BRIDGE 09 MINOR CONSTRUCTION ANCILLARY FACILITY CHECKLIST

FOR

M12 Motorway (Central), Badgerys Creek and the Water Tower Access Road, Cecil Hills

Contract No: 20.0000303606.2284

Transport for New South Wales

DOCUMENT CONTROL

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REVISION REGISTER

REVISION	REV DATE	REVISION DETAILS
A	15/03/2024	Initial Submission

TABLE OF CONTENTS

Page

1 INTRODUCTION

1.1 Purpose

The purpose of this Ancillary Facility Checklist is to assess the compliance of the proposed minor ancillary facility at Bridge 09, adjacent Elizabeth Drive with the relevant Conditions of Approval (CoA) of the Planning Approval for the M12 Motorway (SSI 9364) and TfNSW QA Specification G36 Environmental Management.

1.2 Definitions

TERM	DEFINITION
Environmental Assessment Documentation	The Project was assessed as part of an EIS, Submission Report, Amendment Report, ARSR, ARSR amendment report and the M12 Motorway – Central Section Detailed Design Consistency Assessment (October 2021) which are herein collectively referred to as the Environmental Assessment Documentation.
Construction	Includes all activities required to construct the CSSI as described in the documents listed in **Condition A1,** including commissioning trials of equipment and temporary use of any part of the CSSI, but excluding **Low Impact Work** which is carried out or completed prior to approval of the CEMP, works approved under a **Site Establishment Management Plan,** demolition of acquired residential houses, structures and sheds, and works specified in **Appendix B** and approved under an environmental management plan(s) in accordance with **Condition A24**.

TERM	DEFINITION
Construction ancillary facility	A temporary facility for construction of the CSSI including an office and amenities compound, construction compound, material crushing and screening plant, concrete and asphalt batching plant, materials storage compound, maintenance workshop, testing laboratory, material stockpile area, access and car parking facilities and utility connections to the facility.

TERM	DEFINITION
Construction boundary	The area physically affected by works as described in the documents listed in **Condition A1**.

TERM	DEFINITION
Heavy Vehicle	Has the same meaning as in the *Heavy Vehicle National Law 2013* (NSW).
Highly noise affected	As defined in the *Interim Construction Noise Guideline* (DECC, 2009).

TERM	DEFINITION
Highly noise intensive works	Works which are defined as annoying under the *Interim Construction Noise Guideline* (DECC, 2009) including: (a) use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work; (b) grinding metal, concrete or masonry; (c) rock drilling; (d) line drilling; (e) vibratory rolling; (f) bitumen milling or profiling; (g) jackhammering, rock hammering or rock breaking; and (h) impact piling.
Landowner	Has the same meaning as "owner" in the *Local Government Act 1993* (NSW) and in relation to a building means the owner of the building.
Local road	Any road that is not defined as a classified road under the *Roads Act 1993* (NSW).
Minor Construction Ancillary Facilities	Lunch sheds, office sheds, portable toilet facilities, and the like that meet the requirements of Condition A20 and/or G36 Clause 4.15.1.1
Sensitive receivers	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres and passive recreation areas (including outdoor grounds used for teaching). Receivers that may be considered to be sensitive include commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds, restaurants, office premises, and retail spaces), and industrial premises as identified by the Planning Secretary.
Work	Any physical work to build or facilitate the building of the CSSI, including low impact work, environmental management measures and utility works. However, it does not include activities that inform or enable detailed design of the CSSI and generate noise that is no more than 5 dB(A) above the rating background level at any sensitive receiver.

2 CONSTRUCTION ANCILLARY FACILITY DESCRIPTION

2.1 Location

The proposed minor ancillary facility is located at Bridge 09, south of Elizabeth Drive (Lot 27 DP 1268721). The site is located within the approved Construction Boundary (refer to

Figure 2-1), however not within a construction ancillary facility identified in the Environmental Assessment Documentation. Access to the compound would be via existing site access gates off Elizabeth Drive and Range Road, Kemps Creek.

Figure 2-1 Site Location of MAF 09 – Bridge 09

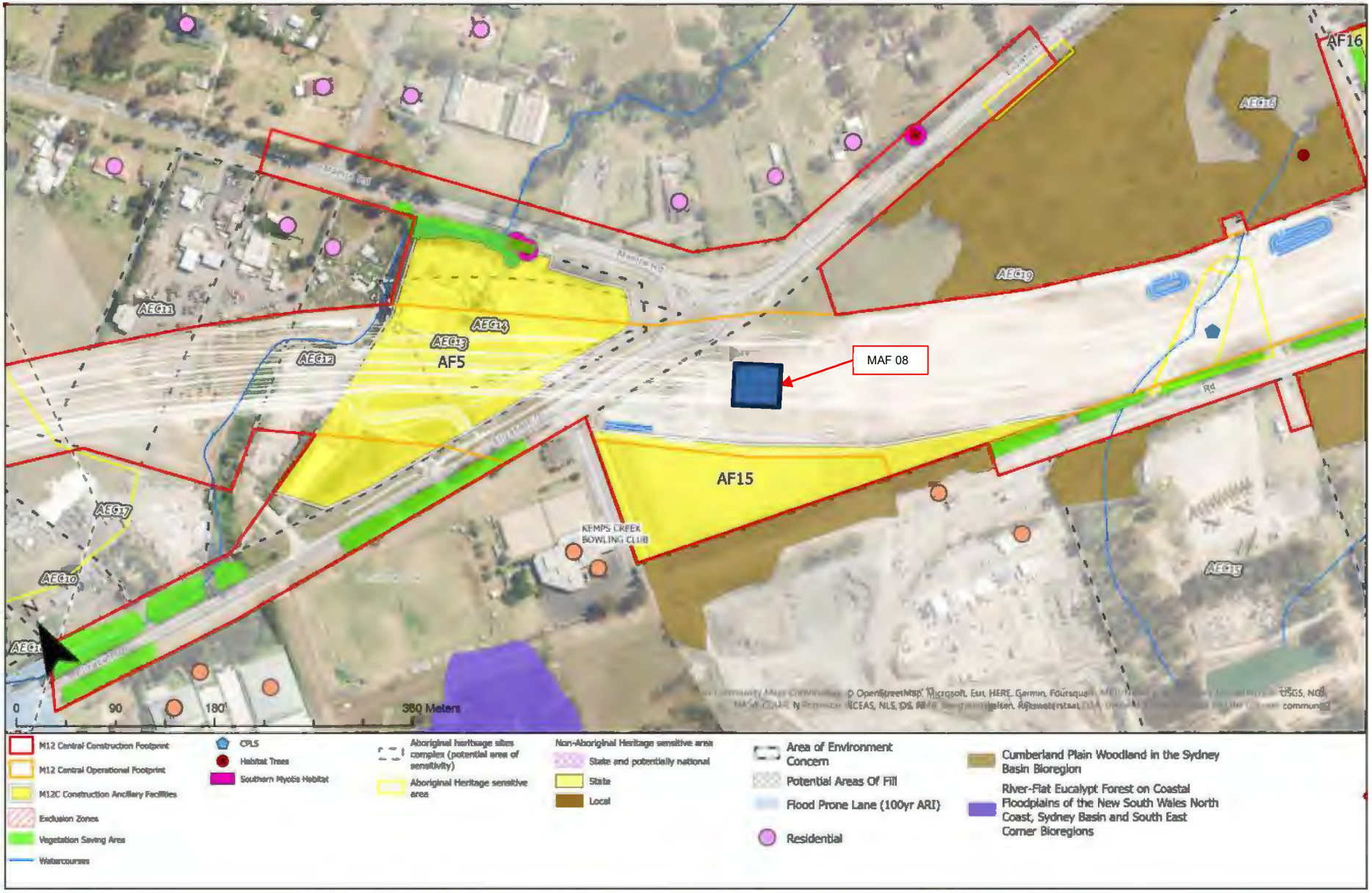


Figure 2-2 Site layout of MAF08 – Bridge 09

2.2 Proposed activities

SWC propose to establish a minor ancillary facility which will be used be the structures site team. This will consist of :

- 1 x Ablution block
- 1 x general storage container

An indicative layout is provided in Figure 2-2

Access to the site will be via Elizabeth Drive and require no changes to existing entry/ exit. Additional parking will not be required.

Establishment of the site will include:

- Delivery of ablution block and general storage container.
- Installation of footings for ablution block
- Placement of ablution block and general storage container with Hiab crane

No construction activities or other noisy work is proposed at this minor ancillary facility.

3 CONSTRUCTION ANCILLARY FACILITY ASPECT AND IMPACT

Table 3-1 provides a review of the existing environment and potential impacts associated with the proposed minor construction ancillary facility at Bridge 09, adjacent Elizabeth Drive (Lot 3 DP 1268721).

Table 3-1 Environmental aspect and impact review

ASPECT	EXISTING ENVIRONMENT	POTENTIAL IMPACTS	ADDITIONAL CONTROLS MEASURES
Traffic and transport	Site access would be via existing site access off Elizabeth Drive and Range Road. Traffic associated with the use of the site would consist of approximately 20 light vehicles for approximately 20 staff plus visitors. This road is identified as a haulage route for the project, however no heavy vehicles are proposed for the use of the minor construction ancillary facility.	There is no anticipated increase of current traffic as a result of the use of the facility. The minor ancillary facility will function as an ablution space and general storage for current construction activities. Traffic associated with the use of the site will have minor amenity impacts on the surrounding residences and business.	No additional control measures are required to manage traffic impacts from the proposal.
Noise and vibration	The site is located within Noise Catchment Area NCA05. The construction noise management levels (NML's) in NCA04 are: • 46 dBA during standard construction hours • 41 dBA during evening period, and • 39 dBA during the night period (GHD M12 Motorway Central Section Consistency Assessment – Noise and vibration Technical Memorandum) The nearest residential receiver outside of the construction boundary is located approximately 135m to the north at 1306-1308 Mamre Road, Mount Vernon. Additional residential properties are located on Elizabeth Drive.	The establishment of the minor ancillary facility will involve placement for the ablution block and storage area within the identified area. Noise impacts would be consistent with the construction noise and vibration assessment for construction activities associated with the M12 project. The noise screening assessment indicated that the compound establishment would not exceed the noise management levels during standard construction hours. Operation of the site would not exceed the noise management levels during standard construction hours, out of hours daytime , evening or night time periods.	No additional control measures are required to manage noise and vibration impacts from the proposal.

ASPECT	EXISTING ENVIRONMENT	POTENTIAL IMPACTS	ADDITIONAL CONTROLS MEASURES
Light Spill / Visual Amenity	The nearest residential receiver from the minor site facility is located approximately 150m to the north at 135m to the north at 1306-1308 Mamre Road, Mount Vernon Additional residential properties are located on Elizabeth Drive.	Additional lighting around the site for personnel safety and crime prevention in accordance with crime prevention through environmental design (CPTED) principles. Lighting could result in light spill impacting sensitive receivers. No out of hours work is required for use of the minor site facility and light impacts are expected to be minor.	An inspection will be completed the first time any additional lighting is added at the site. This inspection should include spot measurements of horizontal light spill. Lighting would only be required during standard construction hours (e.g. entering the site at the start and end of the day shift during winter). M12 branded shadecloth and project signage will be located on the gate off Elizabeth Drive.
Flora and fauna	No mapped native vegetation or trees require clearing for the occupation of the site. There are no threatened species or their habitat known at the site. There are no exclusion zones at the site.	There will be no impact to flora and fauna resulting from the proposal.	The site is within the M12 Motorway road alignment. No additional controls required.
Soil and water	No ground breaking activities or delivery and stockpile of materials are proposed for the use of the site. The property has existing gravel driveways.	There will be no impact to soil or water resulting from the proposal.	The existing driveways and parking areas will be monitored and maintained if the use of the site results in impacts to water quality. No other additional control measures are required to manage soil and water impacts from the proposal.
Contaminated land	This are no identified Areas of Environmental Interest located at the site. No ground breaking are proposed for the use of the site that could expose unexpected contaminated land.	There will be no impact to contaminated land resulting from the proposal.	No additional control measures are required to manage contaminated land impacts from the proposal.

ASPECT	EXISTING ENVIRONMENT	POTENTIAL IMPACTS	ADDITIONAL CONTROLS MEASURES
Cultural heritage	The site is located within the Aboriginal Heritage Kemps Creek complex. The site has been disturbed by the previously rural / residential land use. No ground breaking is proposed for the use of the site that could impact on potential Aboriginal Heritage items associated with this complex. There are no non-Aboriginal heritage items previously identified at the site.	Impact to Aboriginal and non-Aboriginal cultural heritage resulting from the proposal is unlikely. The proposed use of the site will be of a similar nature to the previous land use of the property.	Aboriginal and non-aboriginal heritage salvage works have been completed. Any heritage items uncovered during construction will be treated under the unexpected heritage finds procedure. No additional control measures are required to manage Aboriginal and non-Aboriginal cultural heritage impacts from the proposal unless recommended by the Project archaeologist.
Air quality	The nearest residential receiver outside of the construction boundary is located approximately 150m to the north at 1-7 Duff Road, Cecil Park. Additional residential properties are located on Elizabeth Drive. The proposal does not involve any activities that are likely to result in noticeable increase in dust or odour at sensitive receivers in close proximity of the site.	There will be no air quality impacts to surrounding residential receivers resulting from the proposal.	The existing driveways and parking areas will be monitored and maintained if the use of the site results in the generation of dust. No additional control measures are required to manage air quality impacts from the proposal.
Flooding	The site is located outside of the EIS modelled probable maximum flood level.	The site is located on the road alignment. There will be no impact to the proposal from flooding.	No additional control measures are required to manage flood impacts from the proposal.
Waste Management	Waste bins will be provided at the site.	The MAF will generate general waste.	Waste Collections will be arranged during office hours. Waste will be separated into recycling and non-recycling items.

4 CONSTRUCTION ANCILLARY FACILITY COMPLIANCE CHECKLIST

4.1 Type and Location

Table 4-1 Construction Ancillary Facility Checklist

ID	CRITERIA	COMMENT / DETAILS / ADDITIONAL CONTROLS
Section A - Type and Location		
A1	Is the facility identified by description and location in the EIS?	☐ Yes – Assessment not required ☒ No – Proceed to A2
A2	Is the facility a minor ancillary facility?	☒ Yes – Assessment against criteria in Condition A15 not required. Proceed to Section B ☐ No - Assess suitability of site against criteria in Condition A15 in Section B
A3	Were the construction ancillary facility(ies) established for any early works listed in Appendix B of the Infrastructure Approval?	☐ Yes – Assessment against criteria in Condition A15 not required. Proceed to Section B ☐ No - Assess suitability of site against criteria in Condition A15 in Section B
Section B – Additional Construction Ancillary Facilities Assessment Criteria ☒ Not applicable for minor construction ancillary facilities **CoA A15** Construction ancillary facilities (excluding minor construction ancillary facilities established under Condition A20) that are not identified by description and location in the documents listed in Condition A1 may only be established and used in each case if:		
B1	(a) they are located within or immediately adjacent to the construction boundary; and	☐ Yes – Proceed to B2 ☐ No – Review consistency against documents listed in A1 before proceeding.
B2	(b) they are not located next to a sensitive receiver(s) (including where an access road is between the facility and the receiver(s)), unless the sensitive receiver(s) (both the landowner(s) and occupier(s)2) have given written acceptance to the carrying out of the relevant facility in the proposed location; and	☐ Yes – Proceed to B3 ☐ No – Review consistency against documents listed in A1 before proceeding.
B3	(c) they have no impacts on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities beyond the impacts approved under the terms of this approval; and	☐ Yes – Proceed to B4 ☐ No – Review consistency against documents listed in A1 before proceeding.
B4	(d) the establishment and use of the facility can be carried out and managed within the outcomes set out in the terms of this approval, including in relation to environmental, social and economic impacts.	☐ Yes – Prepare a Site Establishment Management Plan in accordance with **Condition A16** for endorsement by the ER ☐ No – Review consistency against documents listed in A1 before proceeding.

ID	CRITERIA	COMMENT / DETAILS / ADDITIONAL CONTROLS
Section C - Use of Construction Ancillary Facilities ☒ Not applicable for minor construction ancillary facilities established under Condition A20 **CoA A18** The use of a construction ancillary facility for construction (excluding minor construction ancillary facilities established under Condition A20 and construction ancillary facilities established for the purposes of early works in accordance with Condition A24) must not commence until the CEMP required by Condition C1, relevant CEMP Sub-plans required by Condition C4 and relevant Construction Monitoring Programs required by Condition C11 have been approved by the Planning Secretary. **CoA A19** Construction ancillary facilities established for the purposes of early works in accordance with Condition A24 cannot be used for construction until the CEMP required by Condition C1, relevant CEMP Sub-plans required by Condition C4 and relevant Construction Monitoring Programs required by Condition C11 have been approved by the Planning Secretary. Condition A18 and A19 do not apply to the use of construction ancillary facilities where the ER has determined that the use of the facility will have a minimal impact on the environment and community.		
C1	Have the CEMP required by Condition C1, relevant CEMP Sub-plans required by Condition C4 and relevant Construction Monitoring Programs required by Condition C11 have been approved by the Planning Secretary?	☐ Yes – Construction Ancillary Facility may be used for construction ☐ No – Proceed to C2
C2	Is the proposed use of the construction ancillary facility (prior to approval of the CEMP, CEMP Sub-plans and construction Monitoring Programs) likely to result in minimal impact on the environment and community?	☐ Yes – The construction ancillary facility may be used for the proposed activities the ER determines are likely to result in minimal impact on the environment and community ☐ No – the use of the facility must not occur until the CEMP, CEMP Sub-plans and construction Monitoring Programs have been approved by the Planning Secretary
Section D - Minor Construction Ancillary Facilities **CoA A20** Lunch sheds, office sheds, portable toilet facilities, and the like, can be established and used where they have been assessed in the documents listed in Condition A1 or satisfy the following criteria:		
D1	**A20** Lunch sheds, office sheds, portable toilet facilities, and the like, can be established and used where they have been assessed in the documents listed in Condition A1 or satisfy the following criteria:	
D2	(a) are located within or adjacent to the construction boundary; and	Bridge 09, adjacent Elizabeth Drive (Lot 3 DP 1268721).is located within the construction boundary (refer to **Error! Not a valid result for table.**).
D3	(b) have been assessed by the ER to have -	`

ID	CRITERIA	COMMENT / DETAILS / ADDITIONAL CONTROLS
	(i) minor amenity impacts to surrounding residences and businesses, after consideration of matters such as compliance with the Interim Construction Noise Guideline (DECC, 2009), traffic and access impacts, dust and odour impacts, and visual (including light spill) impacts, and	Refer to Table 3-1 for details and control measures for managing minor amenity impacts, including specific additional controls for managing light spill and dust. The surrounding residences and businesses are unlikely to be impacted by the proposed use of the minor construction ancillary facility. No other additional control measures are required to maintain amenity to surrounding residences and businesses.
D4	(ii) minor environmental impact with respect to waste management, soil, water and flooding, and	Refer to Table 3-1 There are no impacts to with respect to waste management, soil, water and flooding. Monitoring of driveways for dust is required. No other additional control measures are required with regard to these environmental aspects.
D5	(iii) no impacts on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities beyond the impacts approved under the terms of this approval.	Refer to Table 3-1 There will be no impacts on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities from the by the proposed use of the minor construction ancillary facility. Orange Flagging will be installed around the trees and vegetation on the property to prevent any impacts prior to construction.

5 ASSESSMENT OUTCOME

CONDITION	CATEGORY	ENDORSEMENT OR APPROVAL
☐ CoA A15	Additional construction ancillary facilities	ER Endorsement of SEMP
☐ CoA A17	Construction ancillary facility(ies) has been established for any early works listed in Appendix B	ER Endorsement of SEMP
☒ CoA A20	Minor Construction Ancillary Facilities	ER Endorsement of this assessment

ATTACHMENT A – NOISE SCREENING ASSESSMENT

Minor Ancillary Facility 08

Project	M12 Motorway - Central Package
Client	Seymour Whyte

Assessment Date	15/03/2024	Assessment Id	MAF08
Proposed start date	15/03/2024	Proposed end date	15/03/2024

Contents

Acoustic terms and acronyms

AA	Acoustic Advisor
AMM	Additional mitigation measures – applicable where standard measures have been implemented and NML is still expected to be exceeded.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
ICNG	Interim Construction Noise Guideline (Department of Environment and Climate Change 2009)
NCA	Noise Catchment Area
Noise level statistics	L_{A90} - The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise. L_{Aeq} - The equivalent continuous A-weighted noise level—the level of noise equivalent to the energy average of noise levels occurring over a measurement period. L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period. L_{Amax} – The maximum A-weighted noise level associated with the measurement period.
NML	Noise Management Level
PPV	Peak Particle Velocity – Measurement of ground-borne vibration in units of mm/s
RBL	Rating Background Level - a single figure that represents the background noise level for assessment purposes
ROL	Road Occupancy Licence – granted by Transport for NSW and required for any activity likely to impact on traffic flow.
SWL	Sound Power Level - The A-weighted sound power level is a logarithmic ratio of the acoustic power output of a source relative to 10-12 watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
SPL	Sound pressure level - This is the level of noise, usually expressed in dB(A), as measured by a standard sound level meter with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of noise. A technical definition for the sound pressure level, in decibels, is 20 times the logarithm (base 10) of the ratio of any two quantities related to a given sound pressure to a reference pressure (typically 20 µPa equivalent to 0 dB).
Tonal noise	Noise with perceptible and definite pitch or tone
VDV	Vibration dose value – used when assessing intermittent vibration as it is sensitive to peaks in vibration acceleration and accumulates the vibration energy received over the daytime and night-time periods

1 Introduction

1.1 Overview

Seymour Whyte has been engaged to deliver the Central package of the M12 Motorway (the Project). Construction of the Central package involves building 7.5 km of motorway from west of Badgerys Creek to the Water Tower Access Road within Western Sydney Parklands.

The M12 Central package will provide a dual carriageway with a wide median to allow for future widening to six lanes. A shared user path with lighting will provide an active transport link along the motorway and eastward to the M7.

The M12 Motorway Project, which includes the Central Package, was approved by the Minister for Planning and Public Spaces in April 2021 (SSI 9364). An Environment Protection Licence (EPL) for the project was also granted for the Central Package (EPL 21596).

An overview of M12 Motorway project staging is presented in Figure 1, which illustrates the location and setting of the Central Package relative to the total project.

Under the Project's NVMP, activity-specific noise and vibration impact statements (NVIS) must be prepared for ongoing risk analysis during project delivery and for when out-of-hours work is proposed (as per the Project's out-of-hours protocol).

This NVIS has been prepared using KNOWnoise™, a project-specific noise prediction tool, and addresses proposed activities described in Appendix A, which lists each assessed activity, its timing and proposed equipment.

The structure of this NVIS includes:

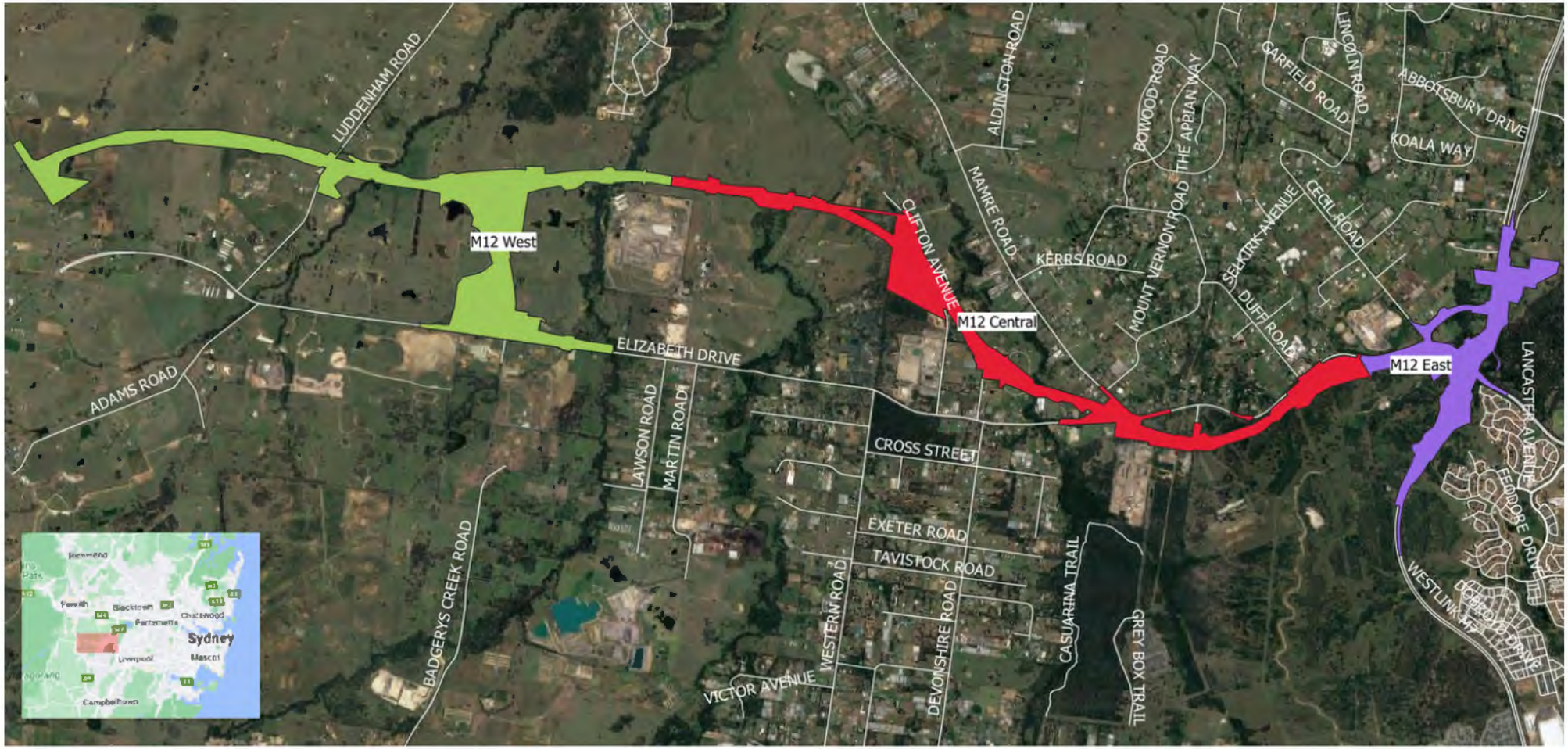
- Section 1.2 – Construction works and hours with justification for these works in Section 1.3
- Section 2 – Existing environment
- Section 3 – Assessment framework including noise and vibration management levels
- Section 4 – Construction noise assessment
- Section 5 – Construction vibration assessment
- Section 6 – Mitigation and management, including consultation

1.2 Justification of the works

In line with the Interim Construction Noise Guidelines (DECC 2009), justification is typically required to work outside approved construction hours. These situations may involve low impact or emergency works, works required to be undertaken under a Road Occupancy Licence (ROL) and works under an out-of-hours work protocol.

The AFJV proposes the works subject to this assessment outside approved construction hours for the following reason.

- establishment of minor ancillary facility.



M12 Motorway Overview

Figure 1 Location map

1 Existing environment

1.1 Sensitive receivers

The alignment of the M12 Central package is mainly through semi-rural properties with few residences. However land uses near the project include a mix of rural and suburban areas:

- Cecil Hills, Cecil Park and Mount Vernon (small-lot rural residential areas) are located in the eastern section of the construction footprint near to the M7 Motorway and Elizabeth Drive.
- Kemps Creek and Badgerys Creek are in the western section of the construction footprint are sparsely populated, consisting primarily of large rural lots.

Receivers potentially sensitive to noise and vibration can be categorised as residential dwellings, commercial/industrial buildings (including small businesses), or 'other' sensitive land uses which includes educational institutions, childcare centres, medical facilities, and places of worship.

The noise environment within suburban areas is generally influenced by road traffic from the M7 Motorway and Elizabeth Drive, particularly during the daytime period. During the evening and night-time periods, ambient noise levels typically decrease due to a reduction in the volume of road traffic on Elizabeth Drive and the M7 Motorway.

The noise environment in rural locations is generally influenced by environmental noises such as wind and insects.

1.2 Heritage items

Heritage assessments carried out as part of the EIS identified four heritage items within or near the project footprint:

- The Fleur radio telescope site – 2 items within the construction footprint to be removed. Four other items scattered at distances of 80 - 800 metres from project boundary.
- Exeter farm archaeological site – no structures identified within the minimum working distances of the project.
- South Kemps and Badgerys Creek confluence weirs scenic landscape – no structures identified.
- Fleurs Aerodrome – metal structure around 13 metres from project boundary. A shed also identified around 250 metres from boundary.

In summary, one item of heritage value remains within a distance potentially affected by vibration, the Fleurs Aerodrome metal structure.

1.3 Noise catchment areas

To facilitate the assessment of noise impacts from the project and to apply representative Noise Management Levels (NMLs) to all receivers, receivers adjacent to the Project have been divided into Noise Catchment Areas (NCAs).

NCAs group individual sensitive receivers by representative traits such as existing noise environment and potential exposure to noise and vibration from the Project.

NCAs established as part of the EIS are summarised in Table 1-1. Background noise monitoring has been completed as part of the EIS to apply appropriate NML to each NCA.

Table 1-1 Summary of work areas, Noise Catchment Areas and land uses

Noise catchment	Description
NCA01	Along Wallgrove Road and to the east of the M7 Motorway, extends south to Elizabeth Drive. Largely residential with the nearest receiver located to the east of the project, however Western Sydney Parklands (passive recreation) covers a large portion to the catchment to the east of the M7 Motorway. Saints Peter and Paul Assyrian Church of the East are in the west of the catchment.
NCA02	To the south of Elizabeth Drive and east of the M7 Motorway. Primarily suburban residential, plus Cecil Hills Public School, Cecil Hills High School, Head Start Long Day Care. Commercial use near Sandringham Drive and Feodore Drive.
NCA03	North of Elizabeth Drive and west of the M7 Motorway, extending to the west of Mamre Road. Set back from Elizabeth Drive and not adjacent to major roads. The nearest receivers are north of the construction footprint on Mamre Road, plus DoReMi Childcare in southwest of catchment.
NCA04	North of Elizabeth Drive and west of the M7 Motorway extending west to the intersection of Devonshire Road and Cross Street. Primarily residential land uses with nearest receivers adjacent to the construction footprint north of Elizabeth Drive. Irfan College is in the centre of the catchment adjacent to Elizabeth Drive.
NCA05	South of Elizabeth Drive and west of the M7 Motorway extending west to Kemps Creek. Primarily Western Sydney Parklands with no residential receivers and The Sydney International Shooting centre is in the centre of the catchment.
NCA06	West of Kemps Creek and east of South Creek and extending to the north and south of Elizabeth Drive. Primarily rural residential receivers. Kemps Creek Children's Cottage is located in the centre of the catchment.
NCA07	West of Kemps Creek, east of Cosgroves Creek, and north of Elizabeth Drive (set back from Elizabeth Drive to represent receivers which are not adjacent to the existing major roads). Primarily rural residential receivers and a cluster of residential dwellings 500 metres to the north of the construction footprint.

2 Assessment framework

2.1 Approved construction hours

Working hours are set by CoA E34 and E35, EPL conditions L5.1 and L5.2, and Section 3.6 of QA Specification G36, as summarised in Table 2-1. Use of power saws, rock breakers, drills and other tonal or impulsive activities are defined as annoying under the Interim Construction Noise Guideline (ICNG) and are 'highly noise intensive works'.

Table 2-1 Approved construction hours

CoA	Construction activity	Monday to Friday	Saturday	Sunday / Public holiday
E34	Approved construction	7:00 am to 6:00 pm	8:00 am to 6:00 pm	No work (unless approved under out-of-hours work protocol)
E35	Highly intensive works resulting in exceedance of applicable noise management level	8:00 am to 6:00 pm[1]	8:00 am to 1:00 pm[1]	No work (unless approved under out-of-hours work protocol)

Note:

1. if continuously, then not exceeding three hours, with a minimum cessation of work of not less than one hour.

2.2 Noise assessment criteria

2.2.1 Construction noise

The ICNG describes noise in excess of the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a $L_{Aeq,\ 15\ minute}$ noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected. Table 1 (reproduced from Table 2 of the ICNG) sets out the NMLs for residences and how they are to be applied.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

2.2.2 Sleep disturbance

The CNVS requires maximum noise levels to be analysed in terms of the extent and number of times the maximum noise exceeds specific noise trigger levels, in general accordance with the Noise Policy for Industry (NPfI) (EPA 2017). These triggers are:

- LAeq, 15 minute 40 dBA or the prevailing RBL plus 5 dB, whichever is greater, and the
- LAmax 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

The NPfI also recommends the DECCW (2011) Road Noise Policy (RNP) be reviewed for further risk assessment. The RNP recommends maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

Table 2 Residential noise management levels

Time of day	NML $L_{Aeq\ (15\ min)}$ *	How to apply
Standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: - times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences); - if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.

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

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). The noise management levels for non-residential receivers set in accordance with the Interim Construction Noise Guideline are provided in Table 3. These levels apply only during hours when the non-residential premises are being used.

The difference between an internal noise level and the external noise level is about 10 dB(A), which provides a conservative assumption that windows are open for ventilation. Buildings where windows are fixed or cannot otherwise be opened may achieve a greater noise level performance.

Table 3 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML ($L_{Aeq,15min}$)
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

2.3 Project construction noise management levels

Based on the measured RBLs for each NCA and requirements of the ICNG and CNVG, project-specific Noise Management Levels (NML) are summarised in Table 4. NMLs for non-residential receivers are listed in Table 3.

As per *Noise Policy for Industry* recommendations, the community generally expects greater control of noise during the more sensitive evening and night-time periods than during the less sensitive daytime period. Therefore NMLs for the evening should be no greater than during the day, and NMLs for night no greater than evening.

Table 4 Noise management levels

NCA	Monitoring location	Noise Management Level, $L_{Aeq\ 15\ minute}$								
		Standard hours		Outside approved hours						
		Noise affected	Highly noise affected	Morning shoulder	Day	Evening shoulder	Evening	Night	Sleep disturbance (CNVS)	
									$L_{Aeq,\ 15\ minute}$	L_{Amax}
NCA01	L01	55	75	50	50	49	49	45	45	55
NCA02	L01	55		50	50	49	49	45	45	55
NCA03	L05	49		44	44	44	44	40	40	52
NCA04	L03	64		59	59	53	53	42	42	52
NCA05	L02	46		41	41	41	41	39	39	52
NCA06	L05	49		44	44	44	44	40	40	52
NCA07	L06	44		39	39	39	39	36	36	52

As part of planning for out of hours works, standard mitigation measures, as described in the CNVMP, are implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the Construction Noise and Vibration Guidelines (CNVG),(TfNSW 2016), which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are taken from the Project's OOHW Protocol and summarised in Table 5. Further details of specific additional mitigation measures are described in the CNVG.

Table 5 Triggers for additional mitigation measures – Airborne noise (CNVG)

Predicted airborne LAeq(15min) noise level at receiver			
Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
All hours			
75 dB(A) or greater			N, V, PC, RO
Standard hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)			
Noticeable	5 to 10	0	-
Clearly audible	10 to 20	< 10	-
Moderately intrusive	20 to 30	10 to 20	N, V
Highly intrusive	> 30	> 20	N, V
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)			
Noticeable	5 to 10	<5	-
Clearly audible	10 to 20	5 to 15	N, R1, DR
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR
Highly intrusive	> 30	>25	V, IB, N, R1, DR, PC, SN
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)			
Noticeable	5 to 10	<5	N
Clearly audible	10 to 20	5 to 15	V, N, R2, DR
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR
Highly intrusive	> 30	>25	AA, V, IB, N, PC, SN, R2, DR

Notes:
PC = Phone calls
V = verification
IB = Individual briefings
N= Notification
AA = Alternative accommodation
SN = Specific notifications
RO = Respite offer
R1 = Respite period 1
R2 = Respite period 2
DR = Duration respite
Perception = relates to levels above RBL
NML = Noise management level
HA = Highly affected

2.4 Vibration management

2.4.1 Human comfort

When assessing human exposure to construction-related vibration, the CNVS requires vibration goals to be established using *Environmental Noise Management Assessing Vibration: A Technical Guideline* (DECC 2006), which provides criteria for the assessment of vibration impacts on humans.

Construction activities typically generate vibration of an intermittent nature, which is assessed using a Vibration Dose Value (VDV). Acceptable values of vibration doses are presented in Table 6 for sensitive receivers.

Table 6 VDV Vibration criteria

Receiver type	Low probability of adverse comment ($m/s^{1.75}$)	Adverse comment possible ($m/s^{1.75}$)	Adverse comment probable ($m/s^{1.75}$)
Residential buildings – 16 hour day (7am to 11pm)[1]	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings – 8 hour night (11pm to 7am)[1]	0.13	0.26	0.51

Note 1: Day time and night time as described in BS6472:1992 (as referenced in the CNVS), i.e. a daytime period of 16 h or a night time period of 8 h, for example 23.00 h to 07.00 h.

2.4.2 Buildings

Potential building damage from construction vibration requires the application of values in BS 7385 Part 2-1993 *Evaluation and measurement for vibration in buildings* Part 2. These values are presented in Table 7 and relate to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings.

Table 7 Guideline values for vibration velocity for the effects of short-term vibration on structures (BS 7385).

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz to 50 mm/s at 40 Hz and above

Where vibration may give rise to magnification due to resonance, especially at lower frequencies where lower guide values apply, the guide values may be reduced by 50%. The CNVS describes rock breaking/hammering and sheet piling activities as having potential to cause dynamic loading in some structures (e.g. residences).

For activity involving rock breakers, piling rigs, vibratory rollers, excavators, vibration predominantly occurs at frequencies in the 10 Hz to 100 Hz range. On this basis, a conservative vibration damage screening level is:

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

2.4.3 Heritage

Heritage buildings and structures would be assessed under a conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity (from DIN 4150). Where vibration levels at heritage items are identified as exceeding this screening level, structural assessment would be completed by the Project team to confirm the structure's sensitivity to vibration. If a heritage building or structure is found to be structurally unsound (following inspection) the conservative criterion would stand. Where the structure is suitably sound, the guideline values from Table 7 would be applicable.

2.4.4 Additional mitigation measures

The CNVG recommends additional mitigation measures where all standard mitigation measures to minimise vibration at the nearest receivers have been implemented and vibration is still predicted to exceed the maximum guideline values. The Additional Mitigation Measures Matrix (AMMM) for vibration from the CNVG is presented in Table 8.

Table 8 Additional Vibration Mitigation Measures (CNVG)

Construction hours	Mitigation measures where predicted vibration levels exceed maximum levels
Approved hours Monday – Friday: 7am – 6pm, Saturday: 8am to 6pm	LB, M, RO
Evening Monday – Friday: 6pm – 10pm; Saturday: 7am – 8am, 6pm – 10pm; Sunday / PH: 8am – 6pm	LB, M, IB, PC, RO, SN
Night Monday – Saturday: 10am – 7am Saturday: 10pm –8am); Sunday / PH: 6pm –7am	LB, M, IB, PC, RO, SN, AA

3 Impact assessment

3.1 Modelling method

Predictions of noise impacts were performed using KNOWnoise™, a project-specific noise assessment tool developed by Hutchison Weller for the CTP Project. KNOWnoise calculates the maximum $L_{Aeq,15minute}$ noise level for each identified receiver for each proposed activity using predictions from SoundPlan noise modelling software. Predictions include geometric spreading, air and ground absorptions as well as topographical and structural screening and reflection.

The following components were incorporated in the model:

- Topography – Based on terrain data of 1 m resolution.
- Individual sensitive receivers – Worst-affected façade of each building to 700 metres from the works
- Construction noise sources –Activities and equipment provided by AFJV were included in the noise model as individual sources across the nominated work areas for each activity. The maximum predicted LAeq noise level within each work area was identified for each receiver.
- Cumulative impacts – all activities with overlapping time periods are included in cumulative results
- Source height – construction noise sources assumed to be at 1.5 metres above ground level.
- Ground Absorption – Ground assumed to be mixed hard and soft with absorption factor of 0.5
- Meteorology –worst-case meteorological conditions (gentle breeze from source to receiver and stable conditions).
- Residential building structures are included in the model, meaning screening provided by neighboring houses is considered.
- Results are shown for all floors of assessed buildings with the worst-case façade result assumed for the whole floor.

Equipment proposed to be used for OOHW activities together with estimated sound power levels for each item are summarised in Appendix A.

The sound power levels and ultimate predicted noise levels will depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. In practice, the predicted levels will vary due to plant moving around the site and not operating intensively or concurrently for a 15 minute assessment period. Shielding and reflection provided by buildings will also vary as plant moves around the site. Therefore, predicted noise levels are conservative.

3.2 Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels for the Day period is presented in Table 9, with the worst-case predicted noise level of 43 dB(A) during the works, resulting in 0 receivers classed as highly noise affected.

With reference to the CNVS, 0 receivers are predicted to be classified as Highly Impacted during the Day period.

Table 9 Summary of predicted noise levels with comparison against ICNG criteria for the Day period.

Maximum cumulative predicted $L_{Aeq,\ 15\ minute}$ noise level		43 dB(A)
Number of highly noise affected receivers (>75 dB)		0
Impact class	**Predicted noise level**	**Predicted number of receivers**
Noticable	= 0 dB above NML	0
Clearly Audible	0 <= 10 dB above NML	0
Moderately Intrusive	10 <= 20 dB above NML	0
Highly Intrusive	> 20 dB above NML	0

Predicted impact classes for the Day period are illustrated graphically in Appendix B. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

In the event works are planned for more than two consecutive nights, sleep disturbance is considered. Table 10 summarises the number of residents predicted to exceed the sleep disturbance screening criterion. Further analysis is also provided to indicate the number of receivers expected to be woken, at LAmax noise levels greater than 65 dBA.

Where exceedances of the awakening criteria are predicted, additional care should be taken, and mitigation measures implemented in line with the CNVS.

Table 10 Summary of predicted exceedances of sleep disturbance screening criterion and awakening criterion.

Criterion	Predicted number of receivers
Potentially Sleep Disturbed (exceed RBL + 15 screening criterion)	0
Exceed 65 dBA awakening criterion	0

3.3 Vibration

The CNVS requires attended vibration measurements at commencement of vibration generating activities to confirm vibration levels satisfy the criteria for that activity.

Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the calculated safe-working distances.

Based on the proposed work locations and selected equipment, indicative exceedances of the vibration criteria are summarised in Table 11. The exceedances are based on recommended minimum working distances from vibration intensive plant given in Appendix D of the Construction Noise and Vibration Strategy (Transport for NSW 2019). Vibration impacts for each sensitive receiver are listed in Appendix C.

Table 11 Predicted exceedances of vibration criteria

Impact classification	Number of potentially affected receivers
Human comfort	0
Cosmetic damage	0
Heritage structure	0

4 Controls and safeguards

The Project represents a risk of adverse impacts on sensitive receivers, particularly when working close to the project boundary and outside approved hours.

Where short term noise impacts are unavoidable, mitigation measures described in the project construction environment management plan should be implemented together with the recommendations in Table 12 and additional mitigation measures for each receiver identified in Appendix B and summarised in Table 13.

Table 12 Standard mitigation measures

Community consultation	• Potentially affected receivers will be notified of OOH works in accordance with project requirements. • Where practicable, works will be scheduled to not conflict with major student examination periods, church congregation times, and other sensitive periods identified through community consultation.
Site induction	• All workers will be inducted to the project prior to commencing work and will be cognisant of their noise and vibration obligations under the CNVMP.
Behavioural practices	• Avoid swearing and unnecessary shouting or loud radios onsite. • Avoid dropping materials from height.
Equipment selection	• Priority given to the use of quieter and less vibration emitting construction methods and plant alternatives where feasible and reasonable. • The noise levels of plant and equipment would meet the maximum noise requirements of the CNVS.
Use and siting of plant	• Locate compounds away from sensitive receivers and discourage access from local roads. • Plant used intermittently to be throttled down or shut down. • Noise-emitting plant to be directed away from sensitive receivers where possible. • Stationary plant should be located behind a structure or enclosed if practicable. • Deliveries should be made as far as practical from sensitive receivers. Dedicated loading/unloading sites should be shielded where possible, if close to receivers. • Plan traffic flow, parking and loading/unloading areas to minimise reversing. • Avoid compression breaking on approach to the site. • Where additional activities or plant may result in marginal noise increases and speed works up, consider concentrating activities at one location and complete works as quickly as possible.
Non-tonal reversing alarms.	• Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Noise monitoring	• Monitoring should be completed to verify the assumptions of this CNVIS regarding estimated equipment noise emissions and to ensure compliance with the CNVS.
Vibration monitoring	• Attended vibration measurements should be completed at commencement of vibration generating activities predicted to occur within safe working distances for cosmetic damage. • Where monitoring demonstrates maximum levels exceeded, consider alternative methodologies/equipment
Implement any project specific mitigation measures	
1	None

Table 13 Additional mitigation measures

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

Appendix A Proposed activities and associated sound power levels

Minor Ancillary facility 08

Establishment of MAF

3/15/2024 2:40:31 PM - 3/15/2024 3:00:34 PM

Equipment	Quantity	Usage	Reduction	SWL
Flatbed Truck	1	30 %	0	88
Franna Crane	1	40 %	0	94
Hand Tools (electric)	1	20 %	0	87

Activity Sound Power Level: 96

* includes 5 dB penalty for potentially annoying characteristics in line with the ICNG

Appendix B Map showing predicted noise impacts by impact class

Appendix C Detailed predictions

C.1 Noise

Assessment: Minor Ancillary Facility 08					NML, LAeq, 15 minute				Sleep, LAmax		Predicted noise level, dBA		Exceedance summary											
														Exceed NML by (dB):				Exceed sleep disturbance by (dB):		Impact classification			
NCA	Rec	Address	Flr	Land use	Day	O/day	Eve	Night	Screen	Awake	Cumulative LAeq, 15 minute	LMax	Highly Affected?	Day	O/day	Eve	Night	Screen	Awake	Day	O/day	Eve	Night

C.2 Vibration

NCA	Receiver	Address	Land use	Vibration Impact