing predicted impacts to affected businesses, key issues and appropriate mitigation measures for implementation). The TfNSW Communications team are to

endorse the OOHW application and provide comments specific to the work within the OOHW application, as required, to identify specific issues and/or mitigation measures (such as specific notification) that are to be carried out prior to or when implementing the OOHW.

The Contractor will identify an indicative risk level which will be agreed by the AA (see **Section 3.2** for determination of noise and vibration risk levels). Following agreement of the risk level, which will consider a range of risk factors associated with the proposed activities and other additional risk factors, the AA endorses the OOHW application and provides any conditions or comments.

If the AA identifies that the OOHW application is high risk, the application is forwarded to the ER for endorsement only. Following the ER's endorsement, the application is then formally submitted by TfNSW via email to the Secretary for approval in accordance with Condition E28 of the Infrastructure Approval. The application to the Secretary will include a statement from the AA to support the risk level identification.

If the AA identifies that the OOHW application is low or moderate risk, the application is forwarded to the ER for their approval (or otherwise) on the application, including any conditions or comments, and forwards the endorsed application directly to TfNSW, the contractor and AA.

For applications seeking to vary the standard respite requirements of Condition E37, the AA/ER may approve respite modifications published in a Community and/or Business Agreement for low or moderate risk activities (as determined by the AA). Where these standard respite modifications are proposed for activities determined to be high risk (as determined by the AA), approval is required by the Planning Secretary. Approval of an OOHW application is considered approval of the variation of the requirements of Condition E37, where relevant.

8.3.2 Out-of-Hours Work subject to an EPL

For OOHW that are subject to an EPL, the EPL conditions will dictate the approval process (i.e. works are not approved through this Protocol). As a minimum however, for proposed OOHW that is not approved in the EPL and a variation is required, the contractor is expected to:

- Prepare an application to the EPA in accordance with the CNVS and EPL requirements
- Submit the revised application to the EPA for approval and submit the application to the TfNSW Senior Manager Community Engagement, TfNSW Environment and Planning Manager, AA and ER for information
- Notify TfNSW, the AA and ER upon receiving EPA approval
- Ensure any required community notifications have been issued (by either TfNSW or the contractor directly) at least seven days prior to the works commencing (this notification does not constitute consultation under Condition E39).

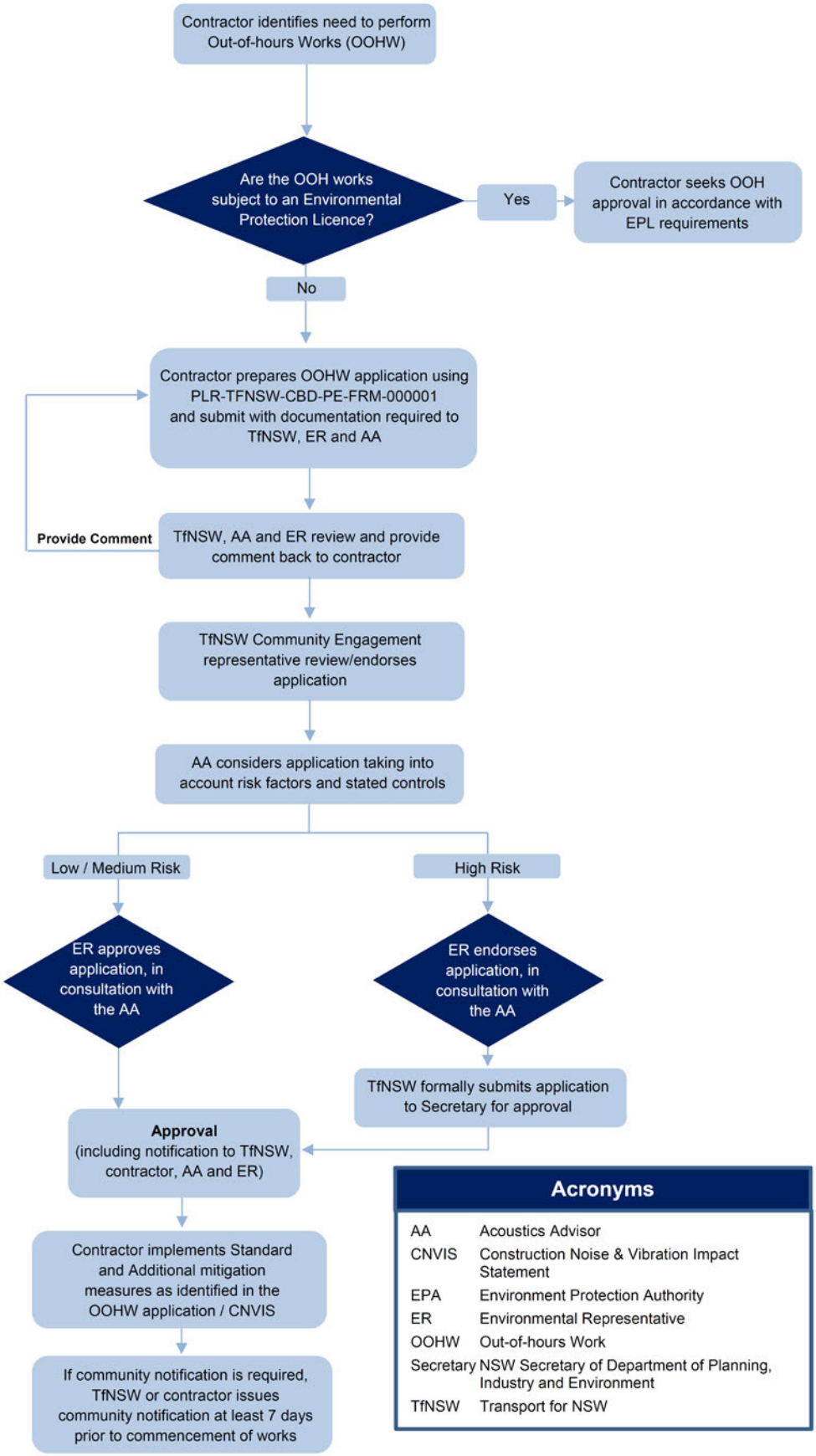


Figure 1: Out-of-hours work (OOHW) Approval Process

Appendix A – Out-Of-Hours Work Protocol Form (Template)

PLR Out-Of-Hours Work Protocol Form

(Environment Protection Licence Variation NOT Required)

This form is to be read / completed in conjunction with the PLR Out-of-Hours Work Protocol (PLR-TFNSW-CBD-PE-FRM-000002)

Works:	**No:**	**Rev:**

ENSURE APPROPRIATE TIMEFRAME FOR APPLICATION AND ALL SUPPORTING INFORMATION THAT IS TO BE SUBMITTED TO THE APPROVING AUTHORITY BEFORE THE PLANNED DATES OF OUT-OF-HOURS WORK (OOHW). TFNSW REQUIRE A 10 DAY REVIEW PRIOR TO THE SUBMISSION TO THE APPROVING AUTHORITY.

Application Date:	**Contractor:**	**Project:**

A. Contact details	Name	Mobile number	Email
Contractor's Representative			
Contractor's 24 hour contact person			
TfNSW Project Manager			
TfNSW Environment & Planning Manager			
TfNSW Community and Engagement Representative			

B. Justification for OOHW List any environmental / community benefits of OOHW (if any)	*Attach additional details if required.*	
	Consideration of OOHW in accordance with Condition E29	☐ (a) Carrying out works that during standard hours would 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" ☐ (b) The relevant road authority has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to road network operational performance and a road occupancy licence will not be issued ☐ (c) The relevant utility service operator has advised the Proponent in writing that carrying out the works and activities during standard hours would result in a high risk to the operation and integrity of the utility network ☐ (d) Where the TfNSW 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 works or activities during the hours specified in Condition E21 and Condition E22 ☐ (e) Where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required.

C. Details of work ☐ **Map attached** (showing location / work extent / nearest sensitive receivers / landscape)		
	Location	
	Description of works	
	Proposed dates (Start and Finish dates)	
	Proposed timings	*e.g. Four nights per week during the proposed dates from 10pm to 5am. Note if there are any HNIW that extend outside the hours identified in E27 and would require approval within this application.*

<table>
<tr><td colspan="2">Works:</td><td>No:</td><td>Rev:</td></tr>
<tr><td>D. Plant required & level of risk</td><td colspan="3">e.g. Refer to the relevant section in CNVIS, or detail below.</td></tr>
<tr><td>E. Distance to nearest sensitive noise receiver(s)</td><td colspan="3">
Distances to the nearest sensitive noise receiver(s)
<table>
<tr><th>Sensitive Receiver</th><th>Distance</th><th>Sensitive Receiver</th><th>Distance</th></tr>
<tr><td>☐ Place of Worship</td><td></td><td>☐ Educational institution (including child care centres)</td><td></td></tr>
<tr><td>☐ Nearest Residential Receivers</td><td></td><td colspan="2">Distances and receivers to be identified in the ECM</td></tr>
<tr><td colspan="3">☐ Noise and Vibration sensitive business and critical working area (such as theatres, laboratories, operating theatres, mental health services, animal welfare facilities and accommodation).</td><td></td></tr>
</table>
Where one of the above has been checked, noise generating works must not be timetabled within sensitive periods, unless otherwise agreed with the affected institutions. This must be determined through ongoing consultation with the community in accordance with the Community Consultation Strategy.
Has the sensitive receiver agreed to these works or are there any preference for alternative hours and/or duration (refer to E31). Attach any of the outcomes from this consultation
☐ Yes ☐ No
</td></tr>
<tr><td>F. Details of alternatives & how investigated. Details of any consultation carried out.</td><td colspan="3"></td></tr>
<tr><td>G. Noise and Vibration Assessment of activities and work covered in this form</td><td colspan="3">
☐ E25(a),(c) & (e) Activities and works required for one or more of the following:

For the delivery of materials required by the NSW Police Force or other authority for safety reasons
Where different hours of works are permitted or required under an EPL in force in respect of the CSSI
Activities and works causes LAeq(15 minute) noise levels:

i) No more than 5 dBA above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009)
ii) 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
iii) No more than 15dBA above the night-time rating background level at any residence during the night time period, when measured using the LA1 (1 minute) noise descriptor
iv) 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)
v) 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).

☐ Approval not required unless activities. Notification required to the relevant TfNSW Project Manager, TfNSW Environment and Planning Manager, TfNSW Senior Manager Community Engagement, AA and ER prior to works occurring.
Supporting evidence demonstrating compliance with the exemptions to standard working hours criteria must be maintained and be available on request. Summary details of approved Exempt OOHW are to be reported to TfNSW by the Contractor Environment Manager at least monthly.
</td></tr>
</table>

Works:	No:	Rev:

	☐ E23 Activities and works cause noise emissions that are <5dBA above background noise level from 10pm to 7am and are located in the Camellia and Rosehill precinct (east of James Ruse Drive) and the Carlingford precinct (from Parramatta River to Victoria Road) ☐ Approval not required. Notification required the relevant TfNSW Project Manager, TfNSW Environment and Planning Manager, TfNSW Senior Manager Community Engagement, AA and ER must be provided prior to these works occurring. ☐ Community notification required *Supporting evidence demonstrating compliance with the exemptions to standard working hours criteria must be maintained and be available on request. Summary details of approved Exempt OOHW are to be reported to TfNSW by the Contractor Environment Manager at least monthly.*
	☐ E28 Activities and works are outside standard hours and are considered low to medium risk (refer to out-of-hours protocol for identifying risk factor). ☐ Approval from ER/ AA and community consultation (E39) required.
	☐ E28 Activities and works are outside standard hours and are considered high risk (refer to out-of-hours protocol for identifying risk factor). ☐ Approval from Secretary and community consultation (E39) required.
	☐ E24 & E28 Activities and works are occurring in Eat Street outside the standard hours. ☐ Approval required and Business Reference Group (E110) required to be consulted as well as community consultation (E39).
	Consultants' acoustic assessment attached? ☐ Yes ☐ No
H. Contractor's community notification strategy	Compliant with the PLR Community Consultation Strategy ☐ Yes ☐ No
I. Associated impacts of proposed OOHW	☐ Dust e.g. heavy trucks; soil clearance ☐ Traffic e.g. deliveries, lane closures ☐ Pedestrian access e.g. pavements closed ☐ Vibration e.g. rollers, damage to heritage properties ☐ Adjacent construction works ☐ Property access ☐ Public transport *e.g. schedule changes* ☐ Lighting *e.g. floodlit residential areas* ☐ Parking *e.g. closure of spaces* ☐ Impulsive vibration or noise ☐ Continuous vibration or noise ☐ Tonal vibration or noise ☐ HHNIW (as defined by OOHW Protocol) ☐ Others (*specify)*
J. Mitigation measures *E.g. noisy works moved to standard hours or 'low risk' hours; silencing; consultation.* *Refer to CEMP, CNVMP CoAs E30, E33 and E37.*	Mitigation measures have been identified in accordance with the Conditions of Approval and Tables 4, 5, 6 and 7 of the TfNSW Construction Noise and Vibration Strategy *(Refer to the relevant section of CNVIS)* In accordance with the PLR Communication Consultation Strategy, consultation with the community has informed the following mitigation measures: *(Particular days scheduled for work/ no works. Does the CNVIS require additional mitigation measures – refer to map/section of CNVIS that identifies this)*
K. Evidence of Consultation with other PLR package contractors	Consultation with other PLR contract package contractors attached (as appropriate)? ☐ Yes ☐ No

Works:	No:	Rev:

L. Evidence of Consultation with community including Community /Business Agreements **(in accordance with Community Consultation Strategy and E24 or E39)**	Have these works been included in the consultation schedule circulated every 3 months for work? ☐ Yes ☐ No Does the community have any preference for alternative hours and/or duration reduction? Attach any of the outcomes from the community consultation ☐ Yes ☐ No Is the proposed work subject to Standard Respite periods under E37? ☐ Yes ☐ No (Comment, i.e <65dBA or Community/Business Agreement in place): Has the community notification also been sent to DPIE? ☐ Yes ☐ No ☐ N/A Comment: Attach details to this form

Contractor signature	Date

M. TfNSW Communications Team	*Comments on application (include comment on community)* Signature Date
	☐ Community notification required by Contractor? ☐ Application on Register?
N. Acoustics Advisor *For OOHW with high risk factors, make recommendation for approval by Secretary*	Assessment of Risk Factors: ☐ Low ☐ Medium ☐ High (refer to out-of-hour work protocol for example of risk factors)
	☐ OOHW approved / endorsed *(delete as appropriate)* ☐ OOHW approved with conditions *(see below)* ☐ OOHW rejected *Comments on application (include comment from Acoustics perspective)* *Signature* *Date*
O. Environmental Representative *For OOHW, make recommendation for approval by ER or Secretary as applicable.*	☐ OOHW approved / endorsed *(delete as appropriate)* ☐ OOHW approved with conditions *(see below)* ☐ OOHW rejected
	ER recommendation for conditions of approval for OOHW / comments *Attach additional letter/comments if required*
P. Approval to conduct OOHW *For OOHW with low and medium risk factors, Approval may be granted by the ER/AA;* *For OOHW with high risk factors approval by the Secretary is required.*	Approved by (strike out as applicable): ER (with AA endorsement) / Secretary Signature Date

Appendix B – SPIR Compliance Table

Table B-8-1 PLR Out of Hours Work REMMMs and EPO's

Condition Number	Condition	How Addressed
REMMM RC-1	Coordination and consultation with the Sydney Coordination Office and the following stakeholders would occur at the appropriate project stages as required to coordinate interfacing projects: • Department of Planning and Environment. [*since 1st July 2019, known as Department of Planning, Industry and Environment*] • Other Transport for NSW agencies (including Roads and Maritime Services; Sydney Trains and Sydney Buses). • Sydney Water. • City of Parramatta Council. • UrbanGrowth NSW Development Corporation. • Western Sydney University. • NSW Health (and its construction contractors). • Land and Housing Corporation. • Emergency service providers. • Utility providers. • Construction contractors. • Other stakeholders as required, as advised by Transport for NSW. Coordination and consultation with these stakeholders would include: • Current and upcoming development applications and precinct master plans. • Provision of regular updates to the detailed construction program, construction sites and haul routes. • Identification of key potential conflict points with other construction projects. • Developing mitigation strategies in order to manage conflicts cumulative impacts of the Parramatta Light Rail and other interfacing projects. Depending on the nature of the conflict, this could involve: o Adjustments to the Parramatta Light Rail (Stage 1) construction program, work activities or haul routes; or adjustments to the program, activities or haul routes of other construction projects. o Coordination of traffic management arrangements between projects. o Coordination of noise generating activities, such as out of hours works.	Partially addressed - The PLR CCS commits to consulting with affected stakeholders including those identified in RC-1 in relation to all work including OOHW. **Section 6.2** addresses the consultation requirements with the Sydney Coordination Office.

Condition Number	Condition	How Addressed
REMMM NV-1	A Construction Noise and Vibration Management Plan (CNVMP) would be developed in accordance with the requirements of Transport for NSW's Construction Noise Strategy and the Interim Construction Noise Guidelines (DECC 2009). It would to document all necessary measures to manage and mitigation mitigate potential noise and vibration levels during standard daytime working hours and for all and out-of-hours construction activities (refer to section 17.2.3 of the EIS). The CNVMP would also provide the framework and mechanisms for: • The mitigation and management of the noise and vibration impacts from the project. • Development of site specific construction noise management plans. • Out-of-hours work associated with the project.	Partially addressed - The Protocol has been developed as the framework for OOHW associated with PLR and to comply with the CoA, REMMMs and EPO's and align with the CNVS and ICNG. Each CNVMP prepared for PLR will align with the Protocol.
REMMM NV-2	The CVNMP prepared for the project would include standard mitigation and management measures would be applied to for the works with reference to the NSW Interim Construction Noise Guideline (ICNG) and CNVS. Mitigation and management measures which would be considered include: For construction concentrated in a single area, such as at the stops, worksites, substation construction sites, bridge sites and the stabling and maintenance facility location, temporary acoustic fencing/barriers around the site perimeter would be considered where feasible and reasonable to mitigate off-site noise levels. • Given the potentially high noise levels at residential receivers, adherence to daytime construction hours is recommended would be used for excavation, demolition or rock breaking activities, and for activities concentrated in a single area (i.e. activities that do not move along the alignment, and do not require out-of-hours activities for safety reasons or to minimise disruption to road networks). • Where possible, noisy works would be scheduled to minimise impacts to adjacent businesses and commercial properties, such as avoiding undertaking noisy activities on Eat Street during lunch and dinner periods. • Out of hours works would be programmed to minimise the number of consecutive out of hour work periods impacting the same receptors. • Consultation would be carried out with local schools and other educational facilities prior to noise intensive works to ensure impacts are minimised during examination periods and/or other critical periods in the school calendar (where works are predicted to exceed the relevant construction noise management level for this receiver). • Consultation with nearby childcare centres would be carried out to potentially avoid noisy works during rest periods at the centres (where possible). • Simultaneous operation of noisy plant in close proximity to sensitive receptors would be avoided (where possible).	Partially addressed - **Section 5.3** discusses the coordination of OOHW by TfNSW to provide respite to sensitive receivers. **Section 6.1** discusses key points of the PLR CCS in relation to consulting and notifying the community and affected stakeholders of OOHW, respite provisions and the duration and impact of such works.

Condition Number	Condition	How Addressed
	• Equipment which is used intermittently would be shut down when not in use. • Where possible, the offset distance between noisy plant items and nearby noise sensitive receptors would be as great as possible. • Where possible, equipment with directional noise emissions would be oriented away from sensitive receptors. • Construction compounds would use 2.4 metre high hoarding of solid construction where required to minimise noise on sensitive receivers, where safe to do so. • Structures such as site sheds would be positioned to further shield sensitive and residential receivers from works activities. • Regular compliance checks for noise emissions from all plant and machinery used for the project would be carried out to indicate whether noise emissions from plant items are higher than predicted. This would also identify defective silencing equipment on the items of plant. • Ongoing noise monitoring would be carried out during construction at sensitive receptors during critical periods to identify and assist in managing high risk noise events. • Where possible heavy vehicle movements should be limited to daytime hours. • Reversing of equipment should be minimised so as to prevent nuisance caused by reversing alarms, which would be limited to the use of non-tonal reversing alarms. • Loading and unloading should be carried out away from sensitive receptors, where practicable. • Work should be scheduled to provide respite periods from the noisiest activities, and impacted residents should be communicated with to clearly explain the duration and noise levels for the works.	
REMMM NV-3	In the event of predicted exceedances of the noise goals, particularly during out-of-hours works, additional noise mitigation and management measures to be considered in the CNVMPs as described in the CNS. Additional mitigation and management measures would be determined on a site specific basis and are dependent upon the level of predicted impact. Additional mitigation and management measures which would be considered include: • Periodic notifications – These include regular newsletters, letterbox drops or advertisements in local papers to provide an overview of current and upcoming works and other topics of interest. • Website updates – The project website would form a resource for members of the community to seek further information, including CNVPs and current and upcoming construction activities. • Project info-line and construction response line – Transport for NSW will operate a construction response line and a project info-line (1800 775 465). These numbers will provide	**Section 7.1** commits to implementing the CNVS Additional Management Measures and refers to the applicability of Section 8.2 of the CNVS to OOHW.

Condition Number	Condition	How Addressed
	a dedicated 24-hour contact point for any complaints regarding construction works and for any project enquiries. All complaints require a verbal response within two hours. All enquiries require a verbal response within 24 hours during standard construction hours, or on the next working day during out-of-hours work (unless the enquirer agrees otherwise). • Email distribution list – An email distribution list would be used to disseminate project information to interested stakeholders. • Signage – Signage on construction sites would be provided to notify stakeholders of project details and project emergency or enquiry information. • Specific notifications – Specific notifications would be letterbox dropped or hand distributed to the nearby residences and other sensitive receptors no later than seven days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works. • Phone calls – Phone calls may be made to identified/affected stakeholders within seven days of proposed work. For these works considering the large numbers of receptors, phone calls are not likely to be considered a reasonable mitigation and management measure in all cases, but could be used to inform specific receptors if requested (after notification of the works as above). • Individual briefings – Individual briefings may be used to inform stakeholders about the impacts of high noise activities and mitigation and management measures that would be implemented. Communications representatives from the contractor(s) would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Considering the large numbers of potentially affected receptors, individual briefings may not be considered a reasonable mitigation and management measure in all cases, but could be used for specific receptors if requested (after notification of the works as above). • Monitoring – Ongoing noise monitoring during construction at sensitive receptors during critical periods would be used to identify and assist in managing high risk noise events. Monitoring of noise would also be carried out in response to complaints. All noise monitoring would be carried out by an appropriately trained person in the measurement and assessment of construction noise and vibration, who is familiar with the requirements • Project specific respite offer – Residents subjected to lengthy periods of noise or vibration may be eligible for a project specific respite offer. The purpose of such an offer is to provide residents with respite from an ongoing impact.	

Condition Number	Condition	How Addressed
REMMM NV-4	For sensitive receivers that operate outside standard construction hours, for example hospitals which operate on a 24-hour basis, feasible and reasonable noise mitigation options and measures would be developed in consultation with the sensitive receiver.	Partially addressed - The PLR CCS commits to consulting with affected stakeholders in relation to all work including OOHW. **Section 4.3.1** addresses agreement of working hours with businesses and other noise and vibration sensitive non-residential receivers.
REMMM NV-5	The use of noise intensive plant items would be scheduled for normal working hours. If the works cannot be carried out during the daytime, it has been recommended to complete them before 11 pm, where practicable. This would be particularly relevant for works impacting the following noise catchment areas (NCAs) where a number of activities have been predicted to result in high impacts on many residential receivers during the night-time: • NCA04 in the Westmead precinct • NCA06 and NCA07 in the Parramatta North precinct • NCA11 in the Rosehill and Camellia precinct.	**Section 2.3** discusses Highly Noise Intensive Work and the limitations to hours for this work as per Condition E27. **Section 5.1** discusses the planning of OOHW including a hierarchy of preferred working hours, which notes that noise intensive work/plant must be scheduled before 10pm where reasonable and feasible and where approved through this Protocol.
REMMM NV-6	Opportunities to reduce road traffic noise during construction would be investigated during construction planning, including restricting heavy vehicle movements to standard construction hours and/or to routes with fewer sensitive receivers.	**Section 5.1** discusses the consideration of road traffic noise caused by construction and the requirement to plan works in consideration of this REMMM. **Section 6.2** addresses consultation with the Sydney Coordination Office for truck movements in the Parramatta CBD.

Condition Number	Condition	How Addressed
REMMM NV-7	Where vibration intensive construction activities are proposed within 100 metres of sensitive receivers, these works would be confined to the less sensitive daytime period where possible. The potential impacts from vibration are to be considered in the site-specific Construction Noise and Vibration Impact Statements (to be developed during detailed design). In general, mitigation and management measures that would be considered include: • Relocate vibration generating plant and equipment to areas within the site in order to lower the vibration impacts. • Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment. • Use lower vibration generating items of excavation plant and equipment (e.g. smaller capacity rock breaker hammers). • Minimise consecutive works in the same locality (if applicable). • Use dampened rock breakers to minimise the impacts associated with rock breaking works. If vibration intensive works are required within the safe working distances, vibration monitoring or attended vibration trials would be carried out to ensure that levels remain below the cosmetic damage criterion. Building condition surveys would be completed both prior to the commencement of construction works and following the completion of construction works to identify existing damage and any damage due to the works. Measurements of existing ambient vibration levels would be carried out at receivers with vibration sensitive equipment during the detailed design. This information would be used to inform the site-specific Construction Noise and Vibration Impact Statements for works near these locations.	Partially addressed – **Section 2.3** discusses Highly Noise Intensive Work, including vibration intensive work and the limitations to hours for this work as per Condition E27. **Section 3.2** discusses the planning of OOHW including a hierarchy of preferred working hours, which notes that noise intensive work/plant, including those that will generate vibration (above the HVML) must be scheduled before 10pm where reasonable and feasible and where approved through this Protocol. Mitigation and management will be developed during the preparation of CNVIS and/or relevant CNVMP which must support OOHW Applications.
REMMM NV-8	Mitigation and management measures to address potential noise and vibration impacts to facilities within the Westmead Research Zone would be implemented during construction. Mitigation and management measures would be determined in consultation with the facility operator / owner and informed by the sensitivity of impacted spaces prior to the commencement of construction. The mitigation and management measures (in addition to those provided in NV-1 to NV-7) could include: • Consultation with the affected facilities to determine periods when noise and/or vibration intensive works can occur with least impact. • Relocation of vibration sensitive equipment to less impacted locations within the facilities. • Vibration isolation of sensitive equipment predicted to have potential impacts. • Unattended noise and vibration monitoring within the facilities to ensure noise and/or vibration levels are within acceptable levels.	Partially addressed – **Section 5.1** outlines a hierarchy of preferred working hours for OOHW which can be overridden by the outcomes of community consultation. The PLR CCS which is summarised in **Section 6.1** commits to consulting with affected sensitive receivers regarding OOHW to comply with Condition E39. Mitigation and management will be developed during the preparation of CNVIS and/or relevant CNVMP which must support OOHW Applications.

Condition Number	Condition	How Addressed
EPO-NV-1 Construction	Noise levels would be minimised with the aim of achieving the noise management levels where feasible and reasonable.	**Section 1.5.1** commits to implementing the CNVS Standard and Additional Management Measures to minimise noise and vibration impact and refers to the applicability of Sections 8.1 and 8.2 of the CNVS to PLR and OOHW. **Section 4** requires that OOHW be planned and assessed in alignment with the CNVS. The CNVS outlines the process for mitigating noise and vibration impacts with the aim of achieving noise and vibration management levels. Where exceedances occur, Additional Management Measures apply to manage residual noise and vibration impacts (CNVS Section 8.2).

Appendix C – Quantitative Risk Factors

Table C-1 Quantitative Noise Risk Assessment

Receiver Type	Receiver Perception[3]	Sensitive Periods	Associated risk level
All receiver types	Low impact (<NML)	Any period	Low Risk
Childcare	< 55 dBA	During centre operating hours	Low Risk
	> 55 dBA	Outside centre operating hours (e.g. Day (OOH), Evening and Night, holiday period). Noting operating hours can occur outside Standard Construction Hours	Low Risk
	> 55 dBA < 75 dBA	During centre operating hours (periods such as day sleep times, duration of works, and upper limits of noise should be also considered in the assessment)	Moderate Risk
	> 75dBA	During centre operating hours	High risk
Cinema	< 55dBA	During session times	Low Risk
	> 55dBA	Outside of session times	Low Risk
	> 55dBA < 75 dBA	During session times	Moderate Risk
	> 75dBA	During session times	High risk
Commercial – Office/retail	< 65dBA	Any period	Low Risk
	> 65dBA	Outside of trading / business hours	Low Risk
	> 65dBA < 70dBA	During trading / business hours	Moderate
	> 70dBA	During trading / business hours	High risk
Commercial – Industrial	< 75dBA	Any period	Low Risk
	> 75dBA	Outside operation periods of surrounding industrial receivers	Low Risk
	> 75dBA < 85dBA	During operation periods of surrounding industrial receivers	Moderate
	> 85dBA	During operation periods of surrounding industrial receivers	High risk

Receiver Type	Receiver Perception[3]	Sensitive Periods	Associated risk level
Commercial – Sensitive (e.g. Acoustic Space)	< 50dBA	During and outside facility operating periods	Low Risk
	> 50dBA	Outside facility operating periods	Low Risk
	> 50dBA	During facility operating periods that would not prevent the operation of facility (such as through agreed scheduling or respite periods)	Moderate Risk
	> 50dBA	During facility operating periods that would prevent the operation of facility (such as through agreed scheduling or respite periods)	High Risk
Hotel[4]	< 65 dBA	Any period	Low Risk
	> 65 dBA	Any period	Moderate Risk
	> Sleep disturbance	Night	High Risk
Educational institutions	< 55 dBA	Any period	Low Risk
	> 55 dBA	Outside core teaching and study hours	Low Risk
	> 55 dBA < 75 dBA	During core teaching and study hours	Moderate Risk
	> 75dBA	During core teaching and study hours	High risk
Medical	< 65 dBA	Any period	Low risk
	> 65 dBA	Day, Day (OOH), evening	Moderate Risk
		Nights	High Risk
	> 75 dBA	Any OOH works period	High Risk
Place of Worship	< 55dBA	Any period	Low Risk
	> 55dBA	Outside periods of worship, congregation or passive occupation	Low Risk
	> 55dBA	During periods of passive occupation	Moderate
	> 55dBA	During any periods of worship or congregation	High Risk

Receiver Type	Receiver Perception[3]	Sensitive Periods	Associated risk level
Recreation (Passive)	< 65dBA	During normal periods of use and special events	Low Risk
	> 65dBA	Outside normal periods of use and special events	Low Risk
	> 65 dBA < 85 dBA	During normal periods of use and special events	Moderate Risk
	>85 dBA	During normal periods of use and special events	High Risk
Recreation (Active)	< 65dBA	Day and evening	Low Risk
	> 65 dBA	Night and/or when not in use	Low Risk
	> 65 dBA < 85 dBA	Day, Day (OOH) and evening	Moderate Risk
	> 85 dBA	Day, Day (OOH) and evening	High risk
Residential	Noticeable - Moderately Intrusive[1]	Day	Low Risk
	Noticeable - Clearly audible[1]	Day (OOH), Evening	Low Risk
	Clearly audible - highly intrusive[1]	Day (OOH), Evening	Moderate
	Clearly audible[1]	Night	Moderate
	Moderately intrusive or above (sleep disturbance)[1]	Impacts that exceed the sleep disturbance criteria for more than two consecutive nights where alternate accommodation is feasible	Moderate
	Moderately intrusive or above (sleep disturbance)[1]	Impacts that exceed the sleep disturbance criteria for more than two consecutive nights without feasible alternate accommodation	High Risk
	Highly Intrusive[1]	Day	Moderate
		Day (OOH), Evening	High Risk
	< Established criteria[2]	Any period	Low Risk

Receiver Type	Receiver Perception[3]	Sensitive Periods	Associated risk level
Commercial - Sensitive Equipment	> Established criteria[2]	During agreed periods that would not prevent the operation of facility (such as through agreed scheduling or respite periods)	Moderate
	> Established criteria[2]	During periods that would be likely to prevent the operation of facility (such as through agreed scheduling or respite periods) or risk damage to the equipment or space	High Risk

1. Receiver perception levels for residential receivers as per Table 9 of the TfNSW CNVS.
2. Receiver perception level criteria established as part of the Assessment System and Baseline Study (as applicable to Cumberland and Westmead Health Precincts) or criteria established in consultation with affected receivers (applicable to other parts of the Project area).
3. External free field prediction or measure.
4. Alternate criteria may be proposed on case by case basis based on consultation and / or review of prevalent facade performance. Internal criteria to be agreed to by AA In accordance with Australian Standard, *AS2107:2016.*

Table C-2 Quantitative Vibration Risk Assessment

Receiver Type	Receiver Perception[1,2,]	Sensitive Periods	Associated risk level
All receiver types	<Preferred values	Any period	Low Risk
Childcare	<Preferred values	During centre operating hours	Low Risk
	>Maximum values	Outside centre operating hours (e.g. Day (OOH), Evening and Night, holiday period). Noting operating hours can occur outside Standard Construction Hours	Low Risk
	>Preferred values <Maximum values	During centre operating hours (periods such as day sleep times, duration of works, and upper limits of noise should be also considered in the assessment)	Moderate Risk
	>Maximum values	During centre operating hours	High risk
Cinema	<Preferred values	During session times	Low Risk
	>Maximum values	Outside of session times	Low Risk
	>Preferred values <Maximum values	During session times	Moderate Risk
	>Maximum values	During session times	High risk
Commercial – Office/retail	<Preferred values	Any period	Low Risk
	>Maximum values	Outside of trading / business hours	Low Risk
	>Preferred values <Maximum values	During trading / business hours	Moderate
	>Maximum values	During trading / business hours	High risk
Commercial – Industrial	<Preferred values	Any period	Low Risk
	>Maximum values	Outside operation periods of surrounding industrial receivers	Low Risk
	>Preferred values <Maximum values	During operation periods of surrounding industrial receivers	Moderate
	>Maximum values	During operation periods of surrounding industrial receivers	High risk

Receiver Type	Receiver Perception[1,2,]	Sensitive Periods	Associated risk level
Commercial – Sensitive (e.g. Acoustic Space)	<Preferred values	During and outside facility operating periods	Low Risk
	>Maximum values	Outside facility operating periods	Low Risk
	>Preferred values	During facility operating periods that would not prevent the operation of facility (such as through agreed scheduling or respite periods)	Moderate Risk
	>Preferred values	During facility operating periods that would prevent the operation of facility (such as through agreed scheduling or respite periods)	High Risk
Hotel	<Preferred values	Any period	Low Risk
	>Preferred values <Maximum values	Any period	Moderate Risk
	>Maximum values	Any period	High Risk
Educational institutions	<Preferred values	Any period	Low Risk
	>Maximum values	Outside operation periods of surrounding industrial receivers	Low Risk
	>Preferred values <Maximum values	During operation periods of surrounding industrial receivers	Moderate risk
	>Maximum values	During operation periods of surrounding industrial receivers	High Risk
Medical	<Preferred values	Any period	Low risk
	>Preferred values <Maximum values	Day, Day (OOH), evening	Moderate Risk
		Nights	High Risk
	>Maximum values	Any OOH works period	High Risk
Place of Worship	<Preferred values	Any period	Low Risk
	>Maximum values	Outside periods of worship, congregation or passive occupation	Low Risk
	>Preferred values <Maximum values	During periods of passive occupation	Moderate
	>Maximum values	During any periods of worship or congregation	High Risk

Receiver Type	Receiver Perception[1,2,]	Sensitive Periods	Associated risk level
Recreation (passive)	<Preferred values	During normal periods of use and special events	Low Risk
	>Maximum values	Outside normal periods of use and special events	Low Risk
	>Preferred values <Maximum values	During normal periods of use and special events	Moderate Risk
	>Maximum values	During normal periods of use and special events	High Risk
Recreation (Active)	<Preferred values	Day and evening	Low Risk
	>Maximum values	Night and/or when not in use	Low Risk
	>Preferred values <Maximum values	Day, Day (OOH) and evening	Moderate Risk
	>Maximum values	Day, Day (OOH) and evening	High risk
Residential	<Preferred values	Any period	Low Risk
	>Preferred values <Maximum values	Day (OOH), Evening	Moderate
	>Preferred values <Maximum values	Night	Moderate
	>Maximum values	Impacts that exceed the criteria for more than two consecutive nights where alternate accommodation is feasible	Moderate
	>Maximum values	Impacts that exceed the criteria for more than two consecutive nights without feasible alternate accommodation	High Risk
Commercial - Sensitive Equipment	< Established criteria[3]	Any period	Low Risk
	> Established criteria[3]	During agreed periods that would not prevent the operation of facility (such as through agreed scheduling or respite periods)	Moderate
	> Established criteria[3]	During periods that would be likely to prevent the operation of facility (such as through agreed scheduling or respite periods) or risk damage to the equipment or space	High Risk

1. Receiver perception levels as per criteria outlined in Table 3-2 of the Protocol.
2. Receiver perception covers human response to vibration only. Structural impacts would be considered separately as part of CNVMP(s) and CNVIS(s).
3. Receiver Perception level criteria established as part of the Assessment System and Baseline Study (as applicable to Cumberland and Westmead Health Precincts) or criteria established in consultation with affected receivers (applicable to other parts of the Project area).

Appendix D – ER and AA Endorsement

[redacted]

Attention: Transport for NSW (PLR)

Ref: OOHW_Protocol_AA_Endorsement_08Nov2019

07 November 2019

RE: PLR–HAC-HRW-NV_Rev1 (OOHW Protocol) - Adequacy for Submission (AA Review)

[redacted] BEng(Mech), MAAS, RPEQ 09343, appointed Acoustic Advisor (AA), reviewed the following documentation with regard to the PLR – Stage 1 project:

Title:	Document Reference:	Version Status
Parramatta Light Rail – Stage 1 Out-of-hours work protocol	PLR-TFNSW-CBD-PE-FRM-000002	Revision 8.6, 08 Nov 2019
PLR Out-Of-Hours Work Protocol Form	PLR-TFNSW-CBD-PE-FRM-000001	Revision 5.1

Pursuant to Conditions of Approval A29, the review confirms the documents have been reviewed for consistency by the AA, and the document remains in agreement with the acoustic requirements of the Terms of Approval (NSW Government – Infrastructure Approval (Application No.: SSI 8285)), as well as best practice methodologies for acoustics.

Yours sincerely
for [redacted]

[redacted] BE(Mech), MAAS, RPEQ
Senior Environmental Engineer

Note: All professional advice provided by [redacted], including any information contained in this letter, is subject to the terms of the Disclaimer shown on our website at [redacted]

[redacted]

12 November 2019

Transport for NSW

Attention to: [redacted]
A/Senior Manager Environment
Parramatta Light Rail
130 George St, Parramatta, NSW 2150

Review of Parramatta Light Rail (Stage 1)
Out of Hours Work Protocol

Pursuant to SSI8285 Condition of Approval A23 (d) i), as the approved Environmental Representative, I confirm that I have reviewed the updated Parramatta Light Rail (Stage 1) Out of Hours Work Protocol (PLR-TFNSW-CBD-PE-FRM-000002), revision 8.7, dated 8 November 2019, and the PLR OOHW Protocol Form Rev 5 (PLR-TFNSW-CBD-PE-FRM-000001), prepared by Transport for New South Wales, for consistency with the requirements of the Conditions of Approval.

In my opinion the updated aforementioned document is consistent with the requirements included in or required under the terms of the Conditions of Approval for the Parramatta Light Rail (Stage 1) development.

Yours sincerely,

[redacted]

[redacted]
Environmental Representative
[redacted]

[redacted]

[redacted]

Appendix E – DPIE Approval

Planning, Industry & Environment

Our ref: SSI 8285

[redacted]
Director Planning, Environment and Sustainability
Transport for NSW

Locked Bag 5085
PARRAMATTA NSW 2124

BY EMAIL ONLY: [redacted]

Dear [redacted]

Approval of Parramatta Light Rail – Stage 1 Out of Hours Work Protocol: Condition C8: Parramatta Light Rail Stage 1 (SSI 8285)

I refer to your submission dated 12 November 2019 requesting approval of the Parramatta Light Rail – Stage 1 Out of Hours Work Protocol (OOHWP) revision 8.8, dated November 2019, in accordance with condition E28 of SSI 8285.

I note that the OOHWP has been prepared in consultation with the Acoustics Advisor (AA), and the Environmental Representative (ER), and both have endorsed the document as follows:

- AA endorsement dated 7 November 2019
- ER endorsement dated 12 November 2019.

As delegate of the Planning Secretary, I approve the Parramatta Light Rail – Stage 1 Out Of Hours Works Protocol revision 8.8, pursuant to condition E28.

You are reminded that if there is any inconsistency between the approved OOHWP and the conditions of approval, then the requirements of the conditions of approval will prevail.

Please ensure that you make the approved OOWHP publicly available on the project website, before the commencement of any works to which it relates as required by condition B11.

If you have any questions, please contact [redacted]

Yours sincerely,

[redacted] 27/11/2019

[redacted]

Director
Infrastructure Assessments, Infrastructure Management

As delegate of the Planning Secretary

Copied to:

[redacted]

W Parramattalightrail.nsw.gov.au
E Parramattalightrail@transport.nsw.gov.au
T 1800 139 389
Address: Level 10, 130 George Street Parramatta 2150

Appendix B – Land Use Survey

Appendix B-1 – Land use survey

Appendix B-2 – Heritage items

Heritage items identified within the cosmetic damage screening criteria minimum working distances in the EIS: Technical Paper – Noise and Vibration Impact Assessment (Table 58) are presented in Table B-1.

Table B-1: Heritage Items Identified within Cosmetic Damage Minimum Safe Working Distance (from the EIS: Technical Paper – Noise and Vibration Impact Assessment, with additional items identified for NCA05 and NCA12A)

NCA	Item	Location
NCA05	Cumberland Hospital including Wisteria Gardens	Cumberland Hospital (West)
NCA06	Stone kerbing and tree planting	Fleet Street
NCA06	Heritage brick drain	Cumberland Hospital (East)
NCA06	Cumberland Hospital including Wisteria Gardens	Cumberland Hospital (East)
NCA07	Norfolk House and potential archaeological site	Church Street
NCA07	Single storey residence and potential archaeological site	Church Street
NCA07	Roman Catholic Cemetery	Church Street
NCA07	Former bakery and potential archaeological site	Church/Harold Street
NCA07	Bicycle shop	Church/ Fennell Street
NCA07	Shop	Church Street
NCA07	Commercial building	Church Street
NCA07	Stable and potential archaeological site	Church Street
NCA08	Alfred Square and potential archaeological site	Church Street
NCA08	Anthony Malouf and Co	Church Street
NCA08	Horse Trough	Church Street
NCA08	Lennox Bridge	Church Street
NCA08	Royal Oak Hotel and stables and potential archaeological site	Church/Ross Street
NCA08	St Peter's Uniting Church and potential archaeological site	Church/Palmer Street

NCA	Item	Location
NCA09	Archaeological terrestrial	Church Street
NCA09	Former ANZ bank and potential archaeological site	Church Street
NCA09	Sandstone and brick wall	Church Street
NCA09	Telstra House (former post office) and potential archaeological site	Church Street
NCA09	HMV (former Commonwealth Bank) and potential archaeological site	Church Street
NCA09	Archaeological/terrestrial	Church Street
NCA09	Various Shops	Church Street
NCA09	Parramatta House and potential archaeological site	Church Street
NCA09	Archaeological/terrestrial	Church Street
NCA09	Shop and potential archaeological site	Church Street
NCA09	Shops and potential archaeological site	Church Street
NCA09	Former court house wall, sandstone cellblock and potential archaeological site	Church Street
NCA09	Horse parapet facade and potential archaeological site	Church Street
NCA09	Archaeological/terrestrial	Church Street
NCA09	Shop and potential archaeological site	Church Street
NCA09	Shop, office and potential archaeological site	Church Street
NCA09	Shop and potential archaeological site	Church Street
NCA09	Shop and potential archaeological site	Church Street
NCA09	Shop and potential archaeological site	Church Street
NCA09	Westpac Bank	Church Street
NCA09	Shop and potential archaeological site	Church Street
NCA09	Former David Jones Department Store	Church Street
NCA09	Shops and offices	Church Street
NCA10	Bicentennial Square and adjoining buildings	Macquarie Street
NCA10	Convict barracks wall	Macquarie Street

NCA	Item	Location
NCA10	Kia Ora and potential archaeological site	Macquarie Street
NCA10	Bicentennial Square and adjoining buildings	Macquarie Street
NCA10	Convict drain	Macquarie Street
NCA10	Centennial memorial clock	Macquarie Street
NCA10	Arthur Phillip High School and potential archaeological site	Macquarie Street
NCA10	Murrays' Building and potential archaeological site	Macquarie Street
NCA10	Leigh memorial Uniting Church	Macquarie Street
NCA10	Cottages and potential archaeological site	Barrack Lane
NCA10	Convict barracks wall	Barrack Lane
NCA10	Robin Thomas Reserve	Harris Street
NCA10	HMAS Parramatta shipwreck and memorials	George Street
NCA10	Tara (also known as Ellengowan)	George Street
NCA10	Queen's Wharf Reserve and stone wall and potential archaeological site	George Street
NCA11	Cottage	George Street
NCA11	Trees in median strip	George Street
NCA11	Bulimba	George Street
NCA11	Residential flats and houses	George Street
NCA12	Sewage Pumping Station 67	Grand Avenue
NCA12	Tram alignment	Grand Avenue
NCA12	Grave of Eliner Magee & child	Carlingford Line
NCA12	Clyde Carlingford Rail Bridge abutments	Carlingford Line
NCA12A	Granville Town Hall, 10 Carlton Street, Granville	Rosehill and Camellia
NCA12A	The Barn, 138 Parramatta Road, Granville	Rosehill and Camellia
NCA12A	Chateau Blanc, 51 South Street, Granville	Rosehill and Camellia
NCA12A	3-5 A'Beckett Street, Granville	Rosehill and Camellia

NCA	Item	Location
NCA12A	Latalda, 20 A'Beckett Street, Granville	Rosehill and Camellia
NCA12A	Conjoined residences, 22, 24 A'Beckett Street, Granville	Rosehill and Camellia
NCA12A	Conjoined residences, 42 Onslow Street, Granville	Rosehill and Camellia
NCA12A	Conjoined residences, 34, 36 Kemp Street, Granville	Rosehill and Camellia
NCA12A	Duck Creek Bridge, Great Western Highway, Granville	Rosehill and Camellia
NCA12A	Granville Boys High School, 10 Mary Street, Granville	Rosehill and Camellia
NCA12A	Granville Marsh Brothers Tannery Archaeological Site, Junction of main western line and Carlingford branch line, Duck Creek Near Memorial Drive	Rosehill and Camellia
NCA12A	Granville Railway Station Group, Bridge Street, Granville	Rosehill and Camellia
NCA12A	Granville RSL Club, 5 Memorial Drive, Granville	Rosehill and Camellia
NCA12A	Granville Swimming Pool, 1 Memorial Drive, Granville	Rosehill and Camellia
NCA12A	Granville War Memorial, 1 Memorial Drive, Granville	Rosehill and Camellia
NCA12A	Monuments, 5 Memorial Drive, Granville	Rosehill and Camellia
NCA12A	Mount Beulah Hall, 37 Cowper Street, Granville	Rosehill and Camellia
NCA12A	Parramatta Archaeological Management Unit 3047, Parramatta Road, Granville	Rosehill and Camellia
NCA12A	Rosehill Hotel, 91 Parramatta Road, Granville	Rosehill and Camellia
NCA12A	Shop (former), 6-8 Factory Street, Granville	Rosehill and Camellia
NCA12A	Terrace Housing, 5-23 Arthur Street, Granville	Rosehill and Camellia
NCA14	Wetlands	Carlingford Line
NCA14	UWS Parramatta Campus (former Rydalmere Hospital & Female Orphan School)	Carlingford Line
NCA14	Clyde Carlingford Rail Bridge abutments	Carlingford Line
NCA15	Dundas Railway Station Group	Carlingford Line
NCA16	Victorian house	Carlingford Line
NCA18	K13 Memorial	Carlingford Line

NCA	Item	Location
NCA19	Carlingford Stock Feeds	Carlingford Line

Appendix C – Noise management level and rating background level **by NCA**

Table C-1: Noise management level and rating background level by noise catchment area

Precinct	NCA	Rating Background Level (RBL) $L_{A90(15min)}$, dB(A)			Construction Noise Management Level $L_{Aeq(15min)}$, dB(A)				Sleep disturbance NML $L_{A1(1min)}$, dB(A)	
		Day	Eve	Night	Day	Day (OOH)	Eve	Night	Screening	Maximum
Westmead	NCA01	49	47	37	59	54	52	42	52	65
	NCA02	51	48	43	61	56	53	48	58	65
	NCA03	51	48	43	61	56	53	48	58	65
	NCA04	49	48	47	59	54	53	52	62	65
	NCA05	49	48	47	59	54	53	52	62	65
Parramatta North	NCA06[1]	42	41	44	52	47	46	46[1]	56	65
	NCA07	51	50	39	61	56	55	44	54	65
Parramatta CBD	NCA08	59	57	46	69	64	62	51	61	65
	NCA09	58	53	43	68	63	58	48	58	65
	NCA10	43	40	34	53	48	45	39	49	65

Precinct	NCA	Rating Background Level (RBL) $L_{A90(15min)}$, dB(A)			Construction Noise Management Level $L_{Aeq(15min)}$, dB(A)				Sleep disturbance NML $L_{A1(1min)}$, dB(A)	
		Day	Eve	Night	Day	Day (OOH)	Eve	Night	Screening	Maximum
Rosehill and Camellia	NCA11	43	40	34	53	48	45	39	49	65
	NCA12	51	48	41	61	56	53	46	56	65
	NCA12A[1]	43	45	42	53	48	48[1]	47	57	65
	NCA13	51	48	41	61	56	53	46	56	65
Carlingford	NCA14	45	43	38	55	50	48	43	53	65
	NCA15	45	43	37	55	50	48	42	52	65
	NCA16	46	42	34	56	51	47	39	49	65
	NCA17	43	40	31	53	48	45	36	46	65
	NCA18	42	40	32	52	47	45	37	47	65
	NCA19	52	47	39	62	57	52	44	54	65

Notes:

1. Monitored evening or night-time level was found to be higher than the respective evening or daytime level. In line with the direction in Section 2.3 of the NPfI, as the community generally expects greater control of noise during the more sensitive evening and night-time periods than during the less sensitive daytime period, the project noise management levels for evening are set at no greater than daytime level, and the night-time is set to be no greater than the day or evening levels.

Appendix D – Construction predicted noise levels (worst case)

Figure D-1: EIS: Technical Paper – Noise and Vibration Impact Assessment, Table 15 - Construction Activities and Period of Construction

(Blue boxes indicate EIS scenarios equivalent to SOM works)

Scenario	Works ID	Indicative Duration (Weeks)[1]	Activity	Hours of Works[2]			
				Std. Day	Day OOH	Eve	Night
Demolition	W.0001	8	Demolition	✓			
	W.0002	12	Demolition (with Breaker)	✓			
Compounds – 24/7 Operation	W.0003	2	Site Establishment	✓	✓	✓	✓
	W.0004	6	Services & Utilities	✓	✓	✓	✓
	W.0005	2	Hoarding	✓	✓	✓	✓
	W.0006	6	Site Deliveries	✓	✓	✓	✓
Compounds – Daytime Only	W.0007	12	Site Establishment	✓			
	W.0008	12	Services & Utilities	✓			
	W.0009	12	Hoarding	✓			
	W.0010	190	Site Deliveries	✓			
Spoil & Ballast Recycling	W.0011	24	Screening & Crushing	✓	✓	✓	✓
Substations	W.0012	10	Site Establishment	✓			
	W.0013	20	Construction & Installation	✓			
Mainline – Embedded Track	W.0014	40	Earthworks	✓	✓	✓	✓
	W.0015	20	Earthworks (with Breaker/saw)	✓	✓	✓	✓
	W.0016	40	Concrete Works	✓	✓	✓	✓
	W.0017	40	Trackworks	✓	✓	✓	✓
	W.0018	12	Steel Erection & Wiring	✓	✓	✓	✓
Mainline – Ballast Track	W.0019	20	Earthworks	✓			
	W.0020	12	Concrete Works	✓			
	W.0021	12	Trackworks	✓			
	W.0022	8	Trackworks - Tamping	✓			
	W.0023	10	Steel Erection & Wiring	✓			
Stops	W.0024	20	Excavation	✓			
	W.0025	10	Excavation (with Breaker/saw)	✓			
	W.0026	30	Concrete Works	✓			
	W.0027	16	Finishing Works	✓			
Bridges	W.0028	12	Site Establishment	✓	✓	✓	✓
	W.0029	20	Piling	✓	✓	✓	✓
	W.0030	50	Construction & Installation	✓	✓	✓	✓
	W.0031	50	Concrete Works	✓			
Stabling and Maintenance Facility	W.0032	10	Piling	✓	✓	✓	✓
	W.0033	30	Concrete Works	✓	✓	✓	✓
	W.0034	10	Steel Erection	✓	✓	✓	✓
Off Corridor Roadworks	W.0035	20	Excavation	✓	✓	✓	✓
	W.0036	10	Excavation (with Breaker)	✓	✓	✓	✓
	W.0037	20	Pavement Works	✓	✓	✓	✓
	W.0038	8	Signage and Line Marking	✓	✓	✓	✓

Note 1: Durations should be regarded as indicative and represent typical works.

Note 2: OOH = Out of hours. During the daytime this refers to the period on Saturday between 7am – 8am and 1pm – 6pm, on Sunday and public holidays between 8am – 6pm.

Notes for the following prediction tables

The works scenarios developed for the EIS: Technical Paper – Noise and Vibration Impact Assessment that are applicable for the SOM works are indicated in blue boxes in Figure D-1. These works scenarios are used to provide indicative noise impacts from the SOM works at the worst impacted receivers based upon the scenarios developed for the EIS: Technical Paper – Noise and Vibration Impact Assessment.

Note 1:

Colouring indicates the predicted NML exceedances (see legend) based on the worst-case predicted noise level for the appropriate receiver type.

Note 2:

NCA12A was not presented in the EIS and so predictions are not available. See Section 5.1 and 5.2 for further information.

Table D-1: EIS: Technical Paper – Noise and Vibration Impact Assessment, Table 19: Predicted Worst-case Noise Levels from Project – All Works and All NCAs – Residential Standard Daytime (relevant to SOM works)

Precinct	NCA	NML	W.0006 - Site Deliveries	W.0010 - Site Deliveries	W.0012 - Site Establishment	W.0013 - Construction & Installation	W.0018 - Steel Erection & Wiring	W.0023 - Steel Erection & Wiring	W.0027 - Finishing Works	W.0032 - Pilling	W.0033 - Concrete Works	W.0034 - Steel Erection	W.0038 - Signage and Line Marking
Westmead	NCA01	59	49	<30	45	51	51	<30	55	<30	<30	<30	43
	NCA02	-	-	-	-	-	-	-	-	-	-	-	-
	NCA03	61	66	<30	65	71	75	<30	59	<30	<30	<30	70
	NCA04	59	51	74	34	40	76	<30	75	<30	<30	<30	74
	NCA05	59	61	38	30	36	69	<30	43	<30	<30	<30	70
Parr. N	NCA06	52	52	<30	51	57	75	<30	73	<30	<30	<30	72
	NCA07	61	67	<30	66	72	74	<30	75	<30	<30	<30	74
Parr. CBD	NCA08	69	59	<30	33	39	75	<30	67	<30	<30	<30	72
	NCA09	68	46	<30	45	51	77	<30	79	<30	<30	<30	75
	NCA10	53	42	33	35	41	53	44	51	<30	<30	<30	48
Rosehill & C	NCA11	53	64	<30	38	44	74	41	77	<30	<30	<30	43
	NCA12	61	39	<30	41	47	72	41	57	44	38	37	34
	NCA12A	-	-	-	-	-	-	-	-	-	-	-	-
	NCA13	-	-	-	-	-	-	-	-	-	-	-	-
Carlingford	NCA14	55	33	64	32	38	33	60	64	<30	<30	<30	<30
	NCA15	55	34	65	59	65	<30	76	77	<30	<30	<30	<30
	NCA16	56	<30	72	45	51	<30	76	56	<30	<30	<30	<30
	NCA17	53	<30	68	66	72	<30	74	71	<30	<30	<30	<30
	NCA18	52	<30	46	49	55	<30	76	50	<30	<30	<30	<30
	NCA19	62	<30	70	64	70	<30	68	72	<30	<30	<30	<30

Table D-2: EIS: Technical Paper – Noise and Vibration Impact Assessment, Table 20: Predicted Worst-case Noise Levels from Project – All Works and All NCAs – Residential Evening (relevant to SOM works)

Precinct	NCA	NML	W.0006 - Site Deliveries	W.0010 - Site Deliveries	W.0012 - Site Establishment	W.0013 - Construction & Installation	W.0018 - Steel Erection & Wiring	W.0023 - Steel Erection & Wiring	W.0027 - Finishing Works	W.0032 - Pilling	W.0033 - Concrete Works	W.0034 - Steel Erection	W.0038 - Signage and Line Marking
Westmead	NCA01	52	49	-	-	-	51	-	-	<30	<30	<30	43
	NCA02	-	-	-	-	-	-	-	-	-	-	-	-
	NCA03	53	66	-	-	-	75	-	-	<30	<30	<30	70
	NCA04	53	51	-	-	-	76	-	-	<30	<30	<30	74
	NCA05	53	61	-	-	-	69	-	-	<30	<30	<30	70
Parr. N	NCA06	46	52	-	-	-	75	-	-	<30	<30	<30	72
	NCA07	55	67	-	-	-	74	-	-	<30	<30	<30	74
Parr. CBD	NCA08	62	59	-	-	-	75	-	-	<30	<30	<30	72
	NCA09	58	46	-	-	-	77	-	-	<30	<30	<30	75
	NCA10	45	42	-	-	-	53	-	-	<30	<30	<30	48
Rosehill & C	NCA11	45	64	-	-	-	74	-	-	<30	<30	<30	43
	NCA12	53	39	-	-	-	72	-	-	44	38	37	34
	NCA12A	-	-	-	-	-	-	-	-	-	-	-	-
	NCA13	-	-	-	-	-	-	-	-	-	-	-	-
Carlingford	NCA14	48	33	-	-	-	33	-	-	<30	<30	<30	<30
	NCA15	48	34	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA16	47	<30	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA17	45	<30	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA18	45	<30	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA19	52	<30	-	-	-	<30	-	-	<30	<30	<30	<30

Table D-3: EIS: Technical Paper – Noise and Vibration Impact Assessment, Table 21: Predicted Worst-case Noise Levels from Project – All Works and All NCAs – Residential Night-time (relevant to SOM works)

Precinct	NCA	NML	W.0006 - Site Deliveries	W.0010 - Site Deliveries	W.0012 - Site Establishment	W.0013 - Construction & Installation	W.0018 - Steel Erection & Wiring	W.0023 - Steel Erection & Wiring	W.0027 - Finishing Works	W.0032 - Pilling	W.0033 - Concrete Works	W.0034 - Steel Erection	W.0038 - Signage and Line Marking
Westmead	NCA01	42	49	-	-	-	51	-	-	<30	<30	<30	43
	NCA02	-	-	-	-	-	-	-	-	-	-	-	-
	NCA03	48	66	-	-	-	75	-	-	<30	<30	<30	70
	NCA04	52	51	-	-	-	76	-	-	<30	<30	<30	74
	NCA05	52	61	-	-	-	69	-	-	<30	<30	<30	70
Parr. N	NCA06	46	52	-	-	-	75	-	-	<30	<30	<30	72
	NCA07	44	67	-	-	-	74	-	-	<30	<30	<30	74
Parr. CBD	NCA08	51	59	-	-	-	75	-	-	<30	<30	<30	72
	NCA09	48	46	-	-	-	77	-	-	<30	<30	<30	75
	NCA10	39	42	-	-	-	53	-	-	<30	<30	<30	48
Rosehill & C	NCA11	39	64	-	-	-	74	-	-	<30	<30	<30	43
	NCA12	46	39	-	-	-	72	-	-	44	38	37	34
	NCA12A	-	-	-	-	-	-	-	-	-	-	-	-
	NCA13	-	-	-	-	-	-	-	-	-	-	-	-
Carlingford	NCA14	43	33	-	-	-	33	-	-	<30	<30	<30	<30
	NCA15	42	34	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA16	39	<30	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA17	36	<30	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA18	37	<30	-	-	-	<30	-	-	<30	<30	<30	<30
	NCA19	44	<30	-	-	-	<30	-	-	<30	<30	<30	<30

Table D-4: EIS: Technical Paper – Noise and Vibration Impact Assessment, Table 22: Predicted Worst-case Noise Levels from Project – All Works and All NCAs – Commercial (relevant to SOM works)

Precinct	NCA	NML	W.0006 - Site Deliveries	W.0010 - Site Deliveries	W.0012 - Site Establishment	W.0013 - Construction & Installation	W.0018 - Steel Erection & Wiring	W.0023 - Steel Erection & Wiring	W.0027 - Finishing Works	W.0032 - Pilling	W.0033 - Concrete Works	W.0034 - Steel Erection	W.0038 - Signage and Line Marking
Westmead	NCA01	70	38	<30	37	43	36	<30	40	<30	<30	<30	40
	NCA02	70	44	37	<30	30	67	<30	59	<30	<30	<30	50
	NCA03	70	71	31	67	73	77	<30	77	<30	<30	<30	43
	NCA04	70	-	-	-	-	-	-	-	-	-	-	-
	NCA05	70	-	-	-	-	-	-	-	-	-	-	-
Parr. N	NCA06	70	42	31	41	47	50	<30	52	<30	<30	<30	71
	NCA07	70	67	30	66	72	74	<30	77	<30	<30	<30	71
Parr. CBD	NCA08	70	72	30	<30	35	76	<30	77	<30	<30	<30	73
	NCA09	70	73	<30	72	78	78	<30	82	<30	<30	<30	75
	NCA10	70	-	-	-	-	-	-	-	-	-	-	-
Rosehill & C	NCA11	70	59	<30	36	42	73	41	76	<30	<30	<30	36
	NCA12	70	47	34	49	55	73	69	69	64	58	57	33
	NCA12A	70	-	-	-	-	-	-	-	-	-	-	-
	NCA13	70	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Carlingford	NCA14	70	45	71	35	41	41	65	68	44	38	37	<30
	NCA15	70	34	70	67	73	<30	70	59	<30	<30	<30	<30
	NCA16	70	<30	44	43	49	<30	50	54	<30	<30	<30	<30
	NCA17	70	<30	58	55	61	<30	67	71	<30	<30	<30	<30
	NCA18	70	<30	47	57	63	<30	67	60	<30	<30	<30	<30
	NCA19	70	<30	74	66	72	<30	76	80	<30	<30	<30	<30

Table D-5: EIS: Technical Paper – Noise and Vibration Impact Assessment, Table 23: Predicted Worst-case Noise Levels from Project – All Works and All NCAs – Other Sensitive (relevant to SOM works)

Precinct	NCA	NML[1]	W.0006 - Site Deliveries	W.0010 - Site Deliveries	W.0012 - Site Establishment	W.0013 - Construction & Installation	W.0018 - Steel Erection & Wiring	W.0023 - Steel Erection & Wiring	W.0027 - Finishing Works	W.0032 - Pilling	W.0033 - Concrete Works	W.0034 - Steel Erection	W.0038 - Signage and Line Marking
Westmead	NCA01	-	45	<30	37	43	47	<30	51	<30	<30	<30	30
	NCA02	-	60	49	55	61	74	<30	66	<30	<30	<30	51
	NCA03	-	73	<30	72	78	76	<30	70	<30	<30	<30	48
	NCA04	-	33	<30	30	36	74	<30	66	<30	<30	<30	62
	NCA05	-	66	61	34	40	76	<30	73	<30	<30	<30	59
Parr. N	NCA06	-	64	31	42	48	79	<30	81	<30	<30	<30	54
	NCA07	-	65	<30	<30	35	77	<30	74	<30	<30	<30	72
Parr. CBD	NCA08	-	68	<30	30	36	75	<30	60	<30	<30	<30	72
	NCA09	-	67	<30	61	67	79	35	82	<30	<30	<30	75
	NCA10	-	36	<30	<30	<30	47	<30	48	<30	<30	<30	46
Rosehill & C	NCA11	-	-	-	-	-	-	-	-	-	-	-	-
	NCA12	-	42	<30	39	45	57	41	53	43	37	36	33
	NCA12A	-	-	-	-	-	-	-	-	-	-	-	-
	NCA13	-	-	-	-	-	-	-	-	-	-	-	-
Carlingford	NCA14	-	59	57	38	44	42	71	60	40	34	33	<30
	NCA15	-	<30	48	37	43	<30	53	48	<30	<30	<30	<30
	NCA16	-	<30	44	43	49	<30	49	52	<30	<30	<30	<30
	NCA17	-	<30	45	36	42	<30	50	47	<30	<30	<30	<30
	NCA18	-	<30	36	37	43	<30	45	41	<30	<30	<30	<30
	NCA19	-	<30	58	54	60	<30	65	69	<30	<30	<30	<30

Note 1: 'Other sensitive' receiver NMLs are dependent on classification. The most affected 'other sensitive' receiver type may change between each activity resulting in

Appendix E – Acoustic Advisor and Environmental Representative endorsement

Air Noise Environment Pty Ltd

Level 6, 69 Reservoir Road
Surry Hills
NSW 2010
T: 02 8217 0706
E: nsw@ane.com.au

ACN 081 834 513
ABN 13 081 834 513

Attention: Transport for NSW (PLR)

Ref: 5518_PLR1SOM-CNVM Sub Plan_Rev4.1_20Nov2023_AA_Endorsement
22 November 2023

RE: PLR1SOM–GLR-ALL-PM-PLN-000034 Construction Noise and Vibration Management Plan Rev 4.1 November 2023 - Adequacy for Submission (AA Review)

[redacted] BEng(Mech), MAAS, RPEQ 09343, appointed Acoustic Advisor (AA), reviewed the following documentation with regard to the PLR – Stage 1 project:

Title:	Document Reference:	Version Status	Review Date
Construction Noise and Vibration Management (CNVMP), Supply, Operate, Maintain (SOM) Package Parramatta Light Rail – Stage 1, (ISD-17-6720)	PLR1SOM–GLR-ALL-PM-PLN-000034 (Rev F)	Revision F, 29 Oct 2020	06-11-2020
	PLR1SOM–GLR-ALL-PM-PLN-000034 Rev 3	Revision 3, 14 Jul 2022	26-07-2022
	PLR1SOM–GLR-ALL-PM-PLN-000034 Rev 4	Revision 4.1, 20 Nov 2023	22-11-2023 (**current**)
CoA A5 Consultation Report – Construction Noise and Vibration Management Plan, Supply, Operate, Maintain (SOM) Package 5 Parramatta Light Rail – Stage 1,	PLR1SOM-GLR-ALL-EN-RPT-001004 Rev 1	Revision 1 22 Nov 2023	22-11-2023 (**current**)

Pursuant to the requirements of the Conditions of Approval for the CSSI-8285, including A29(e), the CNVIS documents identified above have been reviewed by the AA for consistency with the CNVS and requirements of the CoA and EPL (Environmental Protection Licence – 21347, 3-Jan-2020).

The review confirms the document has incorporated the recommendations and changes requested by DPE and updates necessary to the document to reflect the EPL conditions.

The AA review completed, has identified that the document meets the acoustic requirements of the Terms of Approval (NSW Government – Infrastructure Approval (Application No.: SSI 8285)), requirements of the EPL, as well as best practice methodologies for acoustics.

Yours sincerely
for Air Noise Environment Pty Ltd
[redacted] BE(Mech), MAAS, RPEQ
Senior Environmental Engineer

Note: All professional advice provided by Air Noise Environment, including any information contained in this letter, is subject to the terms of the Disclaimer shown on our website at www.ane.com.au/disclaimer.html

The APP Group

Level 7, 116 Miller St
North Sydney NSW 2060

(02) 9957 6211
enquiries@app.com.au

REF: AQ1148.05 PLR GLR CNVMP rev4 endorsement 231122

Monday 22nd November 2023

[redacted]
[redacted]
Transport for NSW
Parramatta Light Rail

Re: Parramatta Light Rail, Construction Noise and Vibration Management Plan. Supply, Operate, Maintain (SOM) Package

Pursuant to SSI8285 Condition of Approval A23 (d) ii), as the approved Environmental Representative, I confirm that I have reviewed the following updated documents for continued consistency with the requirements of the Conditions of Approval.:

- Construction Noise and Vibration Management Plan (CNVMP), Supply, Operate, Maintain (SOM) Package - Parramatta Light Rail (PLR1SOM-GLR-ALL-PM-PLN-000034 Rev 4.1), dated 20/11/2023, and
- CoA A5 Consultation Report – Construction Noise and Vibration Management Plan, Supply, Operate, Maintain (SOM) Package 5 - Parramatta Light Rail (PLR1SOM-GLR-ALL-EN-RPT-001004 Rev 1), dated 22/11/2023

In my opinion the aforementioned updated documents are consistent with the requirements included in or required under the terms of the Conditions of Approval for the Parramatta Light Rail (Stage 1) development.

These documents have been updated to include the testing and commissioning scope of works associated with the SOM package.

Yours sincerely,

[redacted]
Environmental Representative
The APP Group

[redacted]
[redacted]@app.com.au

Appendix F – Noise and Vibration Monitoring Program

Parramattalightrail.nsw.gov.au
Parramattalightrail@transport.nsw.gov.au
1800 139 389
Level 4, 4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150