

Western Sydney Airport

Noise and Vibration Construction Environmental Management Plan

December 2019



**Western
Sydney
Airport**

Document Control

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Plan Authorisation

Position	Name	Signature	Date
Environment Manager	S Reynolds		06/12/2019

Glossary and Definitions

Item	Definition
the Act	<i>Airports Act 1996</i> (Cth) (Airports Act)
AEPR	Airports (Environment Protection) Regulations 1997
Airport	The airport located at the Airport Site. Note: The Airport is referred to in the Act as Sydney West Airport and also commonly known as Western Sydney Airport.
Airport Lease	An airport lease for the Airport granted under section 13 of the Act
Airport Lessee Company	The company that is granted a lease over the Airport Site
Airport Plan	Means the airport plan for the airport site as determined by the Infrastructure Minister under section 96B of the Airports Act in December 2016 as varied from time to time in accordance with the Airports Act.
Airport Site	The site for Sydney West Airport as defined by the Airports Act.
Apron	The part of an airport used for: <ul style="list-style-type: none"> a. the purposes of enabling passengers to embark/disembark an aircraft; b. loading cargo onto, or unloading cargo from, aircraft; and/or c. refuelling, parking or carrying out maintenance on aircraft
Ancillary Developments	An ‘ancillary development’ as set out in section 96L of the Act
Approved Plan	Means a plan approved in accordance with the Conditions of Approval
A-Weighted noise level (dBA)	This is a value representing the loudness of a sound at a specific time, allowing for the differential response of the human ear to different sound frequencies.
Bulk Earthworks	The large-scale earthworks required to flatten the Stage 1 area in preparation for further construction works as described in section 6 of the Construction Plan.
Condition	A condition set out in Part 3 of the Airport Plan in accordance with section 96C of the Act
Construction Impact Zone	The part or parts of the Airport Site or an Associated Site on which Main Construction Works are planned to occur, as detailed in the Construction Plan approved in accordance with Condition 1.
EEW	The Phase of the Stage 1 Development that involves early earthworks as described in section 6 of the Construction Plan.
Ecological sustainable development	Using, conserving and enhancing the community’s resources so that the ecological processes on which life depends are maintained and the total quality of life now and in the future, can be increased (Council of Australian Governments, 1992).
Environment Minister	The Minister responsible for the EPBC Act
Environmental Impact Statement	The environmental impact statement prepared in relation to the Airport under the EPBC Act
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
Infrastructure Minister	The Minister responsible for the Airport Act from time to time
Main Construction Works	Substantial physical works on a particular part of the Airport Site (including large scale vegetation clearance, bulk earthworks and the carrying out of other physical works, and the erection of buildings

Item	Definition
	and structures) described in Part 3 of the Airport Plan, other than TransGrid Relocation Works or Preparatory Activities.
Noise management levels	The <i>Interim Construction Noise Guidelines</i> is issued by the NSW Department of Environment and Climate Change (now NSW Department of Planning and Environment) and recommends Noise Management Levels (NMLs) to manage construction noise levels at sensitive receivers. Where construction noise levels are predicted to be above the NMLs, all feasible and reasonable work practices are to be applied to meet the NMLs.
Non-conformance	Failure to conform to the requirements of the Airport Plan (including the SEMF).
Preparatory Activities	<p>The following:</p> <ul style="list-style-type: none"> a. day-to-day site and property management activities; b. site investigations, surveys (including dilapidation surveys), monitoring, and related works (e.g. geotechnical or other investigative drilling, excavation, or salvage); c. establishing construction work sites, site offices, plant and equipment, and related site mobilisation activities (including access points, access tracks and other minor access works, and safety and security measures such as fencing, but excluding bulk earthworks); d. enabling preparatory activities such as: <ul style="list-style-type: none"> (i) demolition or relocation of existing structures (including buildings, services, utilities and roads); (ii) the disinterment of human remains located in grave sites identified in the European and other heritage technical report in volume 4 of the EIS; and (iii) application of environmental impact mitigation measures; and e. any other activities which an Approver determines are Preparatory Activities for this definition
the Project	Western Sydney Airport – Stage 1 development
Stage 1 Development	The Developments described in Part 3 of the Airport Plan
Sydney West Airport	The Airport. Note: this is the name used in the Act. The Airport is known as Western Sydney International (Nancy-Bird Walton) Airport, or, more commonly, Western Sydney International.
Western Sydney International (Nancy Bird Walton) Airport (WSI)	The Airport. Note: Under the Act the Airport is referred to as Sydney West Airport
WSA	<p>WSA Co Limited (ACN 618 989 272), the entity responsible for constructing and operating the Airport in accordance with the Airport Plan.</p> <p>For the purposes of the Airports Act 1996 (Cth), WSA is the “airport-lessee company” for WSI</p>

Acronyms and abbreviations

Item	Definition
ABL	The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th per cent) background level (LA90) for each period.
ALC	Airport Lessee Company
ALER	Airfield lighting equipment room
ARFFS	Airfield lighting equipment room
ATC	Air traffic control
ATCT	Air traffic control tower
BEC	Bulk Earthworks Contract
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
CO	Carbon monoxide
CEMP	Construction Environmental Management Plan
CSEP	Community and Stakeholder Engagement Plan
DIPNR	NSW Department of Infrastructure, Planning and Natural Resources (now Department of Planning and Environment)
Infrastructure Department	Australian Government Department of Infrastructure, Regional Development and Cities
DoEE	Australian Government Department of the Environment and Energy
DPI	Department of Primary Industries (including Agriculture NSW, Fisheries NSW and NSW Office of Water)
EIS	Environmental Impact Statement
EPA	NSW Environmental Protection Authority
GSE	Ground support equipment
Ha	Hectares
HIAL	High intensity approach lighting
ISO 14001	AS/NZS ISO 14001:2015 – Environmental Management Systems
Km	Kilometres
LA10	The LA10 level is the A-weighted noise level which is exceeded 10% of the sample period. During the sample period, the noise level is below the LA10 level for 90% of the time. The LA10 is a common noise descriptor for environmental noise and road traffic.
LA90	The LA90 level is the A-weighted noise level which is exceeded 90% of the sample period. During the sample period, the noise level is below the LA90 level for 10% of the time. This measure is commonly referred to as the background noise level.
LAeq	The equivalent continuous A-weighted sound level (LAeq) is the energy average of the varying noise over the sample period and is equivalent to the level of constant noise which contains the same energy as the varying noise environment. The measure is also a common measure of environmental noise and road traffic noise.

Item	Definition
LA (max)	The A-weighted maximum noise level only from the construction works under consideration, measured using the fast time weighting on a sound level meter.
m, m ² and m ³	Metres, square metres and cubic metres
ML and ML/d	Megalitres and megalitres per day
NML	Noise management levels
OEH	NSW Office of Environment and Heritage
POEO Act	NSW Protection of the Environment Operations Act 1997
RBL	The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.
RMS	NSW Roads and Maritime Services
SES	Senior Executive Service
SES Officer	An SES employee under the Public Service Act 1999 (Cth)
SEMF	Site Environmental Management Framework. The SEMF is contained within the Construction Plan (included as Appendix 2)
WSI	Western Sydney International (Nancy-Bird Walton) Airport

Contents

1	INTRODUCTION.....	9
1.1	Background/Context	9
1.2	Document purpose.....	10
1.3	WSA environmental management system overview	11
1.4	Consultation requirements of this plan	12
1.5	Certification and approval.....	14
1.6	Distribution	14
2	SCOPE OF WORKS	15
3	OBJECTIVES AND TARGETS	16
3.1	Objectives	16
3.2	Targets and performance criteria	16
4	LEGAL AND OTHER REQUIREMENTS.....	18
4.1	Relevant legislation and guidelines	18
4.2	Approvals and other specifications	19
4.3	Airport Plan Conditions.....	19
5	EXISTING ENVIRONMENT	25
5.1	Sensitive receptors	25
5.2	Ambient noise.....	25
6	NOISE AND VIBRATION CRITERIA	28
6.1	Construction noise and assessment objectives.....	28
6.2	Quantitative noise assessment criteria	29
6.3	Adopted project Noise Management Levels	30
6.4	Vibration criteria.....	30
6.5	Blasting criteria	30
7	NOISE AND VIBRATION ASPECTS AND IMPACTS	31
7.1	Construction activities.....	31
7.2	Noise and vibration impacts	31
7.3	Risk assessment	36
8	CONSTRUCTION NOISE AND VIBRATION ASSESSMENT	49
8.1	Summary of potential noise impacts	49
8.2	Construction traffic noise	57
8.3	Construction vibration assessment	58
8.4	Blasting noise and vibration	63
9	ENVIRONMENTAL CONTROL MEASURES.....	64
10	WORKING OUTSIDE OF STANDARD CONSTRUCTION HOURS	70
10.1	Project requirements	70
10.2	Out of hours work	70
10.3	Out-of-hours works procedure	70

10.4	Impact assessment	70
10.5	Community notification	71
11	ENVIRONMENTAL ROLES AND RESPONSIBILITIES	73
12	ENVIRONMENTAL INSPECTION, MONITORING, AUDITING AND REPORTING	74
12.1	Environmental inspections	74
12.2	Noise and vibration monitoring	75
12.3	Environmental auditing	80
12.4	Environmental reporting	80
12.5	Review of approved plans	81
12.6	Environmental Incidents and complaints management	81
13	COMPETENCE, TRAINING AND AWARENESS	82
14	REFERENCES	83

Tables

Table 1	Noise and Vibration CEMP relationship with other CEMP documentation	10
Table 2	Noise and Vibration CEMP consultation summary	13
Table 3	Noise and vibration targets	16
Table 4	Principal legislation and relevance	18
Table 5	Relevant guidelines and standards	19
Table 6	Airport Plan conditions relevant to noise and vibration management	20
Table 7	Summary of noise and vibration management requirements	22
Table 8	Measured background noise levels (LA90)	25
Table 9	Vibration damage guideline values (DIN 41503)	30
Table 10	ANZECC recommended vibration and air blast criteria	30
Table 11	Estimated residential population affected by levels above NML - standard construction hours ¹	31
Table 12	Estimated residential population affected by levels above NML– outside standard construction hours ¹	33
Table 13	Expected Experience Centre light vehicle volumes	33
Table 14	Expected Site Office light vehicle volumes	34
Table 15	Predicted construction traffic noise increases on Elizabeth drive	34
Table 16	Expected construction vehicles (excluding material importation)	34
Table 17	Noise and vibration risk assessment	37
Table 18	Early earthworks construction zone summary	50
Table 19	Population affected by Zone 1 and 2 and noise mitigation requirements	52
Table 20	Population affected by Zone 3 and noise mitigation requirements	52
Table 21	Population affected by Zone 6 and noise mitigation requirements	52
Table 22	Population affected by Zone 7 and noise mitigation requirements	52
Table 23	Population affected by Zone 8 and 9 and noise mitigation requirements	53
Table 24	Population affected by all Zones and noise mitigation requirements	53
Table 25	Population affected by Bulk Earthworks and noise mitigation requirements	56
Table 26	Predicted construction traffic noise increased on Elizabeth Drive	57

Table 27	Predicted bulk earthworks construction traffic noise increase - Day	58
Table 28	Predicted bulk earthworks construction traffic noise increase - Night	58
Table 29	Recommended safe working distances for vibration intensive plant	59
Table 30	Number of receivers likely to be impacted based on MIC	63
Table 31	Noise and vibration management and mitigation measures	64
Table 32	Potential management and mitigation measures for OOHW noise impact category	71
Table 33	Noise and vibration monitoring requirements	75
Table 34	Noise monitoring station details	77
Table 35	Noise and vibration reporting	80

Figures

Figure 1	WSA Environmental Management System and CEMP context	12
Figure 2	Sensitive receiver locations surrounding the Airport Site	26
Figure 3	Background noise measurement locations	27
Figure 4	Indicative Airport Site sections used for noise assessment (as per the EIS)	32
Figure 5	Potential drill and blast areas.	36
Figure 6	Early Earthwork Construction Zone Summary	51
Figure 7	Bulk earthworks construction sites	55
Figure 8	Vibration safe working distances	60
Figure 9	Vibration safe working distances during bulk earthworks	62
Figure 10	Respite periods	69
Figure 11	Noise monitoring locations	79

Appendices

Appendix A	Out-of-hour works procedure
Appendix B	Example Out-of-hour works permit

1 Introduction

1.1 Background/Context

This Noise and Vibration Construction Environmental Management Plan (Noise and Vibration CEMP) (this Plan) has been prepared to satisfy the requirements of the Noise and Vibration CEMP set out in the Conditions for the Stage 1 Development of the Western Sydney International (Nancy-Bird Walton) (WSI) Airport detailed in Section 3.10.2 of the Airport Plan. Specifically, Section 3.10.2 Condition 6 (1) of the Airport Plan requires that a Noise and Vibration CEMP be approved under the Airport Plan prior to the commencement of Main Construction Works.

This Noise and Vibration CEMP provides the management approach and requirements (including environmental mitigation measures, controls, monitoring and reporting) for managing noise and vibration during construction of the Stage 1 Development. This Plan forms one of nine CEMPs which are collectively covered by the WSA Site Environmental Management Framework (SEMF). To ensure the environmental resources, responsibilities and management measures are implemented during the construction activities, the SEMF is contained within the Construction Plan (included as Appendix 2). The implementation of the Construction Plan, including the SEMF, sit adjacent to other Project level management plans including the Community and Stakeholder Engagement Plan and the Sustainability Plan as illustrated in Figure 1.

The Construction Plan, including the SEMF, and nine CEMPs provide the environmental management approach and requirements and therefore should not be read in isolation to each other due to interconnecting management outcomes and objectives. Specifically, for the Noise and Vibration CEMP, it is considered that the following management plan linkages can be made:

- Traffic and Access CEMP – Construction traffic will be a contributor to noise.
- Biodiversity CEMP – Noise impacts on fauna will be a management consideration.
- Community and Stakeholder Engagement Plan – Similar to visual and landscape impacts, it is anticipated that the surrounding community and stakeholders will be sensitive to noise and vibration impacts, particularly during works undertaken outside of the normal construction hours and / or prolonged noisy activities.
- Sustainability Plan– Management and reduction of noise and vibration impacts about quality of life for surrounding communities.

Where relevant, linkages to other CEMPs and management objectives have been included in the risk assessment and the environmental control measures, Section 7.3 and Section 9 respectively.

Table 1 highlights relationships and linkages of this Noise and Vibration CEMP with other CEMPs and management plans including key cross-referencing to Airport Plan and EIS requirements.

Table 1 Noise and Vibration CEMP relationship with other CEMP documentation

CEMP or plan	Airport Plan Condition (3.10.2)	EIS Chapter Table 20: Management area	EIS Chapter Table 20: Mitigation measures
Aboriginal Cultural Heritage	11	28-12	28-13
Air Quality	10	28-10	28-11
Biodiversity	7	28-04	28-05
Community and Stakeholder	15	28-20	28-21
European and other Heritage	12	28-14	28-15
Noise and Vibration (this plan)	6	28-02	28-03
Soil and Water	8	28-06	28-07
Sustainability Plan	29	28-37	28-38
Traffic and Access	9	28-08	28-09
Visual and Landscape	14	28-18	28-19
Waste and Resources	13	28-16	28-17

Key

Moderate to high relevance to this CEMP

Some relevance to this CEMP

The review and document control process for this Plan are described further in Section 9 of the SEMF.

The context of this Plan in relation to the WSA environmental management system is presented in Figure 1.

1.2 Document purpose

The purpose of this Plan is to provide the foundation for the management of noise and vibration impacts in accordance with best practice and legal requirements (including environmental mitigation measures, controls, monitoring and reporting) during the construction phase of the Stage 1 development based on the assessment undertaken as part of the EIS.

This Plan details the noise and vibration management requirements that must be satisfied in order to demonstrate compliance with the conditions of approval as set out in Condition 6 of Section 3.10.2 of the Airport Plan for the construction of the Stage 1 Development of the Western Sydney Airport.

Legal and other requirements are identified and maintained in a register within the SEMF (refer SEMF Appendix C). Mitigation measures (specific to noise and vibration) required to satisfy these requirements are derived from the EIS and through risk assessment processes (refer to Section 7.3) and included within this CEMP (refer Section 9).

Implementation of these measures is ensured through monitoring, training and competence, inspection, audit and reporting actions detailed in Sections 12 and 13, with the responsibilities for implementation identified in Section 11. Continual improvement processes in relation to compliance with regulatory requirements are detailed in the SEMF Section 9.2.

In summary, this plan sets out to achieve the following:

- Provision of details for the management and mitigation measures to be implemented, including timing and responsibilities;

- Ensuring the commitments of the Conditions (as set out in the Airport Plan) and regulatory requirements are met and satisfied by both WSA and contractors;
- Provision of process for monitoring implementation, reporting, and auditing of noise and vibration related management and compliance related issues;
- Commitment to meeting the requirements of AS/NZS ISO 14001: 2016 Environmental Management Systems including the need for continual improvement;
- Provision of a process to be implemented for the management of complaints, for stakeholder engagement, and for the management of emerging environmental issues as they arise; and
- Provision of a system including procedures, plans and documentation for implementation by WSA personnel and contractors to enable Project completion in accordance with the environmental requirements.

Effective implementation of this plan will assist WSA and relevant contractors to achieve compliance with necessary environmental regulatory and policy requirements in a systematic manner with an outcome of continual environmental management performance.

1.3 WSA environmental management system overview

WSA Co-operates in general accordance with AS/NZS ISO 14001 – *Environmental management systems*. A copy of the WSA environmental policy is provided in Appendix E of the SEMF.

The Stage 1 development will be undertaken in accordance with the Construction Plan including the SEMF and the associated CEMPs (including this Plan).

The SEMF forms an appendix to the Construction Plan and is the overarching environmental plan for the implementation of the nine CEMPs. It provides a structured and systematic approach to environmental management and provides an expectation and guidance with regards to environmental management for the overall construction of the Stage 1 Development.

The structure of the environmental management system for the Project is shown in Figure 1.

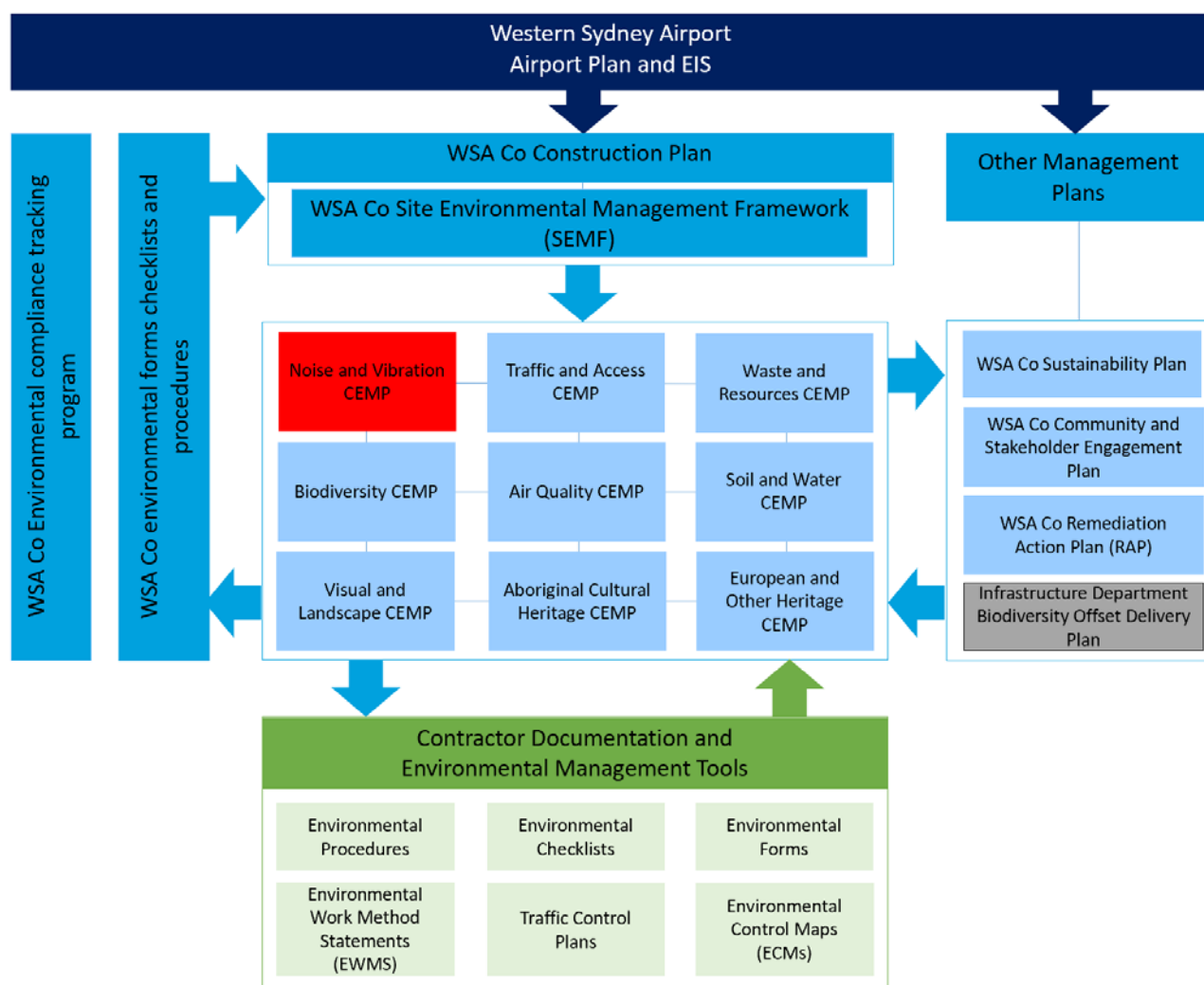


Figure 1 WSA Environmental Management System and CEMP context

1.4 Consultation requirements of this plan

Airport Plan Condition 35 outlines the consultation requirements during the preparation of the CEMP documentation and requires consultation with any NSW Government agencies as specified by the NSW Department of Premier and Cabinet as well as the Environment Department and OEH for specific CEMPs, including this CEMP. NSW Government agencies specified by Department of Premier and Cabinet for consultation for this CEMP, including the OEH, Penrith City Council and Liverpool City Council.

Further, Airport Plan Condition 6(3) requires that this CEMP takes into account Table 28-2 of the EIS which states the CEMP should also be prepared in consultation with the NSW Environment Protection Authority and relevant local councils.

Consultation has been completed during the development of this CEMP (Revision 0) and subsequently during the review and update of Revision 1 of this document. A summary of the stakeholder and government authority consultation completed and used to inform the review of Revision 1 and finalisation of Revision 2 is presented in Table 2.

Consultation will continue with agencies, councils and other relevant stakeholders throughout the Project where there is a change to a CEMP. The outcomes of this consultation will be documented in subsequent revisions of the relevant CEMPs, with details of such consultation included in the applicable document.

1.4.1 Consultation to inform Revision 2

A consultation plan outlining the process for engaging with stakeholders was prepared by the WSA Community and Engagement team. The plan and a scoping document outlining the Bulk Earthworks project and potential modification of the CEMPs was provided to the stakeholders as required by the Airport Plan Conditions.

Details of the construction phases were described in the correspondence to provide context to the stakeholders on the level of impact that would result from the next phase of construction activities. Prior to contract award, stakeholders were invited to attend a site visit (bus tour) on 9 July 2019 to assist the stakeholders to understand the size and scale of the site elements. Following BEC contract award, the CEMPs were updated to reflect the next stage of construction. In October 2019, stakeholders were provided with the nine draft CEMPs to review and were requested to provide comment. To facilitate the review stakeholders were invited to attend a workshop on 8th October 2019, where an overview of the Bulk Earthworks phase was presented and key aspects discussed. A summary of the consultation is provided in Table 2.

Table 2 Noise and Vibration CEMP consultation summary

Activity	Date	Invitees	Summary
Consultation Summary			
Site visit for stakeholders	9 July 2019	<ul style="list-style-type: none"> • Liverpool City Council • Penrith City Council • NSW Health • NSW Aboriginal Affairs • Transport for NSW (RMS) • Western Sydney Unit • Department of Energy and Environment • South Western Sydney Local Health District • Rural Fire Service • DFSI – Waste Assets Management Corporation • NSW Government Architect • Planning and Environment (OEH) • Western Sydney Planning Partnership (DPE/GSC/Councils) • Department of Primary Industries – Water • Greater Sydney Commission • City Deal Alliance (Councils) 	As part of the continuous improvement of the consultation process, a site visit (bus tour) for stakeholders was organised. This has been included due to the good feedback from the last CEMP round where a workshop was held. It is a useful element to assist stakeholders to understand size and scale and also have discussions related to site elements as they are seen during the bus tour.
CEMPs provided to stakeholders for comment	October 2019	<ul style="list-style-type: none"> • Liverpool City Council • Penrith City Council • NSW Health • NSW Aboriginal Affairs • Transport for NSW (RMS) • Western Sydney Unit • Department of Energy and Environment • South Western Sydney Local Health District • Rural Fire Service 	Key themes: <ul style="list-style-type: none"> - Noise during out of hours construction; - Water quality and water source - Air quality and dust management - Source of imported material - Biodiversity surveys - Heritage management
Stakeholder Workshop	8 th October 2019	<ul style="list-style-type: none"> • Liverpool City Council • Penrith City Council • NSW Health • NSW Aboriginal Affairs • Transport for NSW (RMS) • Western Sydney Unit • Department of Energy and Environment • South Western Sydney Local Health District • Rural Fire Service 	

Activity	Date	Invitees	Summary
		<ul style="list-style-type: none"> • DFSI – Waste Assets Management Corporation • NSW Government Architect • Planning and Environment (OEH) • Western Sydney Planning Partnership (DPE/GSC/Councils) • Department of Primary Industries – Water • Greater Sydney Commission • City Deal Alliance (Councils) • Department of Planning Industry and Environment 	

1.5 Certification and approval

This Noise and Vibration CEMP has been reviewed and approved for issue by the WSA Environment Manager prior to submission to Western Sydney Unit, Australian Government Department Infrastructure, Regional Development and Cities (the Infrastructure Department).

1.6 Distribution

All WSA personnel and contractors will have access to this Noise and Vibration CEMP via the Project document control management system. Unless otherwise agreed by the Approver, the Approved Plan must be published on WSA's website within one month of being approved and be available until the end of the Construction Period. An electronic copy can be found on the Project website - <http://wsaco.com.au/project/index.aspx>.

This document is uncontrolled when printed. One controlled hard copy will be maintained by the quality manager at the Project office.

2 Scope of works

The Construction Plan details the construction staging of the Stage 1 Development as progressing generally from the north-east to the south-west of the Airport Site, allowing for the relocation of the Northern Road and a TransGrid transmission line.

The delivery of the Stage 1 Development will be through a packaging strategy with a wide variety of package sizes, risk profiles and contracting entities. Each package will have different levels of environmental risk and environmental obligations, depending on the scope of works, location of works and sensitivity of the receiving environment and cultural heritage issues and relevant statutory requirements and obligations.

Stage 1 Development of the Project comprises the following key features as described in the Construction Plan (which is consistent with the Airport Plan and EIS Chapter 5):

- Site preparation
- Utilities
- Ancillary developments
- Airside precinct
- Ground transport
- Other building activities
- Terminal
- Aviation support facilities

Details of the Project construction activities, staging and programming including the phases of works are described in Section 6 of the Construction Plan (WSA00-WSA-00000-CN-PLN-000001) as required by the Airport Plan Condition 1(5). This Plan applies to the Bulk Earthworks, Early Earthworks and Material Importation phases of works as described in Section 6 of the Construction Plan (WSA00-WSA-00000-CN-PLN-000001). A variation to this Plan will be submitted before work other than Preparatory Activities is undertaken on any other phases of the Project.

3 Objectives and targets

3.1 Objectives

The key objective of this Noise and Vibration CEMP is to ensure that impacts from noise and vibration are managed to within permitted criteria as far as practicable and best practice mitigation practices are implemented to ensure construction phase emissions do not unduly affect the amenity of surrounding receivers.

To achieve this objective, the following will be undertaken:

- Ensure appropriate measures are implemented to address the mitigation measures detailed in Table 28-2 and Table 28-3 in Chapter 28 the EIS;
- Identifying sensitive receivers and ensure appropriate environmental controls and procedures are implemented during construction activities;
- Minimising potential adverse noise and vibration impacts to the environment and community;
- Managing impacts if they occur through a systematic analysis of mitigation strategies;
- Identify a process for monitoring implementation, reporting and auditing;
- Describe the process for managing complaints, stakeholder engagement and emerging environmental management issues as they arise; and
- Ensure appropriate measures are implemented to comply with all relevant legislation, licences and other requirements.

3.2 Targets and performance criteria

Performance criteria specific to noise and vibration have been established for the management of noise and vibration impacts during the Project which have been, in part, derived from the performance criteria identified in the EIS Table 28-2, as presented below in Table 3.

Table 3 Noise and vibration targets

Aspect	Target / Performance criteria	Document Reference
Community Management	No noise or vibration-related complaints associated with the project	Complaints database (Community and Stakeholder Engagement Plan)
	All works are to be undertaken within the designated construction hours or with an out-of-hour work approval	Complaints database (Community and Stakeholder Engagement Plan) Out-of-hour work approval register
Statutory compliance	Nil instances of non-compliance with environmental statutory requirements (e.g. infringement notices, clean-up notices, etc.)	Infringement notices Incident and non-conformance reporting Audit reporting Annual Compliance Report
CEMP compliance	Weekly Environmental Inspections completed	Weekly environmental inspection reports and monthly reporting
	All Environmental Audits completed	Environmental audit reporting
	All incidents and non-conformances closed out in a timely manner	Incident and non-conformance register
	Implementation of feasible and reasonable noise mitigation measures with the aim of achieving the	Environmental inspection checklist Monitoring results

Aspect	Target / Performance criteria	Document Reference
	construction noise management levels detailed in the Interim Construction Noise Guideline (ICNG) (DECC, 2009)	Monthly reporting Annual Compliance Report
Plant and Equipment	All plant and equipment maintained in accordance with manufacturers' requirements	Plant and equipment log books

The above targets in Table 3 have been set to provide a benchmark performance objective to which WSA will endeavour to achieve. Failure to achieve the targets will not be considered a non-conformance, however, will prompt internal review of environmental management and assessment of potential improvement opportunities.

4 Legal and other requirements

Relevant environmental legislation and other requirements are identified below.

4.1 Relevant legislation and guidelines

As the Western Sydney Airport is to be developed under the Airport Plan determined under the Airports Act, some state laws will not be applicable to the Project (s112 of this Act). Where state law is applicable, this Plan will set out the relevant applicable state legislation and requirements and demonstrate how compliance with those laws including obtaining relevant permits will be achieved. Where state laws are not applicable, there may nonetheless be a requirement to have regard to those laws, for example, through mitigation measures to be incorporated in CEMPs to satisfy conditions under the Airport Plan.

4.1.1 Legislation

Relevant legislation and regulations to this Plan are summarised in Table 4.

Table 4 Principal legislation and relevance

Legislation or regulation	Relevance	CEMP compliance provisions
Commonwealth		
<i>Airports Act 1996</i> (Airports Act)	<p>The Airports Act and Airports Regulations set out the framework for the regulation and management of activities at airports that could have potential to cause environmental harm. This includes offences related to environmental harm, environmental management standards, monitoring and incident response requirements.</p> <p>The Airport Plan prepared under the Airports Act covers a number of environmental matters and, in particular, details specific measures to be carried out for the purposes of preventing, controlling or reducing the environmental impact associated with the airport. Criminal offences are applicable if these measures are not complied with.</p>	This CEMP forms part of the overall WSA Co environmental management system which has as a target, full compliance with the Airport Plan.
Airports (Environment Protection) Regulations 1997 (AEPR)	<p>Imposes a general duty to prevent or minimise environmental pollution (including noise pollution) once an airport lease is granted. Promotes improved environmental management practices at airports. Includes provisions setting out definitions, acceptable limits and objectives for noise impacts, as well as monitoring and reporting requirements.</p> <ul style="list-style-type: none"> • Section 2.04 What is offensive noise • Section 4.06 General duty to prevent offensive noise • Section 4.08 Duty - noisy, or potentially noisy, equipment; and 	<p>Section 6 – Noise and vibration criteria</p> <p>Section 3 – Objectives and targets</p> <p>Section 9 – Environmental control measures</p>

Legislation or regulation	Relevance	CEMP compliance provisions
	Section 4.09 Duty-noise control equipment.	
NSW		
Protection of the Environment Operations Act 1997 (POEO Act), and the Protection of the Environment Operations (General) Regulation 2009	The POEO Act provides a range of controls about noise and vibration management. The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment.	Section 9 – Environmental Control Measures

4.1.2 Guidelines and standards

Guidelines and standards that are relevant to noise and vibration management and this plan are summarised in Table 5.

Table 5 Relevant guidelines and standards

Guidelines and standards
<ul style="list-style-type: none"> The Australian and New Zealand Environment Conservation Council (ANZECC) guideline – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC, 1990)
<ul style="list-style-type: none"> NSW Interim Construction Noise Guideline (ICNG) (DECC 2009)
<ul style="list-style-type: none"> Noise Policy for Industry (2017)
<ul style="list-style-type: none"> NSW Assessing Vibration: A Technical Guideline (DE 2006)
<ul style="list-style-type: none"> German DIN 4150-3: Structural Vibration: Effects of Vibration on Structures
<ul style="list-style-type: none"> Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (1990) Australian and New Zealand Environment and Conservation Council (ANZECC)
<ul style="list-style-type: none"> Australian Standard AS 2187.2-2006: Explosives - Storage and use - Use of explosives
<ul style="list-style-type: none"> Liverpool Local Environmental Plan 2008 (NSW)
<ul style="list-style-type: none"> AS/NZS ISO 14001:2015 – Environmental Management Systems

4.2 Approvals and other specifications

- Functional Specifications;
- Western Sydney Airport Plan (2016);
- Western Sydney Airport Environmental Impact Statement;
- WSA Sustainability Plan;
- WSA Community and Stakeholder Engagement Plan; and
- WSA Construction Plan, including the SEMF.

4.3 Airport Plan Conditions

Construction conditions relevant to noise and vibration management during construction of the Stage 1 Development are provided in Section 3.10.2 of the Airport Plan and summarised in Table 6. Compliance with the Airport Plan conditions is a statutory requirement and as such, failure to comply may constitute a criminal offence liable to criminal prosecution under the relevant legislation.

Table 6 Airport Plan conditions relevant to noise and vibration management

Condition No.	Condition	Timing	Responsibility	Document reference
1.4	The Site Occupier must ensure that no CEMP is inconsistent with the approved Construction Plan.	Ongoing	WSA	This document (Noise and Vibration CEMP) and the WSA Construction Plan
1.5	The approved Construction Plan may provide for Main Construction Works to be carried out in phases that commence at different times for different parts of the Airport Site or an Associated Site. If it does, the Site Occupier may prepare a CEMP in relation to one or more phases, and the criteria for approval of such a CEMP are taken to exclude any matter irrelevant to the phases for which approval is sought. A variation of the CEMP must be submitted for approval in accordance with condition 41 (Variation of Approved Plans) prior to commencement of any new phase.	Ongoing	WSA	This document (Noise and Vibration CEMP) and the WSA Construction Plan
5.3	In carrying out a Preparatory Activity, the Site Occupier must: a) implement any plan approved in accordance with sub condition (1) or (2), except to the extent that the plan is inconsistent with any subsequently approved CEMP or the approved Construction Plan; and b) not act inconsistently with any approved CEMP or the approved Construction Plan.	Ongoing	WSA	Site Environmental Management Framework
6.1	The Site Occupier must not: a) Commence Main Construction Works until a Noise and Vibration CEMP has been prepared and approved in accordance with this condition; or b) Carry out any development described in Part 3 of the Airport Plan inconsistently with the approved Noise and Vibration CEMP	Prior to Main Construction Works	WSA	This document (Noise and Vibration CEMP)
6.2	The Site Occupier must: a) Prepare, and b) Submit to an Approver for approval; A Noise and Vibration CEMP in relation to the carrying out of the developments described in Part 3 of the Airport Plan.	Prior to Main Construction Works	WSA	This document (Noise and Vibration CEMP)

Condition No.	Condition	Timing	Responsibility	Document reference
6.3	<p>The criteria for approval of the Noise and Vibration CEMP are that an Approver is satisfied that:</p> <ul style="list-style-type: none"> a) in preparing the Noise and Vibration CEMP, the Site Occupier has taken into account Table 28-2 in Chapter 28 of the EIS; and b) the Noise and Vibration CEMP complies with Table 28-3 in Chapter 28 of the EIS and is otherwise appropriate. 	Prior to Main Construction Works	Approver	Section 4: Legal and Other Requirements
6.4	<p>The Noise and Vibration CEMP must:</p> <ul style="list-style-type: none"> a) provide for respite periods for Sensitive Receptors from noise and vibration associated with construction activities; and b) not permit blasting activity during the hours of 5 pm to 9 am on weekdays, on weekends (other than 9 am to 1 pm Saturdays) and on public holidays. 	Prior to Main Construction Works	WSA	<p>Section 9: Environmental Control Measures</p> <p>Section 10: Working outside of standard construction hours</p>
35	<p>An Approver must not approve a plan referred to in Chapter 28 of the EIS unless he or she is satisfied that the Plan Owner:</p> <ul style="list-style-type: none"> (a) in preparing the plan, has consulted with any NSW Government agencies specified by the NSW Department of Premier and Cabinet; and (b) has provided: <ul style="list-style-type: none"> i) the Approver; and ii) each consulted agency; <p>with an explanation of how any responses have been addressed.</p>	Ongoing	Approver	This document (Noise and Vibration CEMP)
37 to 42	Set out requirements in relation to informing other parties of conditions, keeping records, publishing reports, independent audits, variation to approved plans and publication of approved plans.	Ongoing	WSA and Approver	This document (Noise and Vibration CEMP)

4.3.1 Environmental Impact Statement requirements

The requirements of noise and vibration management to be taken into account and addressed during the construction phase of the Stage 1 development are included in the EIS, specifically Table 28-2 and 28-3. A summary of these requirements and how they have been addressed in this Noise and Vibration CEMP is presented in Table 7.

Table 7 Summary of noise and vibration management requirements

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
Table 28-2	Performance criteria	<p>Performance criteria for managing construction noise and vibration are:</p> <ul style="list-style-type: none"> • Compliance with the approved Noise and Vibration CEMP; • Compliance with criteria provided for in the AEPR and any other criteria established for construction works in the approved Noise and Vibration CEMP; • Compliance with vibration criteria set out in German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures; and • Compliance with residential criteria for overpressure from blasting activities (ANZECC, 1990). 	Section 3 – Objectives and targets
Table 28-2	Implementation framework	A Noise and Vibration CEMP will be approved prior to commencement of Main Construction Works for the proposed airport. The Noise and Vibration CEMP will collate measures to mitigate and manage potential noise and vibration impacts, including cross-references to other environmental management plans where they are relevant.	This Noise and Vibration CEMP
		The Noise and Vibration CEMP will as a minimum:	-
		Detail the management and mitigation measures to be implemented, including those outlined in Table 28-3;	<p>Section 9 – Environmental control measures</p> <p>Section 10 Working outside standard construction hours</p>
		Describe the process for managing complaints, stakeholder engagement, and emerging environmental management issues as they arise;	Section 12.6 – Environmental Incidents and complaints management
		Specify the process for monitoring implementation, reporting, and auditing; and	Section 12– Environmental inspection, monitoring, auditing and reporting
		Identify the party responsible for implementing the Noise and Vibration CEMP.	Section 11 – Environmental roles and responsibilities
Table 28-2	Monitoring	<p>General monitoring requirements are set out under the AEPR. These include that:</p> <ul style="list-style-type: none"> • Monitoring must take place under direction of an appropriately qualified person; • Monitoring for construction and road traffic noise for sensitive receptors; and 	Section 12– Environmental inspection, monitoring, auditing and reporting

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
		<ul style="list-style-type: none"> The results for the monitoring must be kept in a written record. 	
		Additional monitoring requirements include that:	-
		Noise and vibration monitoring locations will be determined in consultation with the NSW Environment Protection Authority;	Section 12– Environmental inspection, monitoring, auditing and reporting
		Regular site inspections will be undertaken to monitor compliance with the Noise and Vibration CEMP and record inspection results;	Section 12– Environmental inspection, monitoring, auditing and reporting
		An inspection log will be made available to the Infrastructure Department upon request; and	Section 12– Environmental inspection, monitoring, auditing and reporting
		The frequency of site inspections will be increased by the person accountable for onsite noise and vibration issues when activities with a high potential to result in elevated noise emissions are undertaken in close proximity to residential receptors.	Section 12– Environmental inspection, monitoring, auditing and reporting
Table 28-2	Auditing and reporting	General reporting requirements are set out under AEPR	-
		In addition, an annual report will be prepared and submitted to the Secretary of the Department of Infrastructure and Regional Development in relation to compliance with Noise and Vibration CEMP.	Section 12– Environmental inspection, monitoring, auditing and reporting
		The Community and Stakeholder Engagement Plan provides for the development of a complaints log and includes specific measures for how complaints will be managed.	Section 12– Environmental inspection, monitoring, auditing and reporting
Table 28-2	Responsibility	Responsibilities include:	-
		The Noise and Vibration CEMP will be prepared in consultation with the NSW Environment Protection Authority and NSW Health;	Section 1.4 – Consultation requirements
		The Noise and Vibration CEMP will be submitted for approval to the Infrastructure Minister or an SES Officer in the Department of Infrastructure and Regional Development;	Section 1.5 – Certification and approval
		The design and construct (D&C) contractor will be responsible for implementing site specific environmental procedures and work method statements applicable to the proposed works in accordance with the requirements of the Noise and Vibration CEMP; and	Section 11– Environmental roles and responsibilities

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
		The airport environment officer will be responsible for day to day regulatory oversight of the AEPR compliance at the airport after an airport lease is granted.	Section 11– Environmental roles and responsibilities

5 Existing environment

The following information is summarised from the EIS – Specifically for the noise and vibration assessment, refer to Chapter 11 of EIS Volume 2A.

For the purpose of the phase of Main Construction Works covered by this CEMP, the existing environment described herein is considered consistent and acceptable for consideration in the risk assessment process and the identification of suitable environmental mitigation measures and controls - for details with regards to environmental mitigation measures and controls for management of noise and vibration impacts refer to Section 9.

5.1 Sensitive receptors

Noise-sensitive receivers in the area around the Airport Site are shown in Figure 2 and include the following:

- Residences and aged care;
- Schools, childcare centres and community centres;
- Hospitals and other health care facilities;
- Parks and recreation areas;
- Religious facilities; and
- Shopping and retail centres.

5.2 Ambient noise

Ambient noise levels in the vicinity of the airport site are reflective of the mostly rural residential character of the area, with dominant existing noise sources including road traffic and industry. Background noise measurements were carried out at 11 locations selected to represent potentially affected areas. The location of the background noise monitoring locations is shown in Figure 3. From the measurement data, the Rating Background Level (RBL) as defined in the NSW Industrial Noise Policy was determined for the selected locations as presented in Table 8 below.

Table 8 Measured background noise levels (LA90)

Location	Rating background level (dBA)*		
	Day (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
9 Harold Bentley Way, Glenmore Park	39	42	38
16 Park Avenue, Springwood	29 ¹	32	24 ¹
17 Blue Ridge Place, Orchard Hills	34	38	36
25 Peter Pan Avenue, Wallacia	37	34	28 ¹
27 Dwyer Road, Bringelly	33	38	35
35 Ramsay Road, Rossmore	35	37	35
54 Ridgehaven Road, Silverdale	36	36	31
114 Mount Vernon Road, Mount Vernon	34	35	33
120 Vincent Avenue, Mulgoa	38	42	35
Twin Creeks Golf Club, 2 Twin Creeks Drive, Luddenham	34	38	33
8 Wade Close, Luddenham	35	36	34

*data provided is from the EIS

¹ According to the NSW Industrial Noise Policy, where the RBL has been measured as less than 30 dBA, it should be assumed to be 30 dBA for the purpose of setting noise criteria. This applies to the RBL at the Springwood and Wallacia locations.

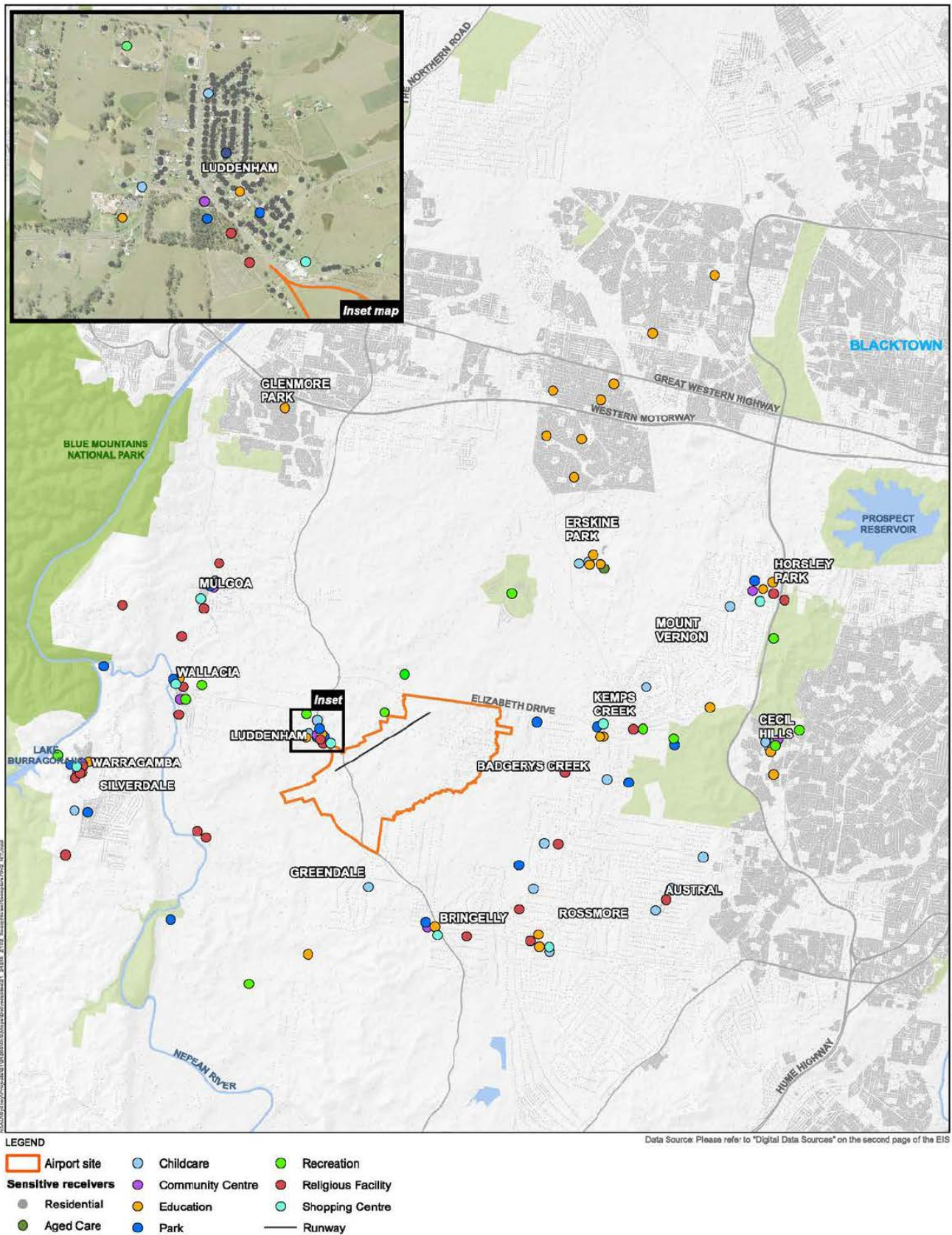


Figure 2 Sensitive receiver locations surrounding the Airport Site

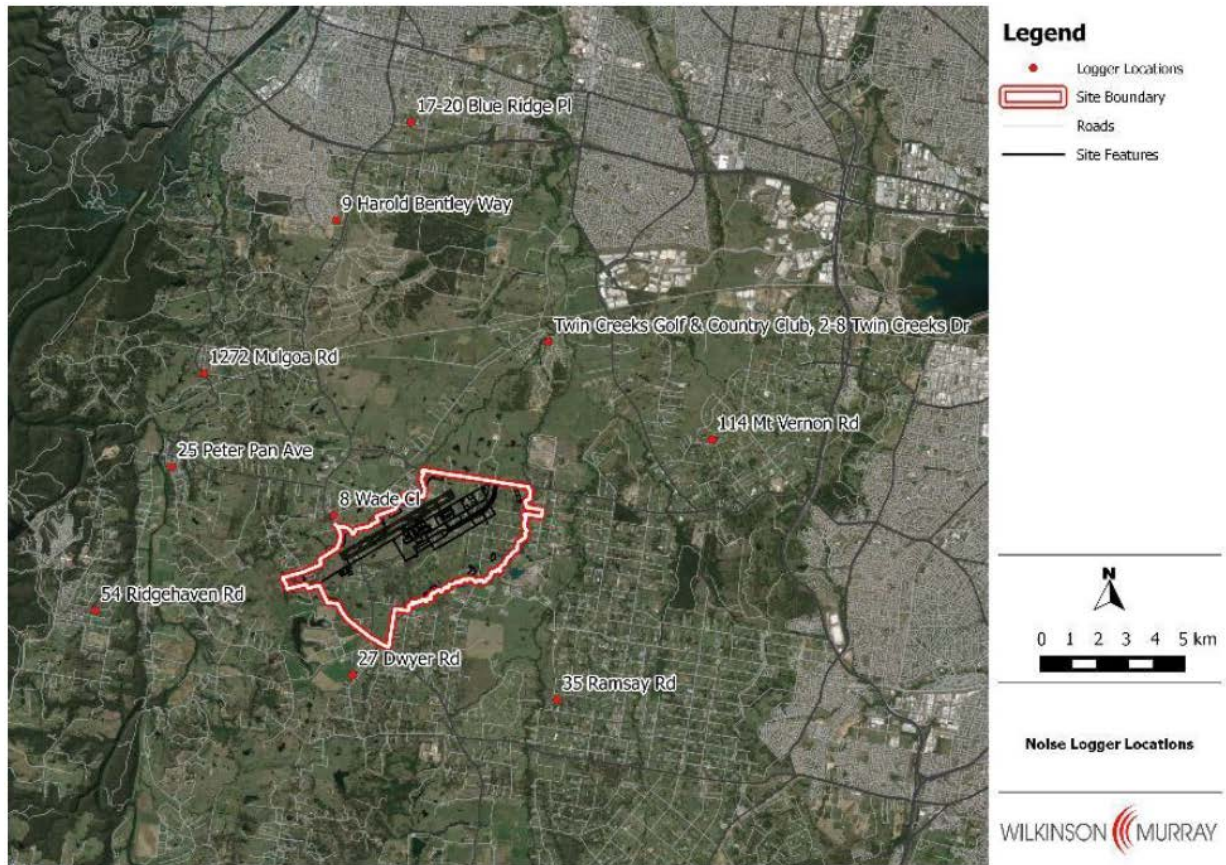


Figure 3 Background noise measurement locations

6 Noise and vibration criteria

Management levels and goals used in assessing construction noise and vibration are outlined in:

- Airports (Environment Protection) Regulations 1997 (AEPR);
- The Interim Construction Noise Guideline (ICNG) (DECC, 2009);
- Assessing Vibration: A Technical Guideline;
- The ANZECC, Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration; and
- NSW Road Noise Policy (RNP) (DECC, 2011).

Relevant elements of these documents are summarised and discussed in this section.

6.1 Construction noise and assessment objectives

6.1.1 AEPR

Airports (Environmental Protection) Regulations 1997 (AEPR) includes provisions setting out definitions, acceptable limits and objectives for noise impacts, as well as monitoring and reporting requirements for the operation of Airports.

The main objectives of the AEPR are to:

- ***Establish, in conjunction with national environment protection measures made under section 14 of the National Environment Protection Council Act 1994, a Commonwealth system of regulation of, and accountability for, activities at airports that generate, or have potential to generate:***
 - pollution; or excessive noise; and to promote improving environmental management practices for activities carried out at airport sites.

Regulation 4.06 of the AEPR sets out a general duty to take reasonable and practicable measures to prevent the generation of offensive noise or if prevention is not reasonable or practicable, to minimise the generation of offensive noise. Under regulation 4.07, an operator of an undertaking at an airport is complying with the duty in Reg 4.06 if noise levels are under the guidelines in Schedule 4 of the AEPR. Guidelines that are relevant to the construction of the Stage 1 Development include:

- **Noise from Construction:**
 - Noise generated from construction, maintenance or demolition of a building or other structure at an airport should not exceed 75 dB(A), calculated in accordance with subclause (2), at the site of a sensitive receptor; and
 - For sub regulation (1), the sound pressure level of a noise is the sound pressure level that is exceeded for 10 per cent of a period of at least 15 minutes, adjusted to take account of tonal character and impulsiveness (if any) of the noise.
- **Noise generated from road traffic on the site of an operator of an undertaking at an airport should not exceed:**
 - 60 dB(A), calculated as the equivalent continuous A-weighted sound pressure level for a 24-hour period of measurement; and
 - 55 dB(A), calculated as the equivalent continuous A-weighted sound pressure level for an 8-hour period of measurement from 22:00 hours on a day to 06:00 hours on the following day.

The AEPRs has additional criteria in relation to commercial receptors (see reg 3.02 of Sch 4). Part 4 of Schedule 4 also provides procedures and standards for measuring construction noise (AS 1055) and Road traffic noise (AS 2702).

6.1.2 Interim Construction Noise Guideline (ICNG)

Interim Construction Noise Guideline (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;
- Performance criteria for managing construction noise and vibration are;
- Ensure general compliance with the ICNG;
- Compliance with vibration criteria set out in German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures; and
- Compliance with residential criteria for overpressure from blasting activities (ANZECC, 1990).

6.2 Quantitative noise assessment criteria

ICNG recommends noise management levels to assist the management of noise on construction sites both during and outside standard construction hours (Monday to Friday, 7.00am to 6.00pm and Saturday 8.00am to 1.00pm). Where noise at sensitive receptors is expected to exceed noise management levels, implementation of reasonable and feasible noise mitigation is recommended and consultation with affected people encouraged.

For works during standard construction hours, the noise management level is background plus 10 dBA for residential locations. For works outside of normal construction hours, the noise management level is background plus 5 dBA.

Where construction would be undertaken during the night-time period the potential for sleep disturbance should be assessed. The current approach to identifying potential sleep disturbance impacts is to set a screening criterion 15 dB above the RBL during the night-time period (10.00pm to 7.00am).

The term 'screening criterion' indicates a noise level that is intended as a guide to identify the likelihood of sleep disturbance. It is not a firm criterion to be met, however where the criterion is met sleep disturbance is unlikely. When the screening criterion is not met, a more detailed analysis is required.

The detailed analysis should assess the maximum noise level or LA1 (one minute), the extent that the maximum noise level exceeds the background noise level and the number of times any exceedance occurs during the night-time period.

The RNP contains a section on sleep disturbance that includes a summary of current literature; concluding that:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions; and
- One or two events per night, with maximum internal noise levels of 65 dB to 70 dB, are not likely to affect health and wellbeing significantly.

6.3 Adopted project Noise Management Levels

Based on the daytime RBLs shown in Table 8, the residential NML for standard construction hours will be between 39 dBA and 49 dBA. As stated in the EIS Section 11.4.2, for assessment of construction noise, a noise management level of 45 dBA may reasonably be adopted for all residential receptors. A noise management level of 40 dBA has been adopted for weekend works and early morning works (outside standard construction hours). Any exceedance in the noise levels will trigger the non-conformance process detailed in the SEMF Section 8.

The noise management levels set for all residential receptors are below criteria for construction at airports of 75 dBA outlined in Schedule 4 of the AEPR in Section 6.1.

6.4 Vibration criteria

The German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures is the most stringent vibration standard typically used to protect buildings from vibration damage. The standard recommends frequency-based vibration damage guideline values (DIN 41503) summarised in Table 9.

Table 9 Vibration damage guideline values (DIN 41503)

Type of structure	Guideline value, peak particle velocity (mm/s)
Dwellings and buildings of similar design	5
Vibration sensitive buildings (heritage)	3

6.5 Blasting criteria

During construction, it is possible that blasting may be carried out at locations where hard rock is encountered. The Australian and New Zealand Environment Conservation Council's (ANZECC) Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990) recommends residential criteria for the assessment of vibration and air blast from blasting. These criteria are designed to protect the comfort of occupants of residential buildings and are summarised in Table 10.

Table 10 ANZECC recommended vibration and air blast criteria

Issue	Measure	Criterion for 95% of blasts	Criterion for 100% of blasts
Vibration	mm/s PPV	5	10
Air blast	dBL Peak	115	120

7 Noise and vibration aspects and impacts

7.1 Construction activities

Construction of the Stage 1 Development will result in the generation of noise and vibration during both the bulk earthworks and the construction of other infrastructure. Specific to the works covered by this CEMP (as detailed in Section 2 and Construction Plan Section 6), the likely activities that have the potential to have impacts associated with noise and vibration include the following:

- General excavation activities expected to involve conventional road excavation equipment;
- Earthworks, including the importing of materials to stockpile on -site;
- Establishment of site compounds;
- Clearing and grubbing of vegetation;
- Construction traffic (heavy and light vehicles), including access to and from site and around the Airport Site; and
- Slope stability works and landscaping activities.

7.2 Noise and vibration impacts

The potential for noise and vibration impacts was considered in Chapter 11 of the EIS. An assessment was undertaken of the potential sources detailed in Section 6.1. The findings are summarised in the sections below.

A more detailed construction noise and vibration assessment, specific to the early and bulk earthworks has been prepared. The results and findings of the assessment are presented in Section 8.

7.2.1 Construction noise impacts

The EIS identified that under worst case conditions, noise emissions arising from construction activities will be predominantly limited to the airport site and immediate surrounds. The adopted construction noise management criteria, as detailed in Section 6.3, has been set to ensure noise and vibration impacts on sensitive receivers are managed and to ensure that the guideline level of 75 dBA set in the AEPR is met at all surrounding receptors. A range of mitigation and management measures listed in Section 9 are to be adopted to mitigate disturbance to nearby receptors, particularly for construction activity outside of standard construction hours.

The estimated population likely to be affected by noise levels above the adopted noise management level during standard hours as assessed in the EIS is summarised in Table 11. The sections referred to in the first column is based on the indicative sections shown in Figure 4.

Table 11 Estimated residential population affected by levels above NML - standard construction hours¹

Location*	NML	Estimated residential population affected above criterion
East section	45 dBA	0
North section	45 dBA	103
North-west section	45 dBA	199
South-west section	45 dBA	14

*Refer to Figure 4

¹worst case temperature inversion

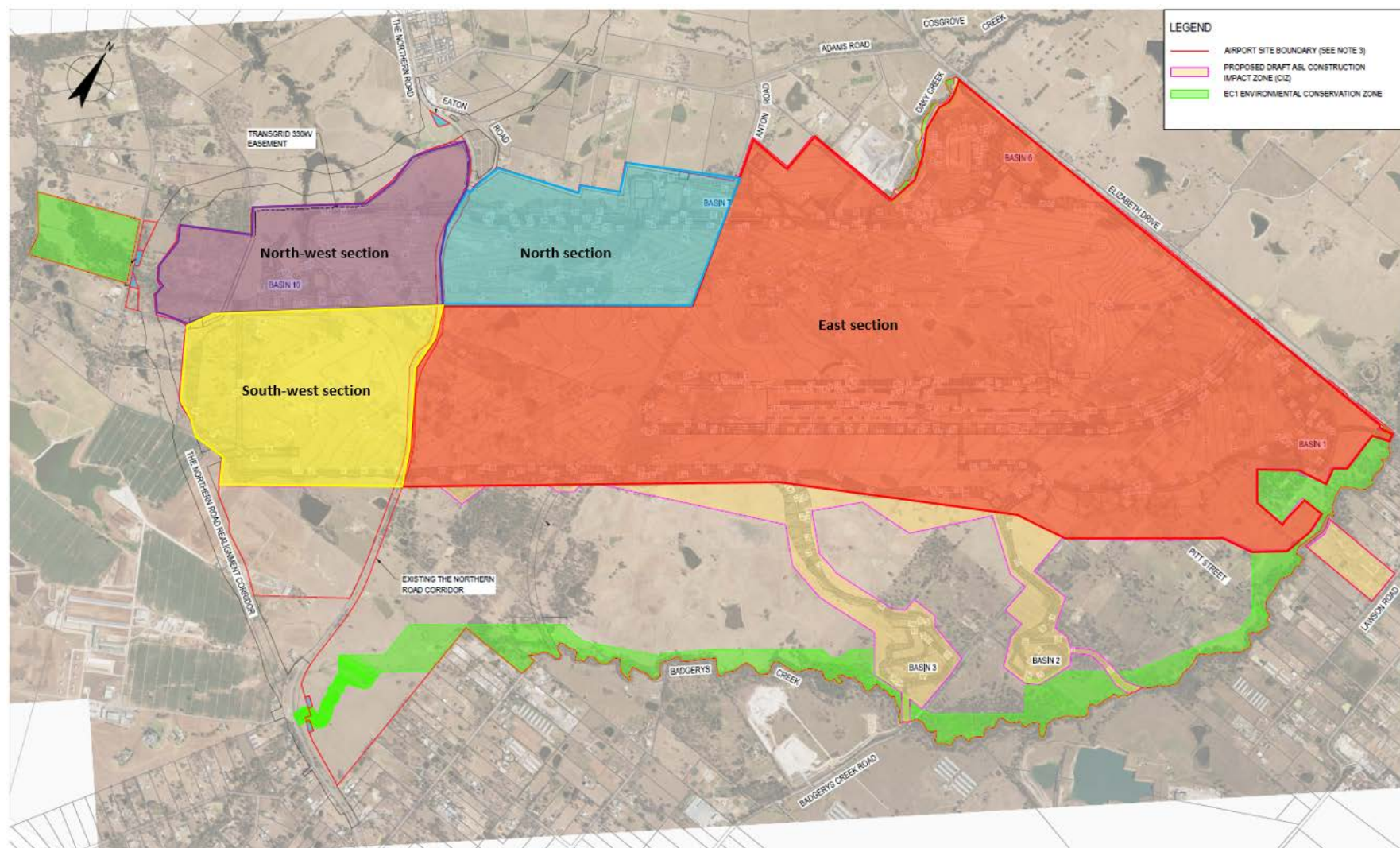


Figure 4 Indicative Airport Site sections used for noise assessment (as per the EIS)

The estimated population likely to be affected by noise levels above the adopted noise management level outside standard hours is shown in Table 12.

Table 12 Estimated residential population affected by levels above NML– outside standard construction hours¹

Location*	NML	Estimated residential population affected above criterion
East section	40 dB(A)	48
North section	40 dB(A)	527
North-west section	40 dB(A)	531
South-west section	40 dB(A)	140

*Refer to Figure 4

¹worst case temperature inversion

7.2.2 Construction traffic noise

Construction traffic would use the nearby road network, with most traffic expected to access the airport site via Elizabeth Drive. Other roads used will include Anton Road, The Northern Road, and Badgerys Creek Road. Details on predicted volumes of increased traffic are outlined in the EIS and summarised in the Traffic and Access CEMP. The predicted increase in noise from construction traffic is less than 2 dB(A).

The cumulative impacts associated with traffic noise and construction noise on a whole of site basis is included in the Traffic and Access CEMP.

Experience Centre and Site Office

Experience Centre

During operation of the experience centre the majority of vehicle movements will be light vehicles with a negligible number of buses and heavy vehicle movements (approximately 4 movements per day). The maximum expected volume of light vehicle movements are detailed below in Table 13.

Table 13 Expected Experience Centre light vehicle volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total/day
Light vehicles	1	2	80	16	1	100

Source – WSA traffic survey

The majority of vehicles movements are expected to occur between the operational hours of the experience centre (10:00 until 16:00 Monday to Thursday). Special events may occur on the weekends and residents will be notified in advance.

Site Office

During operation of the Site Office the majority of vehicle movements will be light vehicles with a negligible number and heavy vehicle movements (approximately 2 movements per week). The maximum expected volume of light vehicle movements are detailed in Table 14.

Table 14 Expected Site Office light vehicle volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total/day
Light vehicles	10	90	100	90	10	300

Source – WSA traffic survey

To determine the potential for traffic noise impacts for the Experience Centre and Site Office, an estimate of expected noise level increase has been based on vehicles using the main access point along Eaton Road. The noise level has been predicted to be no greater than 0.5dB increase and is therefore unlikely to have a significant impact at the closest receiver.

Early Earthworks

Table 15 presents predicted noise increases along Elizabeth Drive as a result of construction traffic. This change in noise level is unlikely to be perceptible.

Table 15 Predicted construction traffic noise increases on Elizabeth drive

Road	Location	Noise level increase (dB)	
		Day	Night
Elizabeth Drive	West of Mamre Road	0.6	1.1
	West of Devonshire Road	0.9	0.5
	West of Lawson Road	0.9	0.6

Bulk Earthworks and material importation

As with the early earthworks, construction traffic would use the adjacent road network including Elizabeth Drive, Anton Road, the Northern Road, and Badgerys Creek Road.

Details on the relative split in construction traffic between these access roads is not currently available. To determine the potential for bulk earthworks construction traffic noise impacts for the project, an estimate of expected noise level increase will be based on vehicles using the main access point along Elizabeth Drive.

Based on the estimated total daily traffic, the heavy vehicle split of bulk earthworks construction traffic is expected to be about 14.5 per cent. This heavy vehicle split would be consistent with existing vehicle movements on Elizabeth Drive.

Table 16 presents the estimated number of earthworks construction vehicles used in the assessment of impacts. An assessment of the predicted increase in traffic noise from the bulk earthworks construction activity for the project is presented in Table 15.

Table 16 Expected construction vehicles (excluding material importation)

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening/Night (18:00–06:00)	Total/day
Light vehicles	200	50	50	250	50	600
Heavy vehicles	10	20	40	20	10	100

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening/Night (18:00–06:00)	Total/day
Oversized and semi-trailers	0	1	2	0	0	3
Sandstone deliveries	0	30	90	30	200	350

7.2.3 Construction vibration

Vibration will be generated by specific construction plant as part of the construction works. In the absence of an applicable Australian Standard, the most stringent vibration standard, the German Standard DIN 4150-3:1999 was used to assess building vibration damage. A lower guideline value applying to vibration sensitive buildings of 3 mm/s was adopted as a threshold of damage from construction vibration.

Vibration during construction may be generated by the ripping of rock; however, the 3 mm/s guideline value is not expected to be exceeded therefore there is no risk of damage outside the airport boundary.

Attended vibration monitoring or vibration trials will be undertaken when proposed works are within the safe working distances to ensure that levels remain below the criterion. Building condition surveys will also be completed both before and after the works at any potentially affected properties to identify existing damage and any proposal related damage.

7.2.4 Blast vibration and air-blast

Preliminary site investigations indicate that the Bringelly shale and Luddenham dyke at the airport can be ripped. However, there are some thicker sandstone deposits throughout the site that may need to be blasted.

These locations are illustrated in Figure 5. The closest residential receptor to the blast areas would be approximately 450 metres to the north of Blast area 1.

At this distance, depending on the quantity of explosive used, among other details such as overburden depth, hole diameter and stemming height, blasting may result in noise (over pressure) and vibration (groundborne) impacts on the closest receivers.

Section 8 describes the noise and vibration assessment for blasting, based on a range of mass instantaneous charges (MIC) and distance from the blast sites.

Section 9 provides a suite of mitigation measures that will be implemented to avoid or minimise the potential noise and vibration impacts.

A detailed blasting vibration and overpressure assessment would be conducted as part of any potential blast design if required and a Blast Management Plan prepared by the contractor, reviewed by the WSA environment team and approved by WSA Environment Manager prior to the works being undertaken.

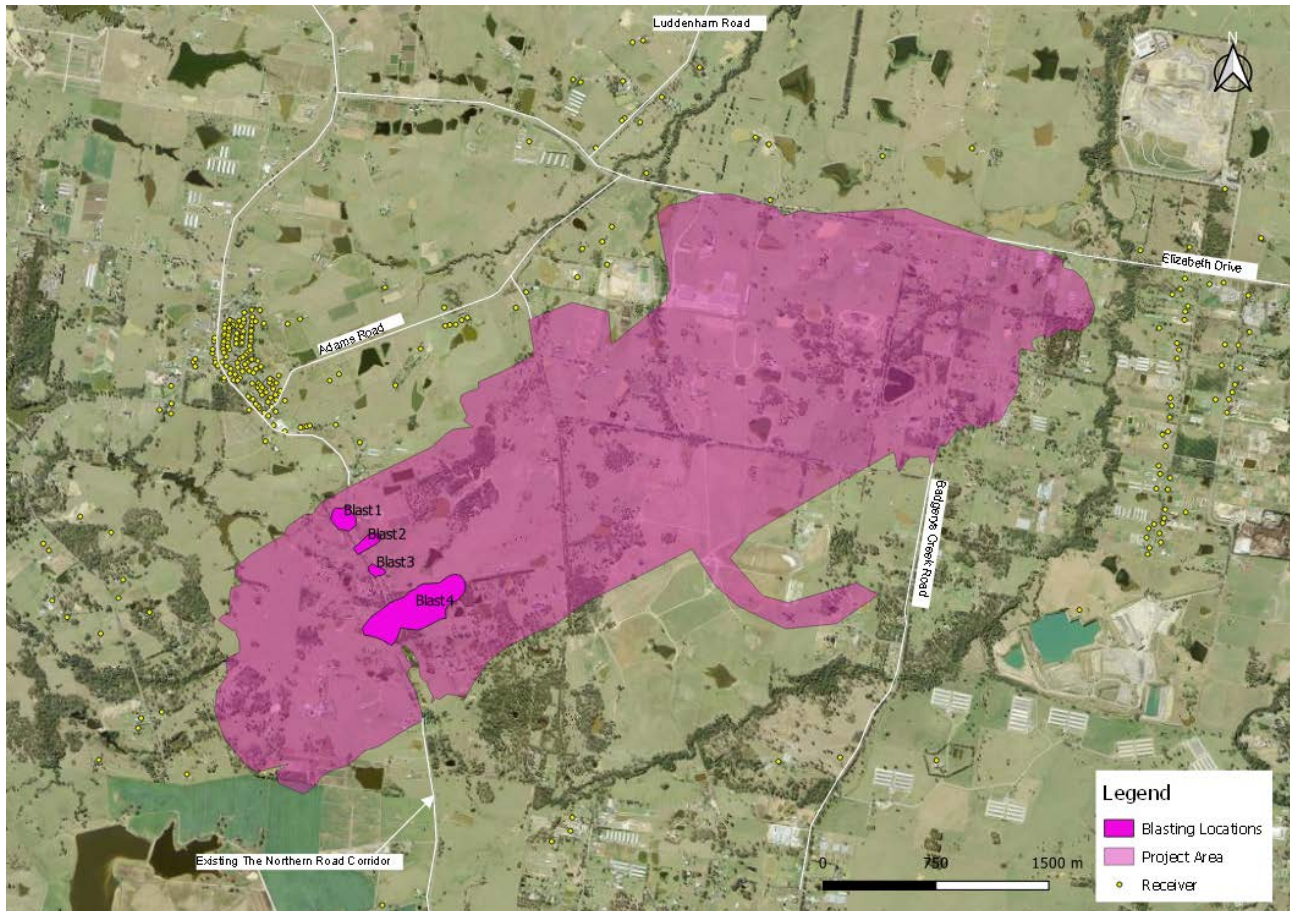


Figure 5 Potential drill and blast areas.

7.3 Risk assessment

A risk assessment has been undertaken as part of the review and development of this CEMP and in accordance with Environmental Aspects, Impact and Risk Procedure (Appendix D of the SEMF). The parts of the overall risk assessment relevant to Noise and Vibration have been extracted and summarised in Table 17 and applies to all phases of works that the Construction Plan authorises.

The identification of construction activities and associated impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards.

The risk management process involved an assessment of all specific Project activities/aspects in or near environmentally sensitive areas and resulted in the development of a list of environmental risks (effects and impacts) and a corresponding risk mitigation strategy and risk ranking.

The identification of risks included a review of the works, and review of the environmental risks identified by the EIS. The mitigations in the risk assessment are in line with the EIS mitigation measures.

Table 17 Noise and vibration risk assessment

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
01	Use of site compound / installation of pre-fabricated structures	Earthworks to construct compound footprint	Noise generation	Community disturbance	C3 (Sig)	NV01 NV07 NV09 NV11 NV15 NV28	C2 (Mod)	Noise and Vibration CEMP Soil and Water CEMP Biodiversity CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
02		Construction of compound buildings, parking and amenities	Noise generation	Community disturbance	D3 (Sig)	NV01 NV03 NV04 NV05 NV07 NV09 NV15 NV18 NV28	D2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
03		Compaction of materials	Vibration	Community disturbance and building damage	B3 (Mod)	NV01 NV07 NV09 NV15 NV18	B2 (Low)	Noise and Vibration CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM)

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV19 NV28		Complaints Procedure Community and Stakeholder Engagement Plan
04	Use of site compound / installation of pre-fabricated structures (continued)	Delivery of materials to compound	Noise generation	Community and local road disturbance	C3 (Sig)	NV01 NV07 NV10 NV16 NV17 NV20	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP Traffic and Access CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
05		Operation of site compound	Noise generation	Community and local road disturbance	C3 (Sig)	NV01 NV02 NV06 NV07 NV21 NV25 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
06	Enabling works	Demolition of structures	Noise generation	Community disturbance	B3 (Mod)	NV01 NV07 NV08 NV09	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV11 NV15 NV18 NV19 NV28		Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
07	Utility works	Potholing and trenching	Noise generation	Community and local road disturbance	B3 (Mod)	NV01 NV07 NV15 NV18 NV28	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
08	Earthworks	Topsoil stripping	Noise generation	Community disturbance	C3 (Sig)	NV01 NV07 NV09 NV11 NV14 NV15 NV18 NV19 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
09		Vegetation clearing	Noise generation	Community disturbance	C3 (Sig)	NV01 NV07	C2 (Low)	Noise and Vibration CEMP Biodiversity CEMP

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV09 NV11 NV14 NV15 NV18 NV19 NV28		EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
10	Earthworks (continued)	Embankment creation and stabilisation	Noise generation	Community disturbance	B3 (Mod)	NV01 NV07 NV09 NV11 NV14 NV15 NV18 NV19 NV28	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
11		Compaction of materials	Vibration	Community disturbance and building damage	B3 (Mod)	NV01 NV07 NV09 NV11 NV14 NV15 NV18 NV19	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV28		
12	Earthworks (continued)	Material stockpiling	Noise generation	Community disturbance	C3 (Sig)	NV01 NV07 NV09 NV10 NV11 NV14 NV15 NV17 NV18 NV19 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
13		Import and export of materials from site	Noise generation	Community and local road disturbance		NV01 NV07 NV10 NV11 NV16 NV17 NV20 NV28		Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
14	Culvert construction	Culvert excavation	Noise generation	Community disturbance	B3 (Mod)	NV01 NV07 NV09 NV11	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV15 NV18 NV19 NV28		Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
15	Culvert construction (continued)	Culvert compaction	Vibration	Community disturbance	B2 (Low)	NV01 NV07 NV09 NV11 NV15 NV18 NV19 NV28	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
16	Bridge construction	Bridge piling	Noise and Vibration	Community disturbance	B2 (Low)	NV01 NV07 NV09 NV11 NV15 NV18 NV28	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
17		Bridge compaction	Vibration	Community disturbance	B2 (Low)	NV01 NV07 NV09 NV11	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV15 NV18 NV28		Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
18	Bridge construction (continued)	Steel and concrete cutting	Noise generation	Community disturbance	C3 (Sig)	NV01 NV07 NV08 NV09 NV11 NV15 NV18 NV22 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
19	Road construction	Milling and excavation of road surface	Noise generation	Community disturbance	C3 (Mod)	NV01 NV07 NV08 NV09 NV11 NV14 NV15 NV18 NV19 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
20		Compacting materials	Vibration	Community disturbance	C3 (Sig)	NV01 NV07 NV09 NV15 NV18 NV19 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
21	Out of hours works	Works on site border closest to residents	Noise generation	Disturbance to sensitive receivers on Overett Avenue, Kemps Ck, Eaton Road	C4 (Sig)	NV01 NV06 NV09 NV10 NV11 NV12 NV13 NV15 NV16 NV17 NV18 NV20 NV21 NV22 NV23 NV25 NV26	C2 (Mod)	Noise and Vibration CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV27 NV28		
22	Out of hours works (continued)	General works	Noise generation	Disturbance to sensitive receivers in Adams Rd, Luddenham	C4 (Sig)	NV01 NV06 NV09 NV10 NV11 NV12 NV13 NV15 NV16 NV17 NV18 NV20 NV21 NV22 NV23 NV25 NV26 NV27 NV28	C2 (Mod)	Noise and Vibration CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
23		General works	Noise generation	Disturbance to sensitive receivers on Badgerys Rd	C4 (Sig)	NV01 NV06 NV09	C2 (Mod)	Noise and Vibration CEMP Soil and Water CEMP EWMS

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
				South and Eaton Road.		NV10 NV11 NV12 NV13 NV15 NV16 NV17 NV18 NV20 NV21 NV22 NV23 NV25 NV26 NV27 NV28		Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
24	Out of hours works (continued)	Road closures	Noise generation	Community and local road disturbance	C4 (Sig)	NV01 NV07 NV09 NV11 NV12 NV15 NV21 NV22 NV23	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
						NV24 NV25 NV26 NV27 NV28		
25	Out of hours works (continued)	Excavation	Noise generation	Community and local road disturbance	C4 (Sig)	NV01 NV07 NV09 NV11 NV12 NV13 NV14 NV15 NV18 NV19 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
26		Compaction	Vibration	Damage to residential structures	C4 (Sig)	NV01 NV07 NV09 NV11 NV15 NV18 NV19 NV28	C2 (Mod)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level 2 pre-mitigation	Mitigation measure 1	Risk level 2 post-mitigation	Management tools
27	Dewatering	Using diesel pumps	Noise generation	Community disturbance	B2 (Low)	NV01 NV07 NV09 NV11 NV15 NV21 NV28	B2 (Low)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

¹ Refer to Section 9 for mitigation measures and controls

8 Construction noise and vibration assessment

In order to quantify noise emissions and associated noise impact from the construction activities associated with the proposed Stage 1 Development, noise modelling will be carried out for works comprising key phases of the development as described in Section 2.

The noise predictions will be used to determine potential construction noise impacts on the surrounding community. An adaptive management approach will be applied to the implementation of mitigation measures to minimise impacts on the community.

Where required, guidance around modelling requirements/assumptions (as set out in Section 8.1) will be given to Contractors to ensure a consistent approach to assessing noise impacts and industry standard modelling will be required. However, it is likely that different modelling software and therefore different outputs will be used and generated for the construction activities for the proposed Stage 1 Development.

The construction noise guideline level of 75 dB(A) in the Airports (Environment Protection) Regulations 1997 is based on the sound pressure level that is exceeded for 10 per cent of a period of at least 15 minutes (LA10), adjusted to consider of tonal character and impulsive (if any) of the noise. Given the predicted noise levels, based on the LAeq (equivalent continuous sound level), the construction noise guideline of 75dB(A) LA10 is unlikely to be exceeded. A range of mitigation and management measures listed in Section 9 will be adopted to mitigate disturbance to nearby receptors.

Modelling of noise levels at nearby receivers resulting from construction activities should consider the following:

- Aim to predict LAeq(15 minute) noise level
- Consider typical-worst case construction noise levels based on locations of work and sound power levels (SWL) of the expected construction activities within each zone or work area.
- Consider the following:
 - Attenuation of noise source due to distance;
 - Barrier effects from buildings, and other man-made and topographical features;
 - Air absorption;
 - Ground effects; and
 - Meteorological conditions.

In order to determine worst-case predictions, the following assumptions should be applied:

- The construction works are occurring at the nearest point to each receiver and that the receiver is located at the most exposed position;
- The noisiest construction sources are operating simultaneously and continuously for the entire 15-minute period. Note, this may not always occur as equipment will regularly be stood down or idled while other activities are undertaken; and
- A worst-case meteorological Category 6 will be assumed, where the receiver is downwind of the source and the wind speed is >3 m/s.

8.1 Summary of potential noise impacts

8.1.1 Early Earthworks phase

Various construction activities associated with the undertaking of the Early Earthworks and Material Importation have been identified for different zones within the Western Sydney Airport Stage 1 Development. A brief summary of each zone and the works associated with that zone is presented in Table 16 and the zones are shown in Figure 5.

The acoustic assessment is for standard construction hours only. If construction works need to be conducted outside of standard hours, a scenario specific noise model will be used to assess potentially affected receivers, detailing location and activities specific to the works that need to be conducted out of hours. Out of hours work procedures, highlighted in Section 10, would be implemented during those times.

Table 18 Early earthworks construction zone summary

Location	Description
Zone 1 and 2	Stockpiling area
Zone 3	Main compound area
Zone 6	Main works zone (cut to fill operation)
Zone 7	Elizabeth road works
Zone 8 and 9	Minor earth works

To present the potential construction noise impacts that may result from the works associated with the development during standard construction hours, a noise assessment has been conducted for each Zone of works individually as well as all works running concurrently.

The number of receivers predicted to exceed the daytime NML and associated receiver-based mitigation measures for each scenario are presented in Table 19 to Table 24.

Notwithstanding the above, the environmental control measures presented in Table 31 will be implemented.

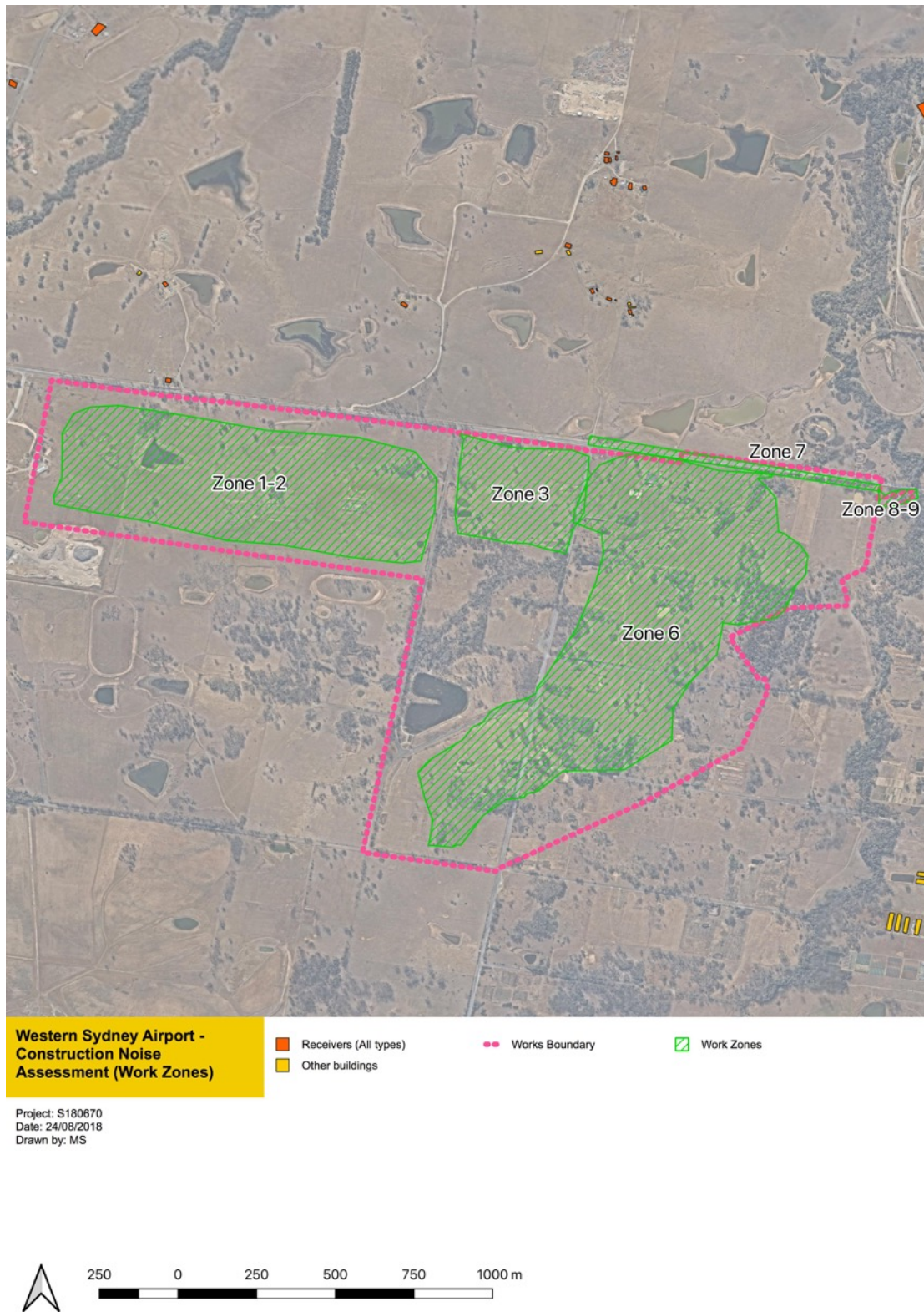


Figure 6 Early Earthwork Construction Zone Summary

Table 19 Population affected by Zone 1 and 2 and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
Zone 1 and 2	56	66 dB(A)	<p>All noise affected receivers require notifications for construction activities likely to affect their amenity through noise and vibration as per Environmental Control Measure NV27.</p> <p>Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are achieved as per Environmental Control Measure NV28.</p>

Table 20 Population affected by Zone 3 and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
Zone 3	9	51 dB(A)	<p>All noise affected receivers require notifications for construction activities likely to affect their amenity through noise and vibration as per Environmental Control Measure NV27.</p> <p>Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met as per Environmental Control Measure NV28.</p>

Table 21 Population affected by Zone 6 and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
Zone 6	86	57 dB(A)	<p>All noise affected receivers require notifications for construction activities likely to affect their amenity through noise and vibration as per Environmental Control Measure NV27.</p> <p>Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met as per Environmental Control Measure NV28.</p>

Table 22 Population affected by Zone 7 and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
Zone 6	86	57 dB(A)	All noise affected receivers require notifications for construction activities likely to affect their

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
			<p>amenity through noise and vibration as per Environmental Control Measure NV27.</p> <p>Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met as per Environmental Control Measure NV28.</p>

Table 23 Population affected by Zone 8 and 9 and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
Zone 6	45	59 dB(A)	<p>All noise affected receivers require notifications for construction activities likely to affect their amenity through noise and vibration as per Environmental Control Measure NV27.</p> <p>Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met as per Environmental Control Measure NV28.</p>

Table 24 Population affected by all Zones and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
All Zones	117	66 dB(A)	<p>All noise affected receivers require notifications for construction activities likely to affect their amenity through noise and vibration as per Environmental Control Measure NV27.</p> <p>Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met as per Environmental Control Measure NV28.</p>

8.1.2 Material Importation

If required, prior to the commencement of out of hours work for material importation, the process set out in Section 10 will be completed, which will include detailed noise modelling. Initial modelling indicates that noise generated from unloading of material is unlikely to generate noise that is significantly over the NML at the closest receiver. It is noted that material will only be unloaded at night and not levelled / incorporated into the stockpile.

8.1.3 Bulk Earthworks

Bulk earthworks will primarily involve cutting and filling across the project site. Cutting will be completed using scrapers for stripping soil and transporting material to adjacent fill areas. Dozers will aid the scrapers by ripping harder material. More detailed work will be completed using excavators with haulage by articulated dump trucks. In fill areas, deposited material will be compacted and graded.

Other activities include clearing (excavators with truck and dogs), removal of utilities (water, comms, sewer, stormwater) (by excavator and trucks) and installation of drainage (Truck and dogs and Excavators). Drilling for blasting has also been assessed in this section.

Ancillary facilities will be constructed and used for amenities, parking, maintenance and refuelling. Installation of site sheds would be completed by a delivery vehicle and 200t crane.

Modelling of the above activities was undertaken using SoundPlan, a computer-based noise prediction model. The model incorporated:

- Digital elevation model (DEM) based on 1 metre LIDAR data
- Potentially affected receivers to a radius of 1 kilometre from the works site boundary. Noise levels were predicted to a height of 1.5 metres above ground. In total, 250 sensitive receivers were included in the model. Of these, 180 receivers are identified as residential. The remaining non-residential receivers include commercial uses, places of worship, recreational areas, schools and child care centres.
- Noise sources have been assessed as separate cut and fill sites across the project, grouped in the north, north-west, southwest and east work sites identified in Figure 4. Cut and fill sites are illustrated in Figure 7. Equipment and estimated sound power levels operating in each work site are included in the modelling. Noise sources were assumed to be 2 metres above ground.
- Structural and topological screening, ground absorption and air absorption.
- Worst-case meteorology, assuming gentle breeze from source to receiver and inversion.

A summary of predicted noise levels for works during standard hours is provided in Table 23, which indicates the works in each section of the site, the number of affected receivers and maximum predicted noise level.

Results demonstrate the risk of adverse impact on receivers near each work site would be low. In summary:

- In the north west section, cut and fill operations should not impact any sensitive receiver, since they are predicted to meet the daytime NML. Other activities such as utility removal, clearing and drainage may impact up to 6 receivers in Luddenham. Where all activities are undertaken concurrently in a location close to the boundary, cumulative level may increase the number of affected receivers to 30.
- In the south west section, Cut 19 may result in up to 11 receivers being impacted by noise. 10 of these would be minor impacts, with levels less than 10 dB above the NML. One receiver may exceed the NML by 11 dB. Utilities, clearing and drainage works may affect up to 2 receivers.
- In the north section, cut and fill operations should not impact any sensitive receiver, since they are predicted to meet the daytime NML. Other activities such as utility removal, clearing and drainage may impact up to 7 receivers in Luddenham. Where all activities are undertaken concurrently in a location close to the boundary, cumulative level may increase the number of affected receivers to 19.
- In the east section, which is the most expansive, cut operations at C2 and C8 may affect up to 6 receivers and other cut and fill sites between 1 and 3 receivers. The impacts would be minor with exceedances no greater than 10 dB above the NML, with the exception of 1 receiver predicted to be up to 26 dB over the NML when works are in cut 2 and fill 4.
- Drilling at the blast area may result in up to 4 receivers exceeding the NML by up to 3 dB. Where two drills are used, this result would increase to 8 receivers exceeding by up to 6 dB.

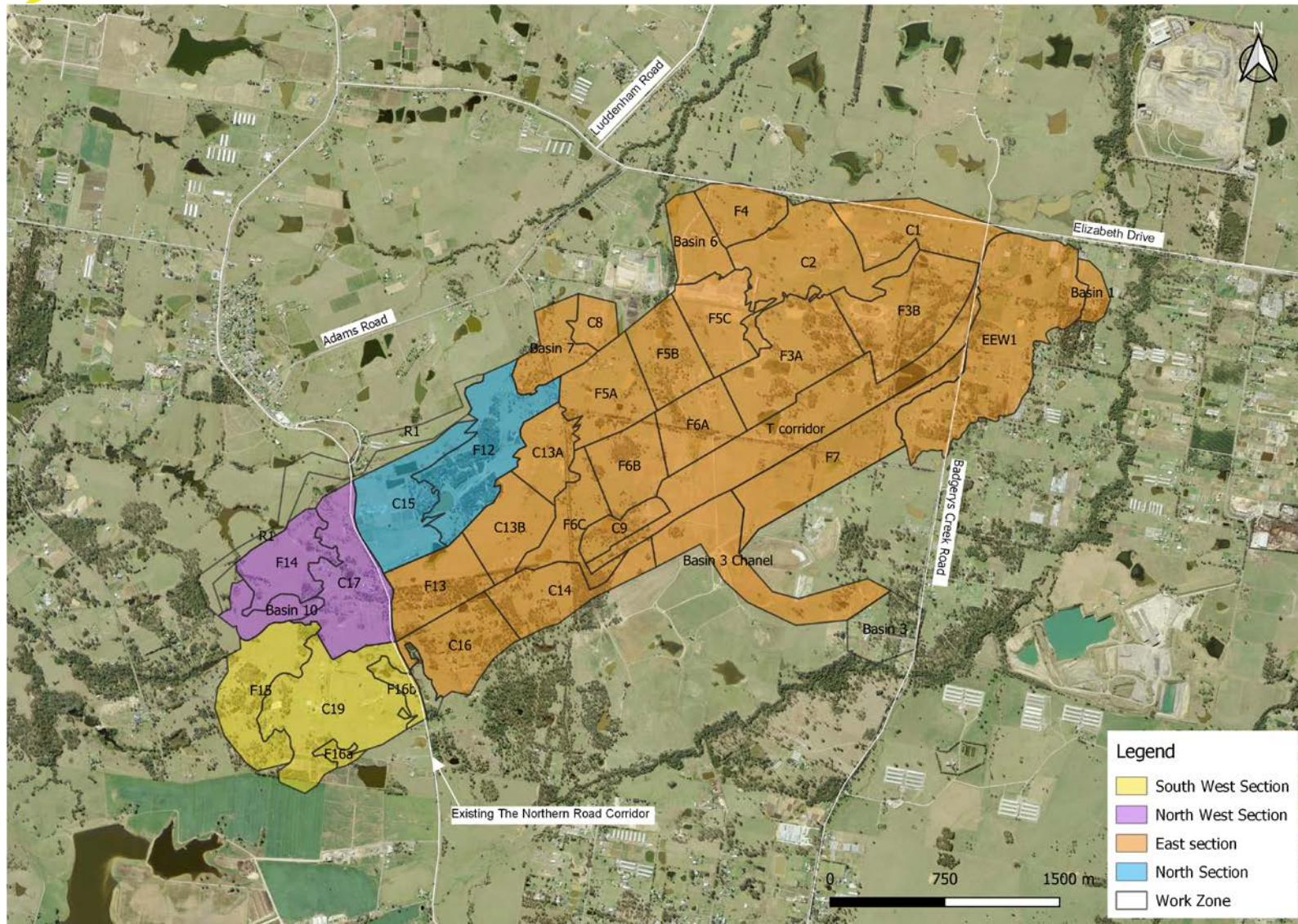


Figure 7 Bulk earthworks construction sites

Table 25 Population affected by Bulk Earthworks and noise mitigation requirements

Activity		Maximum level		Predicted no. receivers with exceedance of standard hours NML		
		L _{Aeq} , 15 minute	Rec. >75	0-10	10-20	20+
Northwest section	C17	44	0	0	0	0
	F14	40	0	0	0	0
	Clearing	51	0	5	0	0
	Drainage	53	0	6	0	0
	Utilities	51	0	5	0	0
	Haul road maintenance	45	0	0	0	0
	Cumulative	57	0	30	1	0
Southwest Section	C19	56	0	10	1	0
	F15	44	0	0	0	0
	F16	35	0	0	0	0
	Clearing	50	0	2	0	0
	Drainage	52	0	2	0	0
	Utilities	50	0	2	0	0
	Haul road maintenance	44	0	0	0	0
	Cumulative	56	0	29	1	0
North section	C15	40	0	0	0	0
	F12	43	0	0	0	0
	Clearing	53	0	6	0	0
	Drainage	55	0	7	0	0
	Utilities	53	0	6	0	0
	Haul road maintenance	47	0	1	0	0
	Cumulative	59	0	19	1	0
East section	C1	56	0	3	1	0
	C2	72	0	6	0	1
	C8	60	0	6	0	0
	C13	46	0	1	0	0
	C14	40	0	0	0	0
	C16	41	0	0	0	0
	F3	50	0	3	0	0
	F4	71	0	2	0	1
	F5	44	0	0	0	0
	F6	40	0	0	0	0
	F7	37	0	0	0	0
	F13	40	0	0	0	0
	F16	40	0	0	0	0
	Clearing	72	0	4	0	1
	Drainage	74	0	7	0	1
	Utilities	72	0	4	0	1
	Haul road maintenance	66	0	0	0	1
	Cumulative	79	1	52	4	1
Blast area	Drill (2 drills)	51	0	8	0	0
All		80	79	1	152	13

8.2 Construction traffic noise

8.2.1 Early Earthworks

Construction traffic will use the nearby road network, with most traffic expected to access the site via Elizabeth Drive. The Roads and Maritime Services Construction Noise and Vibration Guideline (CNVG) does not require further assessment of construction traffic noise if the increase in road traffic noise levels is less than or equal to 2 dB(A) due to project related construction traffic.

For noise mitigation to be triggered by construction traffic on local roads, the number of vehicles would need to increase by nominally 60 per cent. It is not anticipated that the early earthworks package would result in a 60 per cent increase in traffic volumes. Hence, the increase road traffic noise levels due to construction traffic is predicted to be less than 2 dB(A) and no further consideration of mitigation is required.

Furthermore, a review of maximum expected traffic construction traffic flows relative to the current baseline volumes was conducted as part of the EIS. A summary of the findings is provided in in Table 26.

Table 26 Predicted construction traffic noise increased on Elizabeth Drive

Road	Location	Noise level increase dB(A)	
Elizabeth Drive	West of Mamre Road	0.6	1.1
Elizabeth Drive	West of Devonshire Road	0.9	0.5
Elizabeth Drive	West of Lawson Road	0.9	0.6

8.2.2 Material Importation

Construction traffic will use the same network as outlined in Section 8.2.1. When combined with other phases, traffic volumes are not expected to result in a 60% increase in the current levels and therefore a noise level increase of greater than 2dBA is not expected. Prior to the commencement of out of hours work, the process set out in Section 10 will be completed, which will include detailed modelling. Initial modelling to assess the practicability predicts that noise generated from delivery of material is will not generate noise that is significantly over the NML at the closest receiver, this will be confirmed by more detailed monitoring carried out as part of the out of hours permit for this work.

8.2.3 Bulk Earthworks

Construction traffic noise impacts for bulk earthworks have been assessed based on daily construction traffic of 703 total vehicles per day including about 14.5 percent heavy vehicles. Typical construction vehicle access would be during daytime hours with some out of hours works as required.

Existing traffic movements at Cecil Hills on Elizabeth Drive taken from the EIS (Section 3.2, Appendix J) indicate that for the year 2014, combined two-way AADT traffic levels were 26,598 vehicles/day. For the assessment of impacts 90 percent of this traffic volume (23,938 vehicles/day) has been used to determine the daytime split of vehicle usage on Elizabeth Drive.

Section 7.2.2 summaries the construction vehicles per day during peak periods and includes details of traffic numbers predicted during night time hours.

Assuming heavy vehicle splits for the proposed construction traffic and existing volumes on Elizabeth Drive, an estimate of the increase in traffic noise against the 2014 AADT has been provided in Table 27 and Table 28 for daytime and night time assessments respectively.

Table 27 Predicted bulk earthworks construction traffic noise increase - Day

	AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L_{Aeq} Traffic noise (dBA)
Existing day time road traffic	24000	15.0%	3600	20400	24000	-	-
Construction traffic			243	400	643	80	0.2
Increase in total traffic		15.6%	3843	20800	24643		

Table 28 Predicted bulk earthworks construction traffic noise increase - Night

	AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L_{Aeq} Traffic noise (dBA)
Existing day time road traffic	2500	25.0%	625	1875	2500	-	-
Construction traffic			220	250	470	80	1.1
Increase in total traffic		28.5%	845	2125	2970		

The predicted increase in noise level for both day and night time impacts is expected to be less than the 2 dB(A) trigger level for additional mitigation of road traffic noise.

Considering the predicted increase in noise levels is based on traffic data from the 2014 year of operations, estimated noise increases are conservative given expected growth in volumes over the last 5 years.

Where granularity of the bulk earthworks impacts is required specifically around out of hours works, additional information on the split of construction vehicles across the road network and current traffic data over a 24 hour period for existing roads will be necessary to determine this level of detail.

8.3 Construction vibration assessment

Roads and Maritime Services CNVG provides guidelines for minimum working distances for vibration-intensive activities with respect to the stated standards and guidelines. The minimum working distances for building damage should always be complied with. The distances are noted as being indicative and are likely to vary depending on the item of plant and local geotechnical conditions. The minimum working distances apply to addressing the risk of cosmetic (minor – easily reparable) damage of typical buildings under typical geotechnical conditions.

Where vibration intensive works are required to be undertaken within the specified minimum working distances, vibration monitoring should be undertaken to ensure acceptable levels of vibration are satisfied.

In relation to human comfort, the minimum working distances relate to continuous vibration. For most construction activities, vibration emissions would be intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods may be allowed.

Table 29 presents the recommended minimum working distances for vibration intensive plant.

Table 29 Recommended safe working distances for vibration intensive plant

Plant item	Rating / description	Minimum working distance – Cosmetic damage (BS7385)	Minimum working distance – Human response (DECC 2006)
Vibratory roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	4 m
Jackhammer	Hand held	1 m (nominal)	2 m

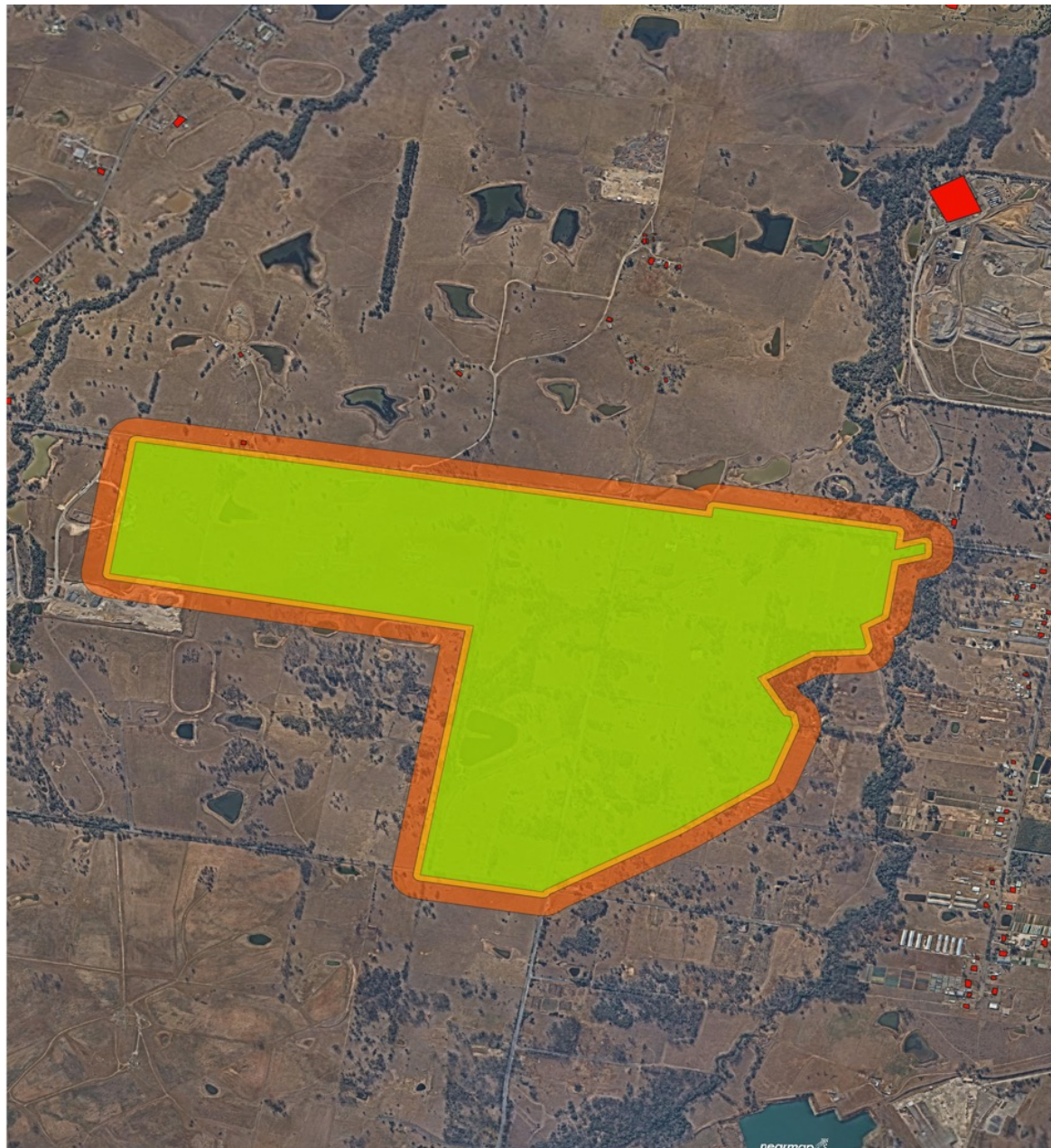
8.3.1 Early Earthworks

shows the minimum safe distance a receiver needs to be from where vibration intensive work is proposed for early earthworks, assuming a worst-case scenario where the works are occurring at the outer perimeter of the proposed work site.

The separation distance(s) between the proposed works and the nearest receivers would generally be enough so that nearby buildings are unlikely to suffer 'Cosmetic Damage' for most of the proposed construction equipment.

There is one receiver located on Elizabeth Drive to the north west of the site within the 100 m contour line. The contour line is representative of the human comfort safe working distance for a large vibratory roller.

Attended vibration monitoring or vibration trials will be undertaken when proposed works are within the safe working distances to ensure that levels remain below the relevant criteria. Building condition surveys will also be completed both before and after the works at any potentially affected properties to identify existing damage and any proposal related damage.



**Western Sydney Airport -
Construction Noise
Assessment (Vibration impact)**

Project: S180670
Date: 24/08/2018
Drawn by: MS

Legend

- Site Layout
- Safe Working Distance 25 m - Cosmetic Damage (Vibratory Roller > 18 tonnes)
- Safe Working Distance 100 m - Human Comfort (Vibratory Roller > 18 tonnes)
- All Building Types



500 0 500 1000 1500 2000 m

Figure 8 Vibration safe working distances

8.3.2 Material Importation

Review of the material importation scope, it is considered that there is very limited risk of vibration impacts. As shown in Figure 9, the stockpile location of imported material is well away from the edge of the site and the nature of the works are unlikely to generate vibration.

8.3.3 Bulk Earthworks

Vibration represents a low risk of impact to the surrounding community, considering the distance between sources and receivers. Equipment with the greatest potential for vibration would be vibratory rollers operating in fill sites. With reference to Table 27, a minimum working distance for a vibratory roller (>18 tonnes) would be 25 metres for cosmetic damage and 100 metres to prevent human comfort.

Figure 9 illustrates the minimum safe working distances from the project boundary for cosmetic damage and human comfort.

One receiver is located within the human comfort minimum working distance on Elizabeth Drive (adjacent to the East work area). Works in the vicinity of this receiver should consider human comfort impacts and utilise lower levels of vibration where possible.

No receivers are within the cosmetic damage minimum work distance, hence damage to structures is not likely from the works.

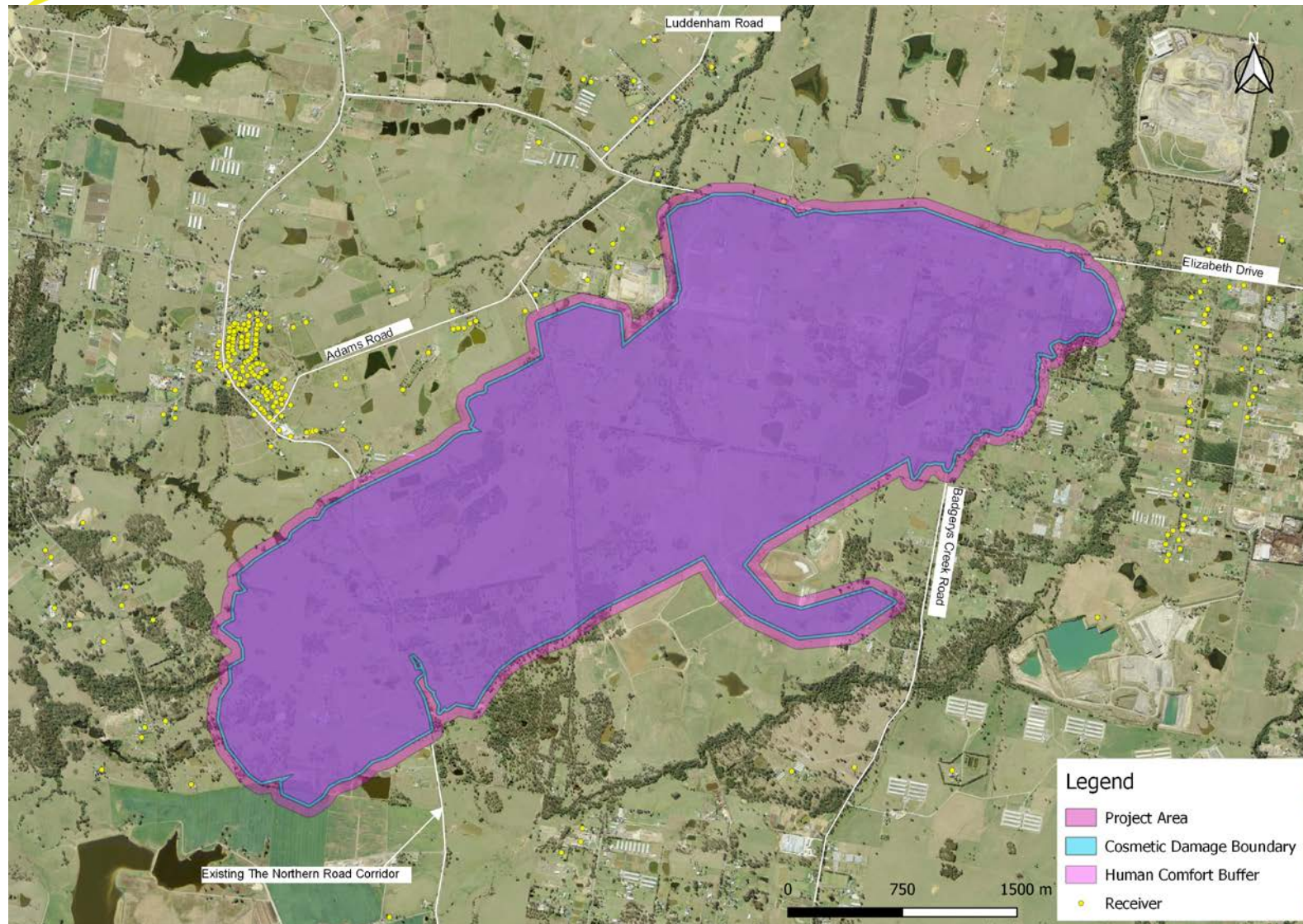


Figure 9 Vibration safe working distances during bulk earthworks

8.4 Blasting noise and vibration

Blasting may take place in the areas identified in Figure 5. Though specific blasting parameters are not known at this stage, the following assessment provides guidance on the number of potentially affected receivers resulting from various charges used for each blast hole.

A range of Mass Instantaneous Charge (MIC) values between 50 kg and 500 kg per hole has been used to estimate the radius at which the assessment criteria may be exceeded.

Predicted ground borne vibration and overpressure levels are based on AS 2187.2-2006 *Explosives—Storage and use Part 2: Use of explosives*. The relevant formulae are as follows:

$$\text{PVS (50\%)} = 1,140 * (\text{R}/\text{Q}^{1/2})^{-1.60}$$

$$\text{SPL (50\%)} = 164.4 - 24 * (\log(\text{R}) - \frac{1}{3} \log(\text{Q}))$$

where,

PVS = Peak Vector Sum vibration velocity (mm/s)

SPL = Peak airblast noise level (dB Linear)

R = Distance between charge and receiver (m)

Q = Charge mass per delay (kg)

Table 30 summarises the number of receivers likely to exceed the vibration and overpressure assessment criteria set out in Section 6.5 for the range of MIC used in each Blast area (illustrated in Figure 3).

No receivers are within 450 metres of a blast site. For blast 1, an MIC up to 250kg is not expected to exceed the 5 mm/s vibration criterion at any single receiver. Up to 6 receivers may be impacted at higher MICs. At more distant blast areas, no further receivers are within a radius likely to be impacted by blasting.

MIC up to 100 kg is expected to meet the 115 dBL criterion for over pressure at blast site 1. A further 14 receivers may be affected at higher MICs in blast site 1. At blast site 2, further from the nearest receiver, an MIC of up to 200 kg is not expected to exceed the criterion. Blast sites further from the nearest receivers (3 and 4) are not likely to impact receivers at MICs up to 500 kg.

Table 30 Number of receivers likely to be impacted based on MIC

MIC	Blast area (refer to Figure 5)							
	1		2		3		4	
	Ground vibration	Airblast	Ground vibration	Airblast	Ground vibration	Airblast	Ground vibration	Airblast
50	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-
150	-	1	-	-	-	-	-	-
200	-	6	-	-	-	-	-	-
250	-	9	-	1	-	-	-	-
300	1	14	-	2	-	-	-	-
350	1	14	-	2	-	-	-	-
400	1	14	-	2	-	-	-	-
450	6	14	-	2	-	-	-	-
500	6	14	-	2	-	-	-	-

9 Environmental control measures

Mitigation and management measures that will be implemented during construction are detailed in Table 31 and are consistent with those provided in Tables 28-2 and 28-3 in Chapter 28 of the EIS, as per Condition 6.3 and 6.4 (Section 3.10.2) of the Airport Plan. The relevant control measures will be included in the site-specific Environmental Work Method Statement (EWMS) and Environmental Control Map (ECM) – refer to Sections 4.3 and 4.3 of the SEMF.

Table 31 Noise and vibration management and mitigation measures

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
GENERAL					
NV01	Training will be provided to all project personnel, including relevant sub-contractors on noise and vibration requirements from this plan through inductions, toolboxes and targeted awareness training. Noise and vibration training requirements will be as per Section 13 of this plan.	Pre-construction, construction	All personnel will be inducted before commencing works.	All Contractors	Good Practice
NV02	Public address systems used at any construction site will not be used outside normal construction hours, except where prior consultation has been undertaken with potentially affected residents or in the case of emergency. Public address systems would be designed to limit noise spillage off-site.	Construction	All personnel will be aware of the normal construction hours.	All Contractors	Good Practice
NV03	Work compounds and their associated layout, parking areas, equipment and material stockpile sites will be positioned away from noise-sensitive locations.	Construction	Site compound details provided in ECM	All Contractors	Good Practice
NV04	Site entry and exit points will be located as far as possible from sensitive receivers where possible, considering the importance of safe access.	Construction	Site compound details provided in ECM	All Contractors	Good Practice
NV05	Where possible, the compounds, refuelling areas and areas near potentially noise and vibration sensitive receivers, will be	Construction	The traffic management plan is designed to comply with this.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
	designed to promote one-way traffic so that vehicle reversing movements are minimised.				
NV06	Site training / tool-box talks will reinforce expected behavioural practices on site such as no swearing or unnecessary shouting or loud stereos/ radios on site, no dropping materials from height where practicable, no throwing of items and no slamming of doors.	Construction	All personnel will undertake inductions and receive ongoing site training.	All Contractors	Good Practice
NV07	Where possible, work will be undertaken within the standard construction hours of: <ul style="list-style-type: none"> - 7am – 6pm, Monday to Friday; - 8am – 1pm Saturday - No work on Sunday or public holidays unless approved through the out of hours process which is described in section 10 of the Noise and Vibration CEMP. Where complaints are received in response to high noise activities (eg. Rock breaking) respite periods will be applied (e.g. 3 hours of work with 1 hour of no high noise work).	Construction	All personnel will undertake inductions. Planning will be undertaken to program works. Approved hours to be included on the ECM OOHW Permit	All Contractors	Good Practice
NV08	Construction Planning will provide for adequate respite periods for Sensitive Receptors from noise and vibration associated with construction activities (refer to environmental control NV_30 and Figure 8 with regards to respite for noise activities) No blasting activity shall be undertaken during the hours of 5 pm to 9 am on weekdays, on weekends (other than 9 am to 1 pm Saturdays) and on public holidays.	Construction	Planning will be undertaken to program works	All Contractor	Airport Plan Condition 6(4) (Section 3.10.2)
PLANT AND EQUIPMENT					
NV09	Undertake saw-cutting operations during standard work hours wherever possible to minimise noise impacts	Construction	Works planning and assessment to be undertake prior to commencing.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
NV10	Plant or machinery will not be permitted to 'warm-up' before the nominated working hours.	Construction Plant located near receivers	All personnel will undertake inductions, which will be reiterated through ongoing site training. Detailed on ECM	All Contractors	Good Practice
NV11	Avoiding queueing and switching off engines when equipment is not in use for extended periods (ie 30 minutes).	Construction	All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	Traffic and Access CEMP
NV12	Where possible, the occurrence of consecutive noisy works within the same locality, and/or noisy plant/equipment working close together in the same locality will be avoided or otherwise minimised.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Good Practice
NV13	Where possible high noise generating work (such as use of a concrete saw or hydraulic hammer) will be undertaken during standard construction hours, even in the event of an out-of-hour works approval.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Good Practice
NV14	Manually adjustable or ambient noise sensitive or 'quacker' type reversing alarms on plant and/or flashing lights will be used at night.	Construction	All vehicles on site will be tested and fitted with appropriate controls before commencing works.	All Contractors	Good Practice
NV15	Where possible, work will be undertaken away from noise sensitive receivers.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Good Practice
NV16	All construction plant and equipment used on the site will be, in addition to other relevant requirements: <ul style="list-style-type: none"> - Fitted with properly maintained noise suppression devices in accordance with the manufacturer's specifications. - Maintained in an efficient condition. 	Construction	All vehicles on site will be tested and fitted with appropriate controls before commencing works.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
	- Operated in a proper and efficient manner				
NV17	Loading and unloading will be carried out as far as practical away from sensitive receivers. When loading trucks, materials are to be placed into trucks as far as practical, rather than dropped from a height.	Construction	Works will be scheduled ahead of time, where possible. Workers will be trained accordingly on unloading.	All Contractors	Good Practice
NV18	Truck movements will be kept to a minimum, i.e. that trucks are sufficiently utilised for each trip. Travel will be via internal haul routes where practicable and not queue near residential dwellings.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Traffic and Access CEMP
NV19	Noisy and vibration generating plant working simultaneously close together will be avoided to the greatest extent practical adjacent to noise affected / vibration sensitive receivers.	Construction	Works will be scheduled ahead of time, where possible, and in combination with the location of sensitive receivers.	All Contractors	Good Practice
NV20	Where practical, at the end of shifts, excavation and/or ripping plant will be taken from their work areas and left overnight away from the immediate vicinity of sensitive receivers. Warming up of the plant will then be conducted away from such receivers.	Construction	Machinery storage points will be determined in combination with the location of sensitive receivers.	All Contractors	Good Practice
NV21	Truck drivers will limit compression braking as far as practicable.	Construction	All truck drivers will undertake induction that informs them of the appropriate measures.	All Contractors	Good Practice
NV22	Where possible, noise generating equipment will be strategically positioned to take advantage of natural screening from geographical features, earthwork features (e.g. stockpiles) or other structures to reduce the transmission of noise between work sites and receiver locations.	Construction	The locations of noise generating equipment will be in combination with the location of geographical features and structures.	All Contractors	Good Practice
NV23	Construction activities which are predicted to exceed any noise management levels will be identified.	Pre-construction, Construction	Predicted exceedances will be through work planning prior to starting and verified through monitoring.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
NV24	Selection of less noisy plant and equipment and less noise emitting construction methods, where feasible.	Construction	Works planning and assessment to be undertake prior to commencing.	All Contractors	Good Practice
NV25	Structures (site sheds, stockpiles / bunds, hoarding) will be used where possible to shield residential receivers from noise.	Construction	Works planning and assessment to be undertake prior to commencing.	All Contractors	Good Practice
CONSULTATION AND COMPLAINTS MANAGEMENT					
NV26	All complaints received will be managed in accordance with the Community and Stakeholder Engagement Plan.	Construction	A Community and Stakeholder Engagement Plan	WSA Community Engagement Manager All Contractors	Good Practice
NV27	Affected receivers will receive notifications for construction activities likely to affect their amenity through noise and vibration.	Pre-construction, Construction	Noisy construction activities are to be pre-determined.	WSA Community Engagement Manager All Contractors	Good Practice
SURVEY, MONITORING AND REPORTING					
NV28	Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met.	Pre-construction, Construction	Plan and schedule monitoring to a program. Reported in Monthly Report	All Contractors	Good Practice
NV29	Noise and vibration monitoring will be undertaken in accordance with Section 12.2. The program for construction noise and vibration monitoring indicates monitoring frequency, location, how the results of this monitoring are recorded and, procedures that are followed where significant exceedances of relevant noise and vibration goals are detected.	Construction	Monitoring and record keeping to be undertaken in accordance with this plan. Contractor require to undertake monitoring for construction activities. WSA will conduct monitoring for the Stage 1 Development as per the EIS	BEC, EEW WSA	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
RESPIRE FROM NOISY ACTIVITIES					
NV30	For work activities considered to be noisy (eg. hammering, grinding etc – excluding blasting), adopt an 8.30 am start and a 5 pm finish with two one-hour respite periods starting at 11.30am and 2pm respectively. Saturday works will commence at 8am and finish at 1pm with a one-hour respite period starting at 11am.	Construction	Monitoring and record keeping being undertaken in accordance with this plan.	All Contractors	AEPR Condition 6
NV31	There is to be no blasting activity during the hours of 5 pm to 9 am on weekdays, on weekends (other than 9 am to 1 pm Saturdays) and on public holidays.	Construction	Monitoring and record keeping being undertaken in accordance with this plan.	All Contractors	AEPR Condition 6

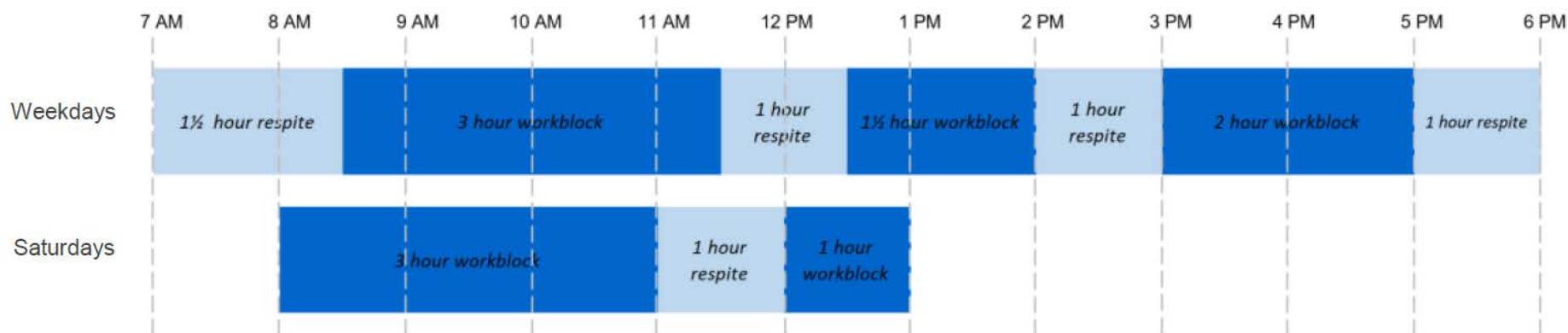


Figure 10 Respite periods

10 Working outside of standard construction hours

10.1 Project requirements

Standard construction hours are:

- 7am – 6pm Monday to Friday;
- 8am – 1pm Saturday; and
- No work on Sunday or public holidays unless approved through the out of hours process.

10.2 Out of hours work

Project related out-of-hour works (OOHW) may include:

- Deliveries of oversized plant or structures;
- Responsive activities to protect people, property and the environment in the event of an emergency such as a fire or structural failure;
- Other activities undertaken in accordance with relevant noise guidelines, or which have no material noise or other impacts on residences;
- Work that relies on third party authorisation; and
- Work that would otherwise be a safety risk to project employees or the general public.

OOHW management and mitigation measures are listed in Table 26.

10.3 Out-of-hours works procedure

An out-of-hours works procedure has been developed to assess and permit works outside of the standard construction hours (refer to Appendix A for the OOHW procedure and Appendix B for the OOHW permit). The procedure is used to:

- Identify works that are proposed outside of the standard construction hours;
- Assessment of proposed out of hours works in accordance with Project approvals
- Community notification guidelines; and
- Permit out of hours works in accordance with the process and Project Approval.

10.4 Impact assessment

Prior to the commencement of OOHW a detailed noise impact assessment shall be carried out. Mitigation measures shall be determined based on potential exceedances of the relevant NML. Mitigation measures shall be determined based on potential exceedances of the relevant NML as follows:

- | | | | |
|----|------------|---|-------------------------|
| 1. | Category A | = | No exceedance above NML |
| 2. | Category B | = | 1-5 dB(A) above NML |
| 3. | Category C | = | 6-15 dB(A) above NML |
| 4. | Category D | = | 16-25 dB(A) above NML |
| 5. | Category E | = | >25 dB(A) above NML |

Following the detailed noise assessment, reasonable and feasible mitigation measures will be considered to assist in the management and mitigation of potential noise impacts. Proposed mitigation measures are outlined in Table 32.

Table 32 Potential management and mitigation measures for OOHW noise impact category

Mitigation Measure	Exceedances of relevant NML dB(A)				
	Category A	Category B	Category C	Category D	Category E
Programming / schedule of works		X	X	X	X
Alternative construction techniques/scheduling		X	X	X	X
Alternative plant and equipment		X	X	X	X
Community consultation (i.e. letter box drops, etc)		X	X	X	X
Use of temporary noise screens			X	X	X
Provision for respite for high noise generating activities				X	X
Face to face consultation					X
Respite offer / act of good will					X
Reasonable temporary relocation offers where agreeable					X
Negotiated agreement					X

10.5 Community notification

WSA will notify the potentially affected sensitive receivers a minimum of seven days prior to proposed works by letterbox drop for work outside of the standard construction hours. The notification shall include:

- A diagram that clearly identifies the location of the proposed out-of-hours works in relation to nearby cross streets and local landmarks or geographical features;
- Details of the timing, nature, scope and duration of the proposed works and activities;
- Detail of why the proposed works and activities are being undertaken outside of standard construction hours;
- Details of the predicted noise and vibration impacts of the works on identified sensitive receivers;
- Details of all proposed mitigation measures, including respite periods and proposed scheduling;
- Details of the types of plant and equipment that will be used to undertake the work;
- Details of how complaints may be lodged, and additional information obtained about the work; and
- Contact details in community languages relevant to the locality; and include notification of any upcoming project community meetings / forums.

Where work is required out of standard hours within the seven day period, a phone call and/or email, and/or doorknock will occur with the potentially affected sensitive receivers. This will be conducted a minimum 48 hours prior to the proposed work.

11 Environmental roles and responsibilities

The key environmental management roles and responsibilities for the construction phase of the work are detailed in Section 4.5 of the SEMF.

WSA will ensure enough resources are allocated on an ongoing basis to ensure effective implementation by both WSA and the responsible contractors.

Specific responsibilities for the implementation of this Noise and Vibration CEMP are detailed below:

The appointed noise and vibration consultant will be to review and update the construction noise and vibration modelling undertaken as part of the EIS. The consultant is also providing an accessible noise model to allow flexible planning and quick and accurate assessment of impacts by the construction team, ensuring that construction methodologies can be optimised to minimise noise and vibration impact outside of the site boundary. The noise and vibration consultant will also provide training to the construction team on noise monitoring and will assist in the development of Construction Noise and Vibration Impact Statements (CNVISs) for activities predicted to exceed Noise Management Levels (such as blasting, if required).

12 Environmental inspection, monitoring, auditing and reporting

Monitoring, inspection and auditing will be undertaken to measure effectiveness and facilitate continuous improvement of noise and vibration management.

General environmental monitoring, inspection and auditing requirements are summarised in Section 8 of the SEMF.

A summary of the environmental inspection, monitoring and auditing requirements is provided below, with details of how they apply to noise and vibration management where applicable.

12.1 Environmental inspections

12.1.1 WSA environmental inspections

Environmental site inspections at active, exposed work areas will be undertaken by the environmental team, WSA Environment Manager (or delegate) on a weekly basis to evaluate the effectiveness of environmental controls implemented by the contractor.

The weekly site inspection is to include a visual inspection of general construction activities and any noise and vibration mitigation measures and or controls including but not limited to the following:

- Observation of noise emissions from specific plant and equipment;
- Noise hoarding / containment measures if required;
- Noise and vibration loggers are installed and operational if and as required;
- Observation with regards to construction activities and compliance with the nominated construction hours; and
- General observation with regards to the construction noise levels.

The findings of the WSA site environmental inspection will be recorded on a *WSA Site Environmental Inspection Checklist* included as Appendix B of the SEMF with an accompanying photographic style inspection report.

12.1.2 Contractor environmental inspections

Weekly site inspections will be undertaken to monitor compliance with this plan at active, exposed work sites. Inspection results will be recorded, and the inspection log made available to the Infrastructure Department upon request. Any exceedance of noise monitoring criteria will be reported in the monthly report and discussed at the Environmental Coordination meeting.

More frequent site inspections by the person accountable for noise and vibration management will be conducted onsite when activities with a high potential to produce noise and vibration impacts are being carried out.

The Contractor's Environmental Manager and/or Environmental Coordinators will undertake inspections in accordance with the Contractor Environmental Management Framework. The Contractor's Environmental Coordinators will record inspection findings on an inspection checklist form.

If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

12.1.3 Pre-start inspection

Prior to the commencement of works on each shift, an informal inspection will be carried out by the relevant contractor and will include a check of relevant environmental controls and resources required to ensure effective operation and maintenance. This is to include an inspection of relevant noise and vibration management mitigation measures and controls where applicable. Works are not to commence unless inspections are found to be satisfactory.

The foreman will undertake the pre-work inspections.

12.2 Noise and vibration monitoring

General environmental monitoring requirements are set out in the AEPR and include the following:

- Monitoring must take place under the direction of an appropriately qualified person; and
- The results of the monitoring must be kept in a written record.

Specific noise and vibration monitoring requirements, including timing and responsibilities, are included in Table 33.

Table 33 Noise and vibration monitoring requirements

Reference	Requirement	Timing	Responsibility
Noise Monitoring			
NV_M_01	Noise monitoring in accordance with AS1055 will be conducted at the nearest sensitive receptor locations to determine the effectiveness of mitigation measures against predicted impacts. During construction monitoring of new activities or new location will be completed within the first two shifts to confirm noise levels are within predicted levels and mitigation measures are appropriate. Further monitoring will be offered in response to a complaint.	Pre-construction and during construction	WSA (Stage 1 Development monitoring) BEC, EEW (monitoring for work activities)
NV_M_02	An inspection log will be prepared following each monitoring event and will made available to DIRDC upon request.	As required	All Contractors
NV_M_03	Where complaints are received, additional noise monitoring may be undertaken at sensitive receptors to determine if the actual construction noise generated exceeds the predicted 'worst case' construction noise levels.	During construction	All Contractors
NV_M_04	Noise monitoring may be carried out for the purpose of refining construction methods or techniques to minimise noise.	During construction	All Contractors
NV_M_05	Ongoing spot checks of noise intensive plant and equipment will be undertaken throughout construction to ensure compliance with manufactures specifications.	During construction	All Contractors
NV_M_06	The frequency of site inspections will be increased by the person accountable for onsite noise and vibration issues when activities with a high potential to result in elevated noise emissions are undertaken near residential receptors.	During construction	All Contractors
NV_M_07	Where actual noise levels are found to exceed the predicted worst-case levels, the source of excessive noise generations will be identified, and any additional feasible and reasonable measures available will be	During construction	All Contractors

Reference	Requirement	Timing	Responsibility
	implemented to either reduce noise emissions or reduce the impacts on receptors.		
Vibration Monitoring			
NV_M_08	For the protection of buildings, monitoring will be carried out at the commencement of vibratory compaction work within 50 metres of buildings to ensure that safe vibration levels specified in Section 6 are not exceeded and to confirm safe working distances.	During construction	All Contractors
NV_M_09	When vibration intensive activities are required, vibration monitoring will be carried out within the established buffer zones, or where there is a risk that levels may exceed the relevant structural damage goals.	During construction	All Contractors
NV_M_10	Vibration monitoring may be carried out in response to complaints, exceedances, or for the purpose of refining construction methods or techniques to minimise vibrations.	During construction	All Contractors
NV_M_11	Vibration monitoring will continue throughout construction, where appropriate, at nominated sensitive receptor locations to determine the effectiveness of mitigation strategies.	During construction	All Contractors

Details of site activity and equipment usage will be noted during construction noise monitoring.

Acoustic instrumentation employed in the noise monitoring surveys will comply with the requirements of AS1259.2-1990 *Acoustics – Sound Level Meters, Part 2: Integrating – Averaging and carry appropriate NATA (or manufacturer) calibration certificates*.

Where vibration is found to exceed safe levels, impacts will be avoided by changing work methods and/or equipment, or through the provision of building protection measures where possible. In the event a complaint relating to property damage is received, an inspection of the property will be undertaken, and an interim building condition survey prepared.

Vibration monitoring will be carried out in accordance with:

- For structural damage vibration – German Standard DIN 4150 and BS 7385: Part 2 – 1993; and
- For human exposure to vibration – the evaluation criteria presented in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DECC 2006).

Where a non-conformance is detected, or monitoring results are outside of the expected range, the non-conformance process described in the SEMF Section 8 will be implemented.

12.2.1 Stage 1 Development Noise monitoring program

In addition to the targeted noise monitoring as required under monitoring requirement NV_M_01 (refer to Table 27), WSA continues to implement a concurrent program of noise monitoring / logging at representative locations which have been identified in consultation with the NSW EPA. Noise monitoring has been undertaken since October 2017 up until the present (November 2019) at the Airport Site for the purpose of obtaining noise data. Baseline noise monitoring data includes monitoring from the EIS and before September 2018 when EEW started. Details of the methodology and sampling locations are provided in the sections below.

The current locations of the noise loggers for the noise monitoring program are shown in Figure 9. However, it should be noted that these locations are subject to change and will be dependent on the staging of the construction activities. Any changes in monitoring locations will be in consultation with the NSW EPA and the AEO and will be reflected in the next revision of CEMP documentation.

Noise monitoring will be undertaken using the *Svante SV200* or equivalent noise monitoring stations. The noise monitoring stations are programmed to accumulate 15-minute period of LA90, LA10, LAeq and LMax sound pressure levels continuously over the entire monitoring period. At monthly intervals (or in response to complaints), the noise monitoring data will be downloaded and analysed. The noise monitoring data will be filtered to exclude any anomalous data and data potentially affected by adverse weather conditions including wind speeds greater than 5 m/s and rain above 0.2 mm/h. The onsite meteorological station located at the southern site will be used for this analysis. A calibration check will be performed remotely on a daily basis using an actuator, which provides a stimulus single of 94.0 dB(A) at 1 kHz. This is to ensure the microphone is recording sound pressure levels within the acceptable tolerance of ± 0.5 dB(A).

The details of each of the noise loggers (as shown in Figure 11) are provided in Table 34. The noise monitoring sites and monitoring network are considered adequate for monitoring the Stage 1 development works including bulk earthworks.

Table 34 Noise monitoring station details

Monitoring site	Equipment	Coordinates	Photo
Northern	SV200	289407E, 6249803N	
Southern	SV200	288314E, 6245134N	
Eastern	SV200	292035 E, 6248589N	


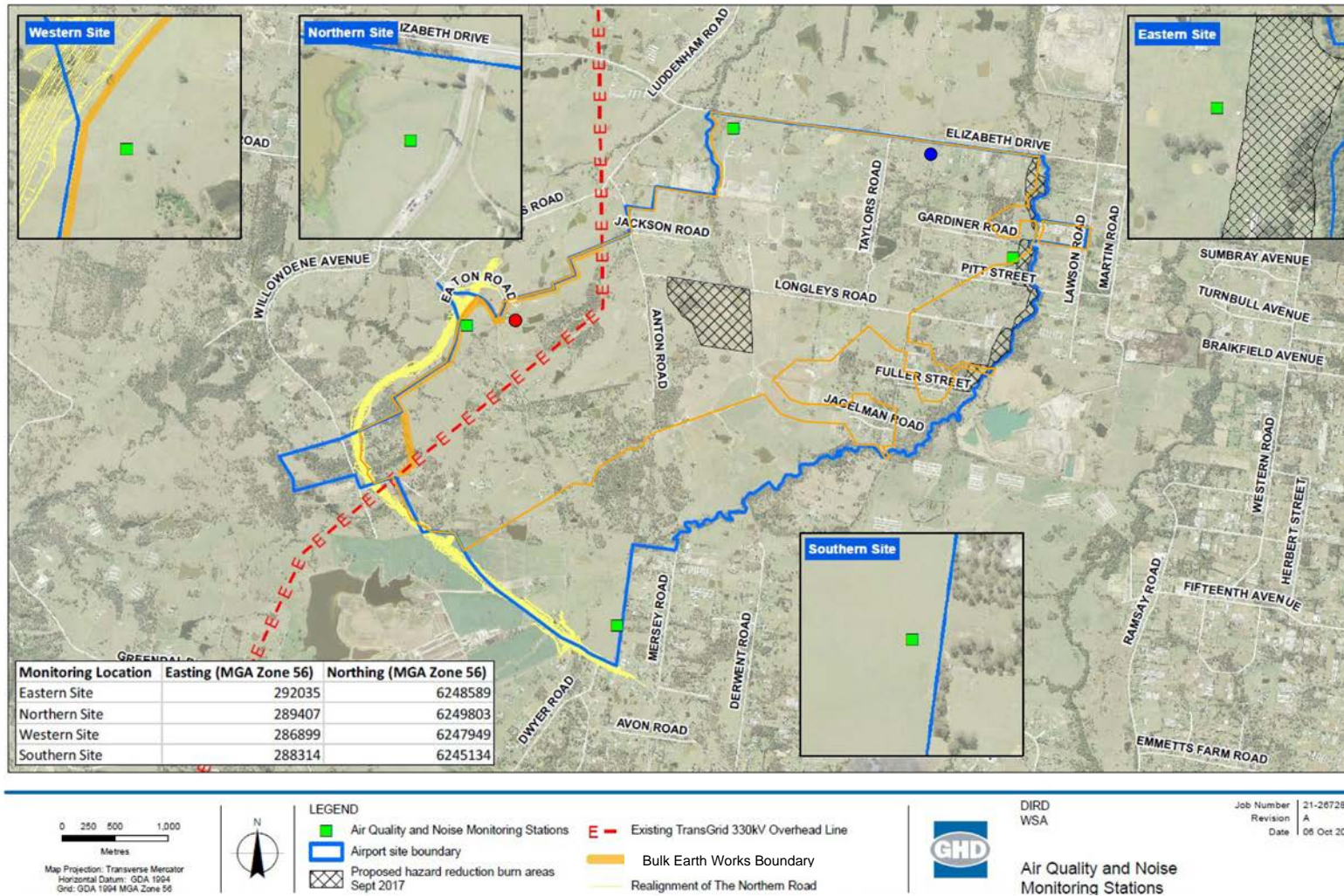
Western	SV200	286899E, 6247949N	
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Figure 11 Noise monitoring locations



12.2.2 Contractor noise monitoring program

Noise monitoring in accordance with AS1055 will be conducted by each contractor at the nearest sensitive receptor locations to determine the effectiveness of mitigation measures against predicted impacts. Noise monitoring to be conducted and results catalogued and subsequently provided must be to Australian Standards 1055 Acoustics - Description and measurement of environmental noise.

During construction monitoring of new activities or new location will be completed within the first two shifts to confirm noise levels are within predicted levels and mitigation measures are appropriate. The locations will be determined by the Contractor Environmental Manager and based on the Contractors noise modelling. Further monitoring will be offered in response to a complaint. Locations of work zones are depicted in Figure 7. All identified receivers are depicted in Figure 5.

Contractor is to provide WSA with a monthly summary of all Noise and Vibration monitoring undertaken and advise of compliance with criteria.

12.3 Environmental auditing

Refer to Section 8.2 of the SEMF for environmental auditing requirements, including internal WSA audits, independent audits and audits to be undertaken by contractors.

12.4 Environmental reporting

General environmental reporting requirements are detailed in Section 8 the SEMF. In addition, a summary of reporting requirements required under this Noise and Vibration CEMP (including environmental reporting requirements under the Airport Plan specific to this Noise and Vibration CEMP) is provided in Table 35.

Table 35 Noise and vibration reporting

Action	Scope	Timing / Frequency	Responsibility
Annual reporting	Unless otherwise agreed in writing by an Approver, an annual report will be prepared in relation to compliance with the Noise and Vibration CEMP (Condition 39). Unless otherwise agreed in writing by an Approver, WSA will publish each of the annual reports on its website within three months of the end of the period in respect of which the report was prepared, with evidence providing proof of the date of publication to the Infrastructure Department with a copy to the Environment Department. The report must remain on the website for a period of at least 12 months (Condition 39).	Annually	WSA Environment Manager
Monitoring compliance reporting	Undertaking monitoring as required by this Noise and Vibration CEMP. Contractor is to provide WSA with a monthly summary of all Noise and Vibration monitoring undertaken and advise of compliance with criteria.	Monthly	All Contractors
Complaints reporting	Recording of complaints and stakeholder interactions.	As required	WSA Environment Manager WSA Community and Stakeholder Manager All Contractors

Action	Scope	Timing / Frequency	Responsibility
Pollution and or excessive noise reporting	In accordance with the AEPR, WSA must give an airport environment officer for the airport, within 14 days, a written report in the event that monitoring results indicate pollution, or excessive noise, occurring as a result of the undertaking of the works associated with the Stage 1 development. The trigger for a 'pollution event' as per the Airports (Environment Protection) Regulations 1997 is provided in the relevant schedules of the AEPR.	As required	WSA
Reporting of non-conformances and improvement opportunities	The management and reporting requirements of environmental non-conformances and improvement opportunities will be in accordance with Section 8 of the WSA SEMF.	As required	WSA and All Contractors
Environmental Site Register (required under the 6.02(3) of the AEPR)	Environmental Site Register to be kept and maintained to include written record of environmental conditions of the Airport and its environmental management generally. The register is to include the results of monitoring required under section 10.2 and a record of any exceptional incidents that cause excessive pollution and the action taken to resolve the situation	Include in Annual report	WSA Environment Manager

12.5 Review of approved plans

WSA will review each approved plan at least every five years (from the date of approval) as required by the Airport Plan. A review will also be completed annually to ensure that it continues to meet the approval criteria. Details of the review will be included in the annual report (refer to Section 8.3 of the SEMF). If the review identifies areas where the plan does not continue to meet the approval criteria for that plan, a variation to the approved plan will be prepared and submitted for approval.

The annual review process will include consideration and review of the implemented background noise levels with regards to the accuracy and currency in light of any significant changes in the receiving/background environment. In the event that the background levels are considered to be inaccurate and or out of date, specialist input will be engaged to assess the background levels of the current environment accordingly. Any changes to the background levels will be reflected in a revised CEMP.

WSA may initiate reviews of Approved Plans at other times in response to improvement opportunities, non-conformances, and changes to scope of work or construction methodology or alterations to legal or contractual requirements.

Any changes identified and implemented through the variation and review process identified above will be communicated to relevant contractors through re-issue of the revised WSA Approved Plan and subsequent training and awareness (refer to refer to Section 5 of the SEMF).

12.6 Environmental Incidents and complaints management

The management and reporting of environmental incidents shall be undertaken by the appropriate person as detailed in Section 6 of the SEMF.

All communications and complaints management will be implemented and managed in accordance with Section 7 of the SEMF and the Community and Stakeholder Engagement Plan.

13 Competence, training and awareness

To ensure this Noise and Vibration CEMP is effectively implemented, each level of management is responsible for ensuring that all personnel reporting to them are aware of the requirements within. The WSA Environment Manager will coordinate the necessary and relevant environmental training in conjunction with other training and development activities.

All competence, training and awareness requirements will be implemented as detailed in Section 5 of the SEMF.

14 References

Commonwealth Department of Infrastructure and Regional Development, 2016. *Airport Plan (December 2016)*

Commonwealth Department of Infrastructure and Regional Development, 2016. *Western Sydney Airport Environmental Impact Statement, 2016*

CONCAWE: May 1981 - *The propagation of noise from petroleum and petrochemical complexes to neighbouring communities*

Department of Environment and Climate Change (DECC) 2009, *Interim Construction Noise Guideline*

NSW Department of Environment and Climate Change, 2006. *Environmental Noise Management Assessing Vibration: A Technical Guideline.*

Standards Australia 2001. *Australian and New Zealand environmental management international standard (AS/NZS ISO 14001).*

Appendix A

Out-of-hour works procedure

1.1 Overview

This work procedure has been developed to assist with compliance of environmental legislation, project obligations and to effectively manage potential environmental impacts associated with noise during construction of the Project. It is prepared in accordance with the Conditions of the Airport Plan, Environmental Impact Statement (EIS) management measures, and the Noise and Vibration Construction Environmental Management Plan (Noise and Vibration CEMP).

1.2 Objectives

This procedure outlines the project requirements for construction working hours and documents a process to be implemented when work outside of standard hours is required. The key objective of the procedure is to ensure that impacts to the local community are avoided and minimised and the Conditions are met.

Specific objectives include:

- Identify and assess all works proposed outside of the project's standard construction hours;
- Minimising potential adverse noise impacts to the community;
- Identify sensitive receivers and ensure appropriate noise control measures are implemented during construction activities;
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in the Noise and Vibration CEMP; and
- Information required by the Contract.

1.3 Project requirements

The project's general construction hours are:

- 7am to 6pm Mondays to Fridays;
- 8am to 1pm Saturdays; and
- Generally, no work on Sundays and other public holidays.

1.4 Out-of-hours work process

The responsible engineer for the out-of-works is to initiate the process when identifying potential works outside of the standard construction hours by populating the relevant sections of the Out-of-Hours Works Permit (Attachment 1) and submitting the permit application to the WSA Environmental Manager.

To provide sufficient time for community notifications, including approval of consultation material, the permit should be initiated up to four (4) weeks prior to critical works (works involving road occupancy licences).

The WSA Environmental Manager will oversee the noise and vibration assessment of the proposed works to determine the predicted level of noise or vibration impact. If proposed out-of-hours works do not comply with the project conditions, the works cannot be undertaken.

A noise and vibration assessment and vibration review shall be completed for all proposed out of hours works to support the OOHW Permit.

The noise assessment will include:

- details of the nature and scope of each activity and work, including details of times, vehicles, plant and equipment to be used to undertake that activity or work;
- justification of the scheduling and duration of each activity and work outside the standard construction hours, including considering:
 - the predicted impact on noise sensitive receivers of any activities and works undertaken outside the hours; and
 - the preference that high noise impact works be undertaken during the day.
- justification of the use of the selected construction and work methods, plant and equipment compared to alternatives taking into consideration noise and vibration impacts;
- a table showing details of the noise and vibration mitigation measures for each activity and work, including respite periods, proposed to be adopted to minimise noise and vibration impacts on surrounding noise sensitive receivers in each locality;
- for Category D and E works:
 - the address of each of the affected noise sensitive receiver;
 - the background noise level for each of the noise sensitive receivers;
 - noise management levels as described in Section 4 of the ICNG (DECC, 2009); and
 - the predicted LAeq (15 min) noise level, incorporating any 5 dB(A) correction for particularly annoying activities as listed on page 16 of the ICNG (DECC, 2009).
- details of the specific noise mitigation measures to be adopted in respect of any activity or work predicted to generate noise levels at any noise sensitive receiver exceeding the noise affected LAeq(15minute) level of background plus 5 dB(A) outside the standard hours;
- the location of noise and vibration monitoring locations in relation to each of the most affected noise sensitive receivers for each activity and work in each noise catchment;
- the EM will document the assessment required by this condition in a report that includes all maps and analyses relied upon in making its determination of:
 - whether the proposed activity or work may be undertaken pursuant to project conditions;
 - the scheduling of each proposed activity and work;
 - the construction methods, plant and equipment used in each activity and work;
 - the noise and vibration impact mitigation measures adopted for each activity and work; and
 - the location of each noise and vibration monitoring location.

1.4.2 Noise monitoring

Out of hours works monitoring will be completed in accordance with the Section 12 of the WSA Noise and Vibration CEMP. Monitoring will be completed for audible (Categories B to E) that will be ongoing for three or more nights.

Additional noise monitoring based on complaints for periods less than three nights or out of hours on the weekend/public holiday should also be available as needed.

1.4.3 Community notification

WSA will notify the community in accordance with the Community and Stakeholder Engagement Plan.

1.5 Complaints

Any complaints received as a result of the OOH works are to be managed in accordance with the Noise and Vibration CEMP. OOH works will be monitored for compliance with the approved Noise and Vibration CEMP.

If the noise monitoring determines noise levels greater than predicted, the construction process will be reviewed, and additional noise mitigation measures will be implemented where reasonable and feasible.

All community complaints are managed by the WSA Community Manager.

1.6 Record keeping

All OOHWs applications are recorded electronically and documented with a unique identification number. Each application is entered the OOHW register which will be managed and tracked by the WSA Environment Manager.

All attended noise monitoring results will be recorded as per AS1055 and using “Noise Monitoring Field Sheet” and data entered into the noise monitoring database as required. A summary of the Contractors noise monitoring results will be provided to WSA Environment Manager on a monthly basis.

Appendix B

Example Out-of-hour works permit



Permit Number:

Out-of-hours works permit

Out-of-hours works permit

Title/Activity:	
Application Date:	
Person Requesting the work:	
Justification why OOHW required:	
Supervisor details:	

Out of Hours Works Assessment		
Item	Description	Information/Comments
1.	Proposed Dates/duration:	
2.	Start Time:	
3.	Finish Time:	
4.	Description of the works:	
	Details on any concurrent construction activities being undertaken adjacent/ in close proximity to the proposed works:	
5.	Plant and equipment to be used: (list all plant and noise generating equipment to be used during the work activities) e.g. hand tools, generators, crane etc	Complete Table 1
	Are alternative, more quiet/less vibration intensive equipment options feasible for the activity? If yes, why are these not being used?	Yes <input type="checkbox"/> No <input type="checkbox"/>
6.	Names of Forman supervising the work:	
7.	Location of Work: Attach a map of the work area (Figure 1) Distance to Nearest Residential Receiver:	
Traffic Management		
8.	Will the work require traffic control or impact on local public roads (y/n)	

	If yes, consider this in the noise assessment and notification																						
	Include the location of traffic impact on map																						
9.	Will lighting be required for the work? (y/n) Angle lighting away from receivers	Yes <input type="checkbox"/> No <input type="checkbox"/>																					
Noise and Vibration Assessment																							
Complete Table 1 to describe the activities and include the predicted noise levels																							
10.	Noise Management Level (NML):																						
10.1	Sleep disturbance level (night only):																						
10.2	Overall Predicted noise (Leq / LA10):																						
11.	Acoustic assessment prepared to determine if works are above RBL +5dB(A) at closest receiver	<input type="checkbox"/> Category A: no exceedance of NML (RBL +5dB(A)) <input type="checkbox"/> Category B: 1 –5 above NML <input type="checkbox"/> Category C: 6 – 15 above NML <input type="checkbox"/> Category D: 16 – 25 above NML <input type="checkbox"/> Category E: >25 above NML																					
12.	What measures are being taken to reduce noise impacts?																						
13.	Noise monitoring required? ¹	<input type="checkbox"/> Yes <input type="checkbox"/> No Category B – E affecting sensitive receiver occurring for more than 2 consecutive nights or following a complaint																					
14.	Are vibration impacts expected/is vibration monitoring required? ²	<input type="checkbox"/> Yes <input type="checkbox"/> No																					
15.	Community notification required for all works for Category B - E																						
Category D and E Works																							
16.	Address(es) of the affected residential receivers and their associated RBL	<table border="1"> <thead> <tr> <th>Address</th> <th>RBL</th> <th>NML</th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </tbody> </table>	Address	RBL	NML																		
Address	RBL	NML																					

¹ Output of noise prediction model or consultant report to be provided with permit application / attached

² Noise monitoring will be undertaken at the nearest affected residential receiver.

³ Vibration monitoring will be undertaken at the nearest affected residential receiver.



Table 1 Details of nature and scope of work

Activity No.	Program Activities	Location (e.g. Chainage)	Date & Time	Vehicles, Plant & Equipment Required	Predicted noise level	Sleep Screening (Y/N)	Justification
1							
2							

Figure 1: Map Illustrating location of works, affected sensitive receivers and notification area



**APPLICANT DETAILS**

I certify that the details provided in this application are true and accurate for the work to be performed.

NAME:

SIGNATURE: DATE:

APPROVALS

1	WSA Environment Manager	NAME: SIGNATURE: DATE:
2	WSA Community Manager	Consultation requirements: NAME: SIGNATURE: DATE:

Hard copy to be maintained by foreman on site during works