



# Western Sydney Airport

## Noise and Vibration Construction Environmental Management Plan

December 2018



**Western  
Sydney  
Airport**

## Document Control

File Name	Document Name	Revision
WSA00-BECHTEL-00400-EN-PLN-000002	WSA Co Noise and Vibration CEMP	1

### Revision History

Revision	Date	Description	Author	Reviewer
0	24/09/2018	Early Earthworks scope and visitor centre preparation	WSA Co	S Reynolds
0.1	09/11/2018	Draft updated with additional scope	WSA Co	S Reynolds
0.2	23/11/2018	Draft updated to address comments on inclusion of new scope (Visitor centre, Site Accommodation and Material Importation)	WSA Co	S Reynolds
0.3	07/12/2018	For approval	WSA Co	S Reynolds
1	14/12/2018	Revision update to include additional scope including Visitor Centre Site Accommodation and Material Importation	WSA Co	S Reynolds

### Plan Authorisation

Position	Name	Signature	Date
Environment Manager	S Reynolds		07/12/2018

## Glossary and Definitions

Item	Definition
the Act	<i>Airports Act 1996 (Cth)</i> (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"> <li>a. the purposes of enabling passengers to embark/disembark an aircraft;</li> <li>b. loading cargo onto, or unloading cargo from, aircraft; and/or</li> <li>c. refuelling, parking or carrying out maintenance on aircraft</li> </ul>
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.
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 (Cth)</i>
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 and structures) described in Part 3 of the Airport Plan, other than TransGrid Relocation Works or Preparatory Activities.

Item	Definition
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"> <li>a. day-to-day site and property management activities;</li> <li>b. site investigations, surveys (including dilapidation surveys), monitoring, and related works (e.g. geotechnical or other investigative drilling, excavation, or salvage);</li> <li>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);</li> <li>d. enabling preparatory activities such as: <ul style="list-style-type: none"> <li>(i) demolition or relocation of existing structures (including buildings, services, utilities and roads);</li> <li>(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</li> <li>(iii) application of environmental impact mitigation measures; and</li> </ul> </li> <li>e. any other activities which an Approver determines are Preparatory Activities for this definition</li> </ul>
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 also commonly known as Sydney Airport.

### 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
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
LA <sub>10</sub>	The LA <sub>10</sub> 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 LA <sub>10</sub> level for 90% of the time. The LA <sub>10</sub> is a common noise descriptor for environmental noise and road traffic.
LA <sub>90</sub>	The LA <sub>90</sub> 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 LA <sub>90</sub> level for 10% of the time. This measure is commonly referred to as the background noise level.
L <sub>Aeq</sub>	The equivalent continuous A-weighted sound level (L <sub>Aeq</sub> ) 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 <sup>2</sup> and m <sup>3</sup>	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

# Contents

---

<b>DOCUMENT CONTROL</b> .....	<b>I</b>
<b>1 INTRODUCTION</b> .....	<b>1</b>
1.1 Background .....	1
1.2 Document context and scope .....	1
1.3 Document purpose.....	3
1.4 WSA Co environmental management system overview .....	5
1.5 Consultation requirements of this plan .....	6
1.6 Certification and approval.....	8
1.7 Distribution .....	8
<b>2 PROJECT DETAILS AND SCOPE OF WORKS</b> .....	<b>9</b>
2.1 Project general features .....	9
2.2 Project site location and layout.....	9
2.3 Project staging and environmental management approach .....	12
2.4 Scope of works.....	13
<b>3 OBJECTIVES AND TARGETS</b> .....	<b>18</b>
3.1 Objectives .....	18
3.2 Targets and performance criteria .....	18
<b>4 LEGAL AND OTHER REQUIREMENTS</b> .....	<b>20</b>
4.1 Relevant legislation and guidelines .....	20
4.2 Approvals and other specifications .....	21
4.3 Airport Plan Conditions.....	22
<b>5 EXISTING ENVIRONMENT</b> .....	<b>27</b>
5.1 Sensitive receptors .....	27
5.2 Ambient noise.....	27
<b>6 NOISE AND VIBRATION CRITERIA</b> .....	<b>30</b>
6.1 Construction noise and assessment objectives.....	30
6.2 Quantitative noise assessment criteria .....	31
6.3 Adopted project Noise Management Levels .....	31
6.4 Vibration criteria.....	32
6.5 Blasting criteria .....	32
<b>7 NOISE AND VIBRATION ASPECTS AND IMPACTS</b> .....	<b>33</b>
7.1 Construction activities.....	33
7.2 Noise and vibration impacts .....	33
7.3 Risk assessment .....	36
<b>8 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT</b> .....	<b>51</b>
8.1 Summary of potential noise impacts .....	51
8.2 Construction traffic noise .....	56
8.3 Construction vibration assessment.....	57

<b>9</b>	<b>ENVIRONMENTAL CONTROL MEASURES.....</b>	<b>61</b>
<b>10</b>	<b>WORKING OUTSIDE OF STANDARD CONSTRUCTION HOURS.....</b>	<b>68</b>
<b>10.1</b>	<b>Project requirements .....</b>	<b>68</b>
<b>10.2</b>	<b>Out of hours work .....</b>	<b>68</b>
<b>10.3</b>	<b>Out-of-hours works procedure .....</b>	<b>68</b>
<b>10.4</b>	<b>Impact assessment .....</b>	<b>68</b>
<b>10.5</b>	<b>Community notification .....</b>	<b>69</b>
<b>11</b>	<b>ENVIRONMENTAL ROLES AND RESPONSIBILITIES.....</b>	<b>70</b>
<b>11.1</b>	<b>External roles and responsibilities.....</b>	<b>70</b>
<b>11.2</b>	<b>WSA Co roles and responsibilities.....</b>	<b>70</b>
<b>11.3</b>	<b>Western Sydney Airport Delivery Partner roles and responsibilities.....</b>	<b>71</b>
<b>11.4</b>	<b>WSA Co Contractor roles and responsibilities .....</b>	<b>72</b>
<b>12</b>	<b>ENVIRONMENTAL INSPECTION, MONITORING AND AUDITING.....</b>	<b>73</b>
<b>12.1</b>	<b>Environmental inspections .....</b>	<b>73</b>
<b>12.2</b>	<b>Noise and vibration monitoring.....</b>	<b>74</b>
<b>12.3</b>	<b>Environmental auditing .....</b>	<b>78</b>
<b>12.4</b>	<b>Environmental reporting .....</b>	<b>78</b>
<b>13</b>	<b>COMPETENCE, TRAINING AND AWARENESS .....</b>	<b>80</b>
<b>13.1</b>	<b>Environmental project induction.....</b>	<b>80</b>
<b>13.2</b>	<b>Contractor-specific site inductions.....</b>	<b>80</b>
<b>13.3</b>	<b>Toolbox talks, training and awareness .....</b>	<b>80</b>
<b>13.4</b>	<b>Daily pre-start meetings .....</b>	<b>81</b>
<b>14</b>	<b>COMMUNICATIONS AND COMPLAINTS MANAGEMENT .....</b>	<b>82</b>
<b>14.1</b>	<b>Complaints management .....</b>	<b>82</b>
<b>14.2</b>	<b>Community and stakeholder communication .....</b>	<b>82</b>
<b>15</b>	<b>ENVIRONMENTAL INCIDENTS, NON-CONFORMANCE AND IMPROVEMENT OPPORTUNITIES .....</b>	<b>83</b>
<b>16</b>	<b>REVIEW AND IMPROVEMENT .....</b>	<b>84</b>
<b>16.1</b>	<b>Continuous improvement.....</b>	<b>84</b>
<b>16.2</b>	<b>Change management.....</b>	<b>84</b>
<b>16.3</b>	<b>Variation of approved plans.....</b>	<b>84</b>
<b>16.4</b>	<b>Review of approved plans.....</b>	<b>85</b>
<b>17</b>	<b>REFERENCES.....</b>	<b>86</b>

## Tables

Table 1	Noise and Vibration CEMP relationship with other CEMP documentation .....	3
Table 2	Noise and Vibration CEMP consultation summary .....	6
Table 3	Works covered by this Noise and Vibration CEMP .....	12
Table 4	Construction staging – Preparatory Activities .....	13
Table 5	Construction staging – Early Earthworks .....	14
Table 6	Construction staging – Visitor Centre and Site Accommodation .....	15
Table 7	Construction staging – Material importation.....	16
Table 8	Noise and vibration targets .....	18
Table 9	Principal legislation and relevance.....	20
Table 10	Relevant guidelines and standards .....	21
Table 11	Airport Plan conditions relevant to noise and vibration management.....	22
Table 12	Summary of noise and vibration management requirements .....	25
Table 13	Measured background noise levels (LA90).....	27
Table 14	Vibration damage guideline values (DIN 41503) .....	32
Table 15	ANZECC recommended vibration and air blast criteria .....	32
Table 16	Estimated residential population affected by levels above noise management level - standard construction hours (worst case temperature inversion) .....	33
Table 17	Estimated residential population affected by levels above noise management level – outside standard construction hours (worst case temperature inversion) .....	35
Table 18	Predicted construction traffic noise increases on Elizabeth drive .....	35
Table 19	Likelihood descriptor .....	37
Table 20	Consequence descriptor .....	37
Table 21	Risk severity and management response.....	38
Table 22	Noise and vibration risk assessment .....	39
Table 23	Early earthworks construction zone summary .....	52
Table 24	Population affected by Zone 1 and 2 and noise mitigation requirements .....	54
Table 25	Population affected by Zone 3 and noise mitigation requirements .....	54
<b>Table 26</b>	<b>Population affected by Zone 6 and noise mitigation requirements</b> .....	<b>54</b>
Table 27	Population affected by Zone 7 and noise mitigation requirements .....	55
<b>Table 28</b>	<b>Population affected by Zone 8 and 9 and noise mitigation requirements</b> .....	<b>55</b>
Table 29	Population affected by all Zones and noise mitigation requirements.....	55
<b>Table 30</b>	<b>Population affected by Visitor Centre and Site Accommodation and noise mitigation requirements</b> .....	<b>56</b>
<b>Table 31</b>	<b>Predicted construction traffic noise increased on Elizabeth Drive</b> .....	<b>56</b>
Table 32	Recommended safe working distances for vibration intensive plant .....	57
Table 33	Noise and vibration management and mitigation measures.....	61
Table 34	Potential management and mitigation measures for OOHW noise impact category.....	69
Table 35	Noise and vibration monitoring requirements .....	74
Table 36	Noise monitoring station details .....	76
Table 37	Noise and vibration reporting .....	78

## Figures

---

Figure 1	WSA Co Environmental Management System and CEMP context .....	5
Figure 2	Western Sydney Airport Site location .....	10
Figure 3	Stage 1 development construction impact zone .....	11
Figure 4	Site Location plan.....	17
Figure 5	Sensitive receiver locations surrounding the Airport Site .....	28
Figure 6	Background noise measurement locations .....	29
Figure 7	Indicative Airport Site sections used for noise assessment (as per the EIS) .....	34
Figure 8	Risk severity rankings .....	38
Figure 9	Early Earthwork Construction Zone Summary .....	53
Figure 10	Vibration safe working distances.....	59
Figure 11	Vibration safe working distances.....	60
Figure 12	Respite periods .....	67
Figure 13	Noise monitoring locations .....	77
Figure 14	Zone 1 and 2 noise propagation .....	104
Figure 15	Zone 3 noise propagation .....	105
Figure 16	Zone 6 noise propagation .....	106
Figure 17	Zone 7 noise propagation .....	107
Figure 18	Zone 8 and 9 noise propagation .....	108
Figure 19	All Zones noise propagation.....	109

## Appendices

---

<b>Appendix A</b>	<b>WSA Co Noise and Vibration CEMP consultation</b>
<b>Appendix B</b>	<b>Schedule 4 of the AEPR – Excessive noise guidelines</b>
<b>Appendix C</b>	<b>Out-of-hour works procedure</b>
<b>Appendix D</b>	<b>Out-of-hour works permit</b>
<b>Appendix E</b>	<b>Noise Modelling</b>

# 1 Introduction

## 1.1 Background

In April 2014 the Australian Government announced that the Commonwealth-owned land at Badgerys Creek will be the site for a second Sydney Airport. The Badgerys Creek Airport Site was selected following extensive studies completed over a number of decades.

In December 2016, the Minister for Urban Infrastructure determined the Airport Plan which sets the environmental and planning authorisation for the development of Stage 1 of the Western Sydney Airport (WSA Stage 1).

Part 3 of the Airport Plan outlines the conditions for the design, construction and operation of the Stage 1 development of the airport that must be complied with, regardless of who is delivering the works. These include strict environmental standards and implementation of mitigation measures identified in the Environmental Impact Statement (EIS).

The EIS was prepared in accordance with the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the EIS was finalised under the EPBC Act in September 2016, following a public exhibition period during which almost 5,000 submissions were received. The EIS considered potential impacts during construction and operation of the Stage 1 and long-term development of the proposed airport. In determining the Airport Plan the Minister for Urban Infrastructure accepted environmental conditions proposed by the Environment Minister, taking into account the EIS.

In May 2017, the Government announced that it would establish WSA Co, to develop and operate the airport. WSA Co is responsible for constructing and operating Western Sydney Airport in accordance with the Airport Plan.

The Western Sydney Airport is expected to be developed in stages to match demand and include planning for services and amenities that are easily expandable over time, providing scalable capacity for aircraft, passengers, cargo and vehicle movements.

Stage 1 will include major site preparation, removing or relocating infrastructure from the site and earthworks to prepare the Airport Site, establishing the Airport with a single 3,700 metre runway located in the north-western portion of the Airport Site, a terminal and other support facilities to provide an operational anticipated capacity of approximately 10 million regional, domestic and international passengers per year, as well as freight traffic (the Stage 1 development).

The scope of works for the Stage 1 Development is defined in the Airport Plan and will generally include the investigation, design, construction and commissioning of:

- Bulk earthworks to move and redistribute approximately 24 million cubic metres of material on the Airport Site
- A single 3.7-kilometre runway
- Aprons, taxiways and other airside pavements
- A multi-user terminal
- Appropriate airport and aviation support facilities
- Drainage and utilities infrastructure
- Car parking, on-site roads and other appropriate landside facilities.

Further details with regards to site activities specific to this Noise and Vibration CEMP is provided in Section 2.

## 1.2 Document context and scope

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 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 Co 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 (once approved) – Management and reduction of noise and vibration impacts with regard to 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 28 Table: Management area	EIS Chapter 28 Table: 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
<b>Noise and Vibration (this plan)</b>	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 Co environmental management system is presented in Figure 1.

### 1.3 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 Section 16.

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 Co 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 ISO 14001 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 Co personnel and contractors to enable Project completion in accordance with the environmental requirements.

Effective implementation of this plan will assist WSA Co 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.

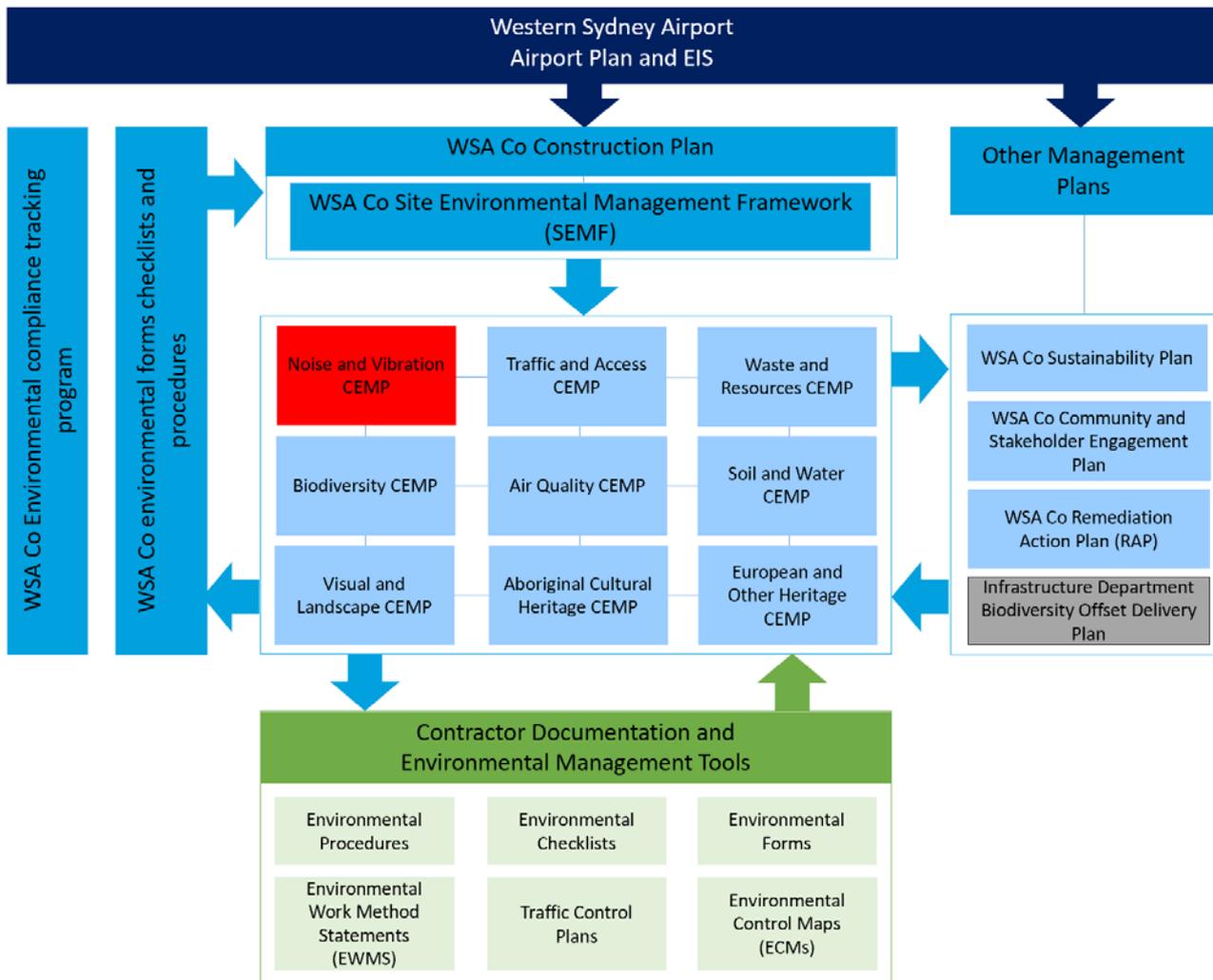
## 1.4 WSA Co environmental management system overview

WSA Co operates in general accordance with AS/NZS ISO 14001 – *Environmental management systems*. A copy of the WSA Co 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 Co Environmental Management System and CEMP context**

## 1.5 Consultation requirements of this plan

Airport Plan Condition 35 outlines the consultation requirements during the preparation of this CEMP and requires consultation with NSW Government agencies as specified by the NSW Department of Premier and Cabinet as well as the Environment Department and OEH for specific CEMPs. NSW Government agencies specified by Department of Premier and Cabinet for consultation about this Noise and Vibration CEMP, include the NSW Environment Protection Authority and NSW Health. Further, Airport Plan Condition 6(3) requires that this CEMP take into account Table 28-2 of the EIS which states the CEMP should also be prepared in consultation with the NSW EPA and NSW Health.

A summary of the stakeholder and government authority consultation which informed the preparation of the Noise and Vibration CEMP is presented in Table 2. Details of consultation is included in Appendix A.

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.

To satisfy the above requirement this CEMP (Revision 0) has been provided to the relevant stakeholders for feedback. Details of the Visitor Centre and Site Accommodation phase and Material Importation (and stockpiling) phase of work was described in the correspondence to provide context to the stakeholders on the level of impact that would result from the change. In addition, stakeholders were invited to attend a workshop on 13 November 2018 where an overview of the additional scope of work was presented and feedback requested. A summary of the consultation is provided in Table 2 and details included in Appendix A.

**Table 2 Noise and Vibration CEMP consultation summary**

Government authority / stakeholder	Date	Summary
<b>Consultation prior to Rev 0 approval</b>		
NSW EPA	July 2018	<ul style="list-style-type: none"> <li>The EPA notes the consultation requirements relating to the preparation of a CEMP, however does not approve or endorse these documents.</li> <li>As a general recommendation, the CEMP should outline the measures that will be implemented to manage and mitigate all impacts assessed during the Environmental Impact Statement. All proposed mitigation and management measures in the CEMP should implement best practice to a level that is feasible and reasonable and clearly demonstrate how the proponent will meet the designated environmental objectives.</li> </ul>
NSW EPA	September 2018	<ul style="list-style-type: none"> <li>The EPA notes that they will not have a direct regulatory role</li> <li>The locations of air and noise monitoring stations appears to reasonably reflect the location of sensitive receivers surrounding the site.</li> <li>In addition to fixed monitoring sites, a holistic monitoring program should also include reactive monitoring protocols and processes to respond to changing construction areas and processes, the proximity of sensitive receiving environments .as construction progresses, and to respond to community concerns.</li> </ul>
NSW Health	July 2018	<ul style="list-style-type: none"> <li>There is emerging evidence of the adverse health impacts of environmental noise, including evidence of a causal relationship between noise exposure, and cardiovascular disease and sleep disturbance. Measures to limit community exposure to noise are important to protect public health.</li> </ul>

Government authority / stakeholder	Date	Summary
		<ul style="list-style-type: none"> <li>• Sensitive receptors are locations where the occupants are likely to be more susceptible to the adverse health effects of exposure to environmental contaminants or stressors (such as noise) including residences, healthcare facilities, childcare centres, schools, and aged care facilities.</li> <li>• The final Environmental Impact Statement predicted that noise levels during construction may exceed noise criteria set by the NSW Environmental Protection Authority (EPA) during and outside standard construction hours for several residential and other sensitive receptors, including childcare centres and schools in Luddenham and Badgerys Creek.</li> <li>• The noise and vibration Construction Environmental Management Plans (CEMP) should implement all reasonable and feasible measures to minimise noise exposure, particularly during the night time, and prevent exceedances of noise criteria.</li> <li>• There should be a full range of measures documented in the CEMP to minimise noise exposure through choice and location of works through to temporary barriers, if necessary.</li> <li>• The CEMP should include tailored mitigation and communication strategies for vulnerable community members who are likely to be more susceptible to the adverse effects of noise, especially those who are elderly, do not speak English, are housebound, or who may be unwell.</li> <li>• Regular noise monitoring at boundary and key offsite locations should be implemented to ensure construction noise effects are circumscribed and meet EPA standard requirements.</li> </ul>
<b>Consultation prior to Rev 1 approval</b>		
NSW EPA	Nov 2018	<ul style="list-style-type: none"> <li>• EPA has no specific comments in relation to updates to the CEMPs. The NSW Government provided a detailed submission on the Western Sydney Airport (WSA) EIS that included advice on the environmental aspects of the proposal.</li> </ul>
NSW Health	Nov 2018	<ul style="list-style-type: none"> <li>• There are no additional health considerations involved in construction of the visitor Centre other than its proximity to residents on the north-western boundary.</li> <li>• No comments were provided in the written submission on the Material Importation phase.</li> <li>• The controls in the existing Construction Environmental Management Plans for Noise and Vibration are adequate and have incorporated previous comments from South Western Sydney Local Health District.</li> </ul>
Stakeholder information workshop	13 November 2018	<p>Workshop held on 13 Nov 2018. Attendees presented with a summary of the proposed works. Topics included:</p> <ul style="list-style-type: none"> <li>• Airport plan condition requirement for consultation</li> <li>• Land-use plan</li> <li>• Site location of works</li> <li>• Visitor Centre and Site Accommodation scope, including images of the concept design</li> <li>• Material importation, including location, distance to closest receiver and site access</li> </ul>

Government authority / stakeholder	Date	Summary	
		No comments received at workshop.	
		<b>Invitees:</b> Liverpool City Council Western Area Health Penrith City Council NSW Department of Premier and Cabinet Roads and Maritime Services NSW Health NSW Department of Education NSW Aboriginal Affairs NSW Department of Planning and Environment Transport for NSW	<b>Attendees:</b> NSW Aboriginal Affairs Liverpool City Council Western Area Health

## 1.6 Certification and approval

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

## 1.7 Distribution

All WSA Co 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 Co'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 Project details and scope of works**

### **2.1 Project general features**

The Project will be delivered through a packaging strategy with a wide variety of package sizes, risk profiles and contracting entities detailed in section [2.1] of the Construction Plan. 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 relevant statutory requirements and obligations.

The Project is described in the Construction Plan. Stage 1 development of the Project comprises the following key features:

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

Further details of the overall Project construction activities, programming and methodologies are included in the Construction Plan.

### **2.2 Project site location and layout**

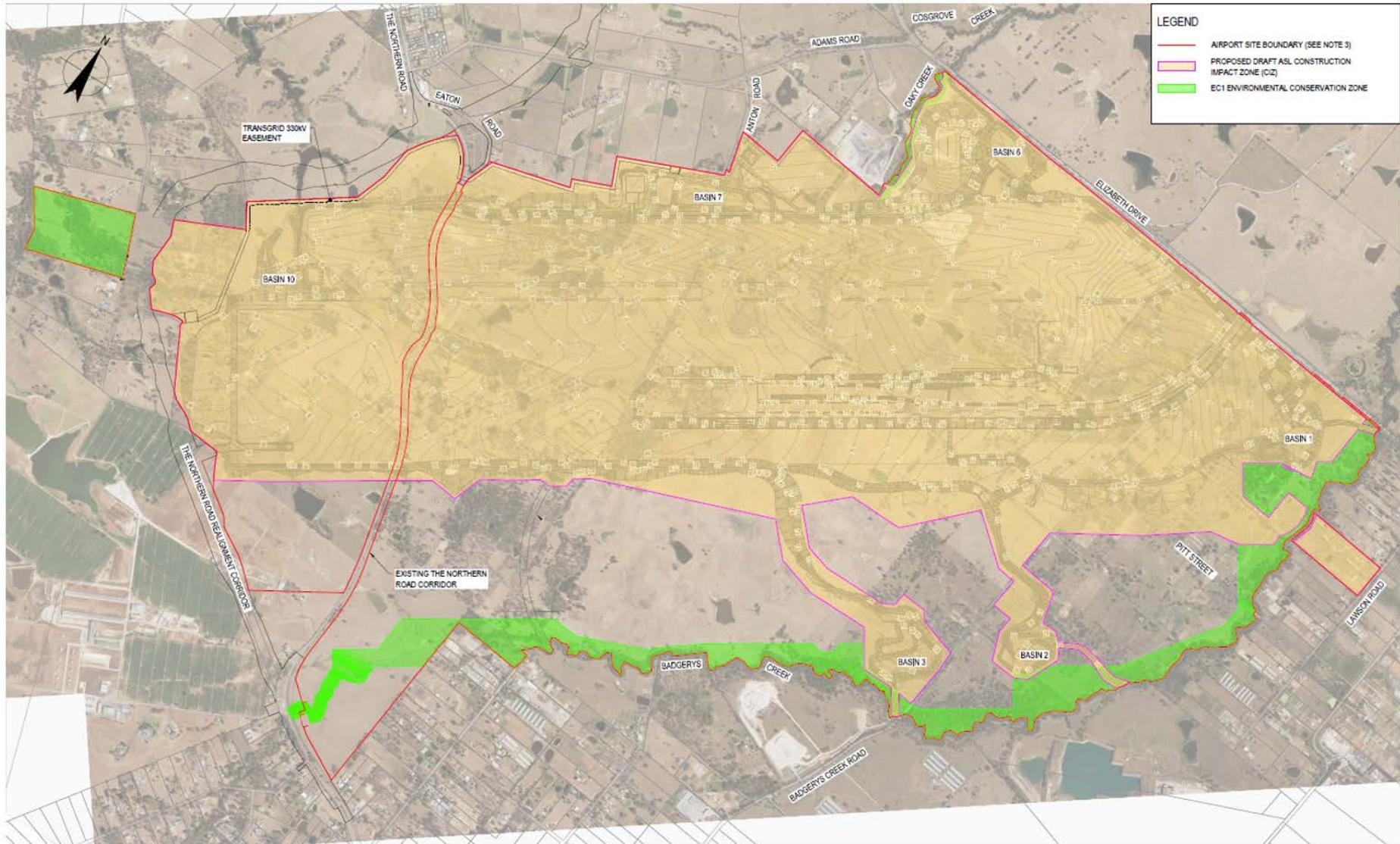
The Western Sydney Airport will be developed on around 1,800 hectares of Commonwealth-owned land at Badgerys Creek in Western Sydney (Airport Site). The Airport Site is approximately 50 kilometres from Sydney's central business district.

The Airport Site is bounded by Elizabeth Drive to the north, Willowdene Avenue to the south, Luddenham and Adams Road to the west and Badgerys Creek to the east. The existing terrain is made up of undulating topography, and substantial earthworks are required to create a level surface to allow construction of the runway, taxiways and support services. The Airport Site location is provided in Figure 2 and the Construction Impact Zone is provided in Figure 3.

An Environmental Conservation Zone (ECZ), referred to as EC1 in Figure 3 is located within the Airport Site, mostly to the south and south east along with a small portion to the west. This is a protected land use due to the occurrence of natural habitats and water flows, including Badgerys Creek. The ECZ also provides for an environmental preservation corridor which has a number of specific objectives and permissible uses in this land use zone as identified in the Airport Plan. Any construction work within the ECZ must be managed appropriately and is to be carried out only with prior approval from the WSA Co Environmental Manager.



**Figure 2 Western Sydney Airport Site location**



**Figure 3 Stage 1 development construction impact zone**

## 2.3 Project staging and environmental management approach

Section 2 of the Construction Plan provides an overview of the total Project activities to be undertaken. As permitted by Condition 1(5), the Construction Plan identifies that the Stage 1 Development will be undertaken in the following phases:

- Preparatory Activities
- Early Earthworks (EEW)
- Visitor Centre and Site Accommodation
- Material Importation
- Bulk Earthworks and Drainage (P1-A)
- Bulk Earthworks and Drainage (P1-B)
- Runway Pavement / Airside Civil (P1-C)
- Passenger Terminal Complex (P2)
- Landside Civil and Buildings (P3)

At the time of preparing this Noise and Vibration CEMP, the current work phases, and therefore the phases covered by this Noise and Vibration CEMP are included below in Table 3.

A variation to this CEMP will be submitted before work other than Preparatory Activities is undertaken on any other phases of the Project.

**Table 3 Works covered by this Noise and Vibration CEMP**

Works covered	Reference
Preparatory activities	Refer to Sections 2.4.1
Early Earthworks	Refer to Section 2.4.2
Visitor Centre and Site Accommodation	Refer to Section 2.4.3
Material Importation	Refer to Section 2.4.4

As the Project develops, this table will be updated accordingly with further detail to be provided as required in the subsequent sections. Any preparatory other construction activities will not be undertaken inconsistently with this CEMP. Section 2 of the SEMF provides a general overview of the total Project activities to be undertaken, with further specific detail targeting the current works (as indicated in Table 3) provided below in Section 2.4.

## 2.4 Scope of works

### 2.4.1 Preparatory activities (General)

Preparatory activities will be ongoing across the Airport Site throughout the Stage 1 Development. The works will be managed in accordance with the Overarching Preparatory Activities Plan which is prepared by the relevant Contractor and approved by WSA Co Environment Manager. The activities must be consistent with the Airport Plan definition for Preparatory Activities, refer to SEMF Section 3.9. Refer to Table 4 for details of proposed activities and indicative timing.

If an Approver determines an activity is a Preparatory Activity for paragraph (e) of the definition of 'Preparatory Activities' as per the Airport Plan and requires that a plan be prepared and submitted, WSA Co will prepare the necessary plan for consideration and approval in accordance with Condition 5 (2) of the Airport Plan. Any Preparatory Activities must not be carried out inconsistently with the approved CEMPs.

Table 4 outlines each the indicative timing for the preparatory activities.

**Table 4 Construction staging – Preparatory Activities**

Construction staging	Indicative Timing
<p>Preparatory Works</p> <ul style="list-style-type: none"> <li>• Spatial Survey</li> <li>• Service Investigations</li> <li>• Pre-condition Surveys</li> <li>• Traffic Counting</li> <li>• Biological Pre-Clearance Surveys</li> <li>• Contamination Pre-Clearance Surveys</li> <li>• Aboriginal and European Cultural Heritage Survey and Salvage Works including Topsoil Protocol implementation</li> <li>• Site Security including fencing</li> <li>• Removal of redundant infrastructure including farm fences, power poles, footings/slabs and rubbish</li> <li>• Site compound establishment and roundabout construction</li> <li>• Remediation works including establishment of stockpiles</li> <li>• Construction of temporary sediment basins and installation of erosion and sediment controls</li> <li>• Other activities which an Approver determines are Preparatory Activities.</li> </ul>	<p>Aug 2018 – 2026</p>

### 2.4.2 Early Earthworks package

A breakdown of EEW construction activities are outlined below and are consistent with the activities described in the Airport Plan. The WSA EEW site comprises of 120 ha of the overall site and is bounded by Elizabeth Drive to the north and Badgerys Creek to the east.

The EEW will involve:

- Topsoil Protocol implementation
- Management of contamination in the Early Earthworks area
- Bulk earthworks in Early Earthworks area
- Construction of a section of the new realigned Badgerys Creek Road within the Site
- Construction of a new intersection at Elizabeth Drive

- Utility relocations

In accordance with the Construction Plan Section 6, the early earthworks construction activities will be delivered in several stages. Table 5 outlines each stage and indicative timing for the proposed works and illustrated in Figure 4. This CEMP identifies the aspects and impacts for each key activity and required appropriate mitigation measures based on a risk assessment.

**Table 5 Construction staging – Early Earthworks**

Construction staging	Indicative Timing
<p>Stage 1</p> <p>Involves construction of permanent open drainage, swales and diversions into existing creeks and tributaries. This prevents clean water from outside the site, entering the construction site. Activities include:</p> <ul style="list-style-type: none"> <li>● Excavate northern end of the bypass channel from the existing Badgerys Creek Road culvert to the existing creek outfall on the north east of the Bio Retention Pond 1;</li> <li>● Construct a temporary channel crossing/culvert to suit the temporary side-track;</li> <li>● Divert overland flows to the partially constructed bypass channel;</li> <li>● Undertake cut to fill operation to develop import stockpile area west of Badgerys Creek road in parallel with stages 1-6;</li> <li>● Demolition of existing house; and</li> <li>● Implementation of the RAP</li> </ul>	Sept 2018 – Jan 2019
<p>Stage 2</p> <ul style="list-style-type: none"> <li>● Excavate Bio Retention Pond 1 for use as temporary erosion and sediment control.</li> </ul>	Jan 2019
<p>Stage 3</p> <p>Commencement of the cut to fill operation with a focus on getting the earthworks underlying Badgerys Creek Road completed. This enables the construction of new utilities routes, bridge construction and storm water drainage underneath Badgerys Creek road. Activities include:</p> <ul style="list-style-type: none"> <li>● Earthworks cut and fill to construct Badgerys Creek Road from the south tie-in to the new bridge location as well as fill required for the temporary side-track;</li> <li>● Construct a culvert beneath the temporary side-track to manage runoff from the main fill area;</li> <li>● Earthworks will include the water bypass channel between Badgerys Creek Road and the new bridge;</li> <li>● Drainage and roadworks to permanent and temporary alignments;</li> <li>● Construct bridge over stormwater channel; and</li> <li>● Endeavour Energy utility removal</li> </ul>	Oct 2018 – April 2019
<p>Stage 4</p> <p>Completion of drainage diversions and connections to the existing creek network will be undertaken after stabilisation of the new water channels and surrounding surface area to maintain water quality standards.</p>	Nov 2018 – Dec 2018
<p>Stage 5</p> <p>Completing the final portion of earthworks on the western side of Badgerys Creek Road and taking it across the road into the main fill. It is expected that Badgerys Creek Road re-alignment has reached the finishing works at this stage. Activities include:</p> <ul style="list-style-type: none"> <li>● Complete Main earthworks;</li> <li>● Complete south west leg of the bypass channel;</li> <li>● Complete Badgerys Creek Road north of the bridge;</li> <li>● Sydney water utility relocation and removal; and</li> <li>● Telstra relocation and removal.</li> </ul>	Nov 2018 – Sept 2019

Construction staging	Indicative Timing
Stage 6	April 2019 – Dec 2019
<p>Following RMS approval of the Works Authorisation Deed (WAD), works inside the Elizabeth Drive road corridor can commence to construct the new intersection of Elizabeth Drive and Badgerys Creek Road. Activities include:</p> <ul style="list-style-type: none"> <li>• Undertake Elizabeth Drive intersection works.</li> <li>• Divert traffic onto the full Badgerys Creek Road alignment;</li> <li>• Endeavour Energy Elizabeth drive works; and</li> <li>• Elizabeth Drive Upgrade works</li> </ul>	

\*Dates are indicative only. Refer to the Construction Plan for a further breakdown of work activities and scheduling.

### 2.4.3 Visitor Centre and Site Accommodation

The site for the visitor centre is located in the north-west section of the site at the intersection of The Northern Road and Eaton Road Luddenham. Refer to Figure 4.

The scope of the activities proposed to be undertaken in accordance with this CEMP are outlined in Table 6 and are consistent with the activities described in the Airport Plan.

**Table 6 Construction staging – Visitor Centre and Site Accommodation**

Construction staging	Indicative Timing
Stage 1	
<p><b>Site access and preparation works</b></p> <ul style="list-style-type: none"> <li>• Removal of redundant infrastructure including farm fences, power poles, footings/slabs and rubbish;</li> <li>• Site compound establishment;</li> <li>• Site Security;</li> <li>• Construction of temporary sediment basins and installation of erosion and sediment controls; and</li> <li>• Implementation of the RAP.</li> </ul>	Nov 2018 – Dec 2018
<p><b>Earthworks to level the site</b></p> <ul style="list-style-type: none"> <li>• Earthworks – Cut and Fill (carting and disposal off-site); and</li> <li>• Site Grading and Benching.</li> </ul>	Dec 2018 – Jan 2019
<p><b>External roadworks (Eaton Road – North and South from VC Entrance)</b></p> <ul style="list-style-type: none"> <li>• Earthworks – Cut and Fill (carting and disposal off-site);</li> <li>• Road pavement installation;</li> <li>• Permanent open drainage (swales formed as part of cut);</li> <li>• Line marking;</li> <li>• Utilities Diversion – relocation of existing light poles (4 each); and Signage – “No Right Turn” signs (2 each).</li> </ul>	Dec 2018 – May 2019
<p><b>Utilities (Power, Water and Telecommunications)</b></p> <ul style="list-style-type: none"> <li>• Substation and connection to HV along The Northern Road;</li> <li>• Connection of water to Sydney Water Main; and</li> <li>• Conduit and pits for telecommunications lead-in cable.</li> </ul>	Dec 2018 – May 2019
Stage 2	
<p><b>Foundation Works and In-Ground Services</b></p> <ul style="list-style-type: none"> <li>• Slab on ground for the Visitor Centre; and</li> <li>• Screw Piles for the Site Accommodation.</li> </ul>	Jan 2019 – Feb 2019

Construction staging	Indicative Timing
<b>Structure</b> <ul style="list-style-type: none"> <li>VC structure shall be a combination of Laminated Veneer Lumber (LVL) columns and roof beams and Cross-Laminated Timber (CLT) ceiling panels solution; and</li> <li>SA - modular timber framed panels lined with plasterboard internally and cladding externally.</li> </ul>	Feb 2019 – Mar 2019
<b>Finished and Internal Services</b> <ul style="list-style-type: none"> <li>Utilities – provision and coordination of connections to external utilities such as potable water, electrical and telecommunications;</li> <li>Services: <ul style="list-style-type: none"> <li>Fire-water and wastewater treatment systems; and</li> <li>Heating, Ventilation, and Air-Conditioning (HVAC)</li> </ul> </li> <li>ITS (Information Technology Services)</li> <li>Technical exhibition display and exhibition content</li> <li>Furniture, Fit-out and Equipment for both VC and SA buildings.</li> </ul>	Feb 2019 – May 2019
<b>Testing and Commissioning</b> <ul style="list-style-type: none"> <li>Comprehensive and systematic testing and commissioning of all utilities (below and above ground), internal services and systems: <ul style="list-style-type: none"> <li>Dry / Dead Testing</li> <li>Wet / Live Testing</li> </ul> </li> <li>Integrated Testing &amp; Commissioning</li> </ul>	Mar 2019 to May 2019
<b>Internal road, car parks and Landscaping</b> <ul style="list-style-type: none"> <li>Landscaping;</li> <li>Security Swipes / Cameras</li> <li>Fencing / Gates to perimeter boundary and site interior;</li> <li>Roadworks and carparking, including line marking, road furniture, and site lighting;</li> </ul>	Jan 2019 – Mar 2019

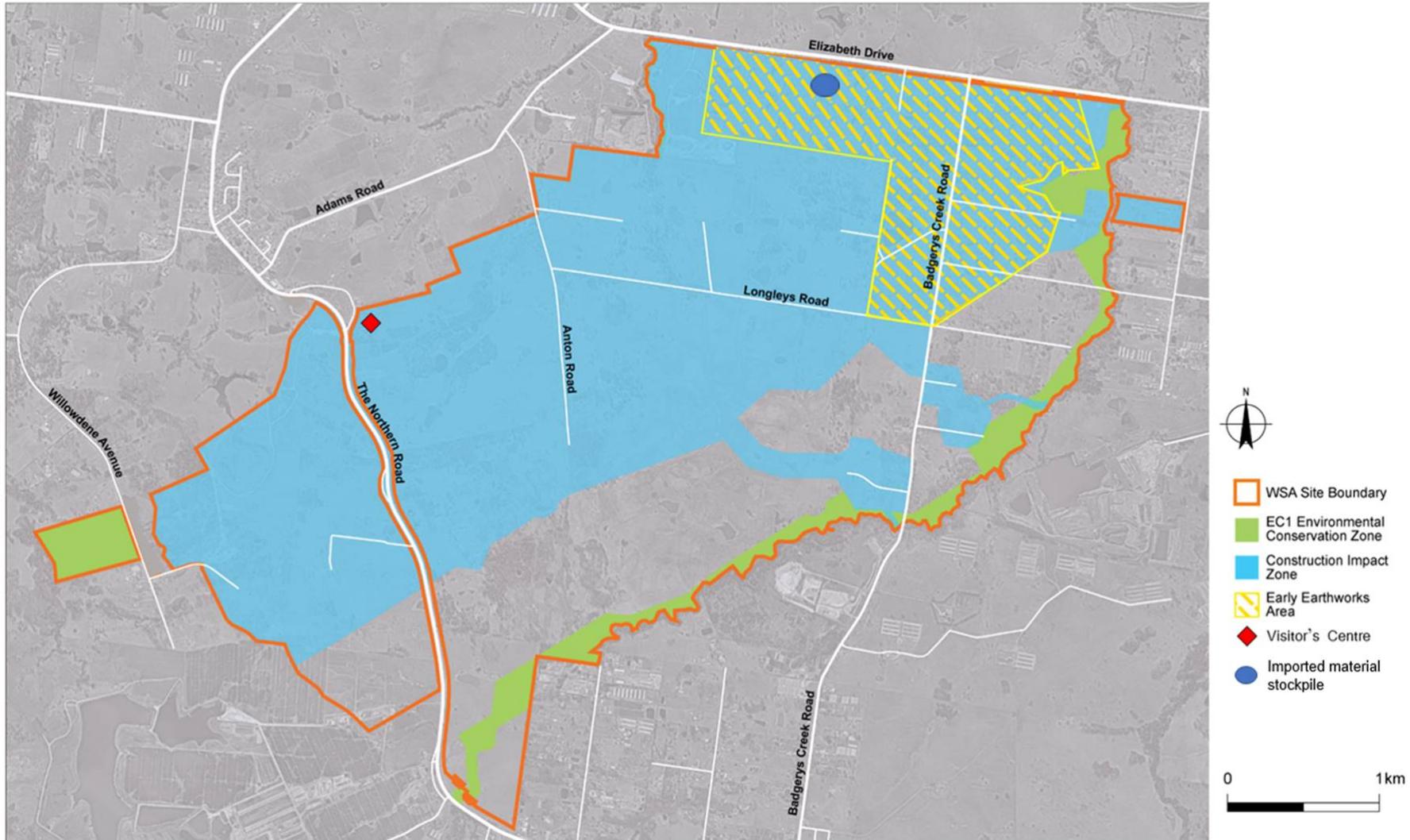
## 2.4.4 Material Importation

Material will be imported to the site from other Sydney infrastructure sites as contemplated by the EIS starting in April 2019, this will ensure that valuable Sydney sandstone will be re-used in pavement construction potentially saving millions of tonnes of quarry won materials while diverting material from landfill sites in the Sydney area. The approximate stockpile location is shown in Figure 2. Initially 1.0 Million tonnes of sandstone material will be imported with the bulk being imported from April 2019 through to December 2020. It is expected that the stockpiled material will be used during pavement construction starting in mid 2022 and completing by December 2023.

To make the most of opportunities to obtain suitable material generated from other major infrastructure projects in Sydney, import will need to occur both during standard hours and also outside standard construction hours. As such, the processes outlined in this CEMP and the Traffic and Access CEMP for the ongoing assessment and environmental management of these works will be applied prior to commencement.

**Table 7 Construction staging – Material importation**

Construction staging – Material importation	Indicative Timing
Material Import	
<ul style="list-style-type: none"> <li>Haulage of sub-base and capping material to site</li> </ul>	April 2019 – December 2020



**Figure 4 Site Location plan**

## 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 8.

**Table 8 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
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

Aspect	Target / Performance criteria	Document Reference
	Implementation of feasible and reasonable noise mitigation measures with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (ICNG)(DECC, 2009)	Environmental inspection checklist Monitoring results Monthly reporting
Plant and Equipment	All plant and equipment maintained in accordance with manufacturers' requirements	Plant and equipment log books

The above targets in Table 8 have been set to provide a benchmark performance objective to which WSA Co 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 9.

**Table 9 Principal legislation and relevance**

Legislation or regulation	Relevance	CEMP compliance provisions
<b>Commonwealth</b>		
<i>Airports Act 1996 (Airports Act)</i>	<p>The Airports Act and AEPRs 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>	<p>This CEMP forms part of the overall WSA Co environmental management system which has as a target, full compliance with the Airport Plan.</p> <p>Relevant mechanisms within this CEMP that will contribute to this include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Section 3.1 – Objectives</li> <li>• Section 4.3 – Airport Plan Conditions</li> <li>• Section 4.3.1 – Environmental Impact Statement Requirements</li> <li>• Section 7.3 – Risk Assessment</li> <li>• Section 9 – Environmental Control Measures</li> <li>• Section 11 – Environmental roles and responsibilities</li> <li>• Section 12 – Environmental Inspection, Monitoring and Auditing</li> <li>• Section 15 – Environmental non-conformance and improvement opportunities</li> <li>• Section 16 – Review and improvement</li> </ul>
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</p>	<p>Refer to commentary on Airport Plan above.</p>

Legislation or regulation	Relevance	CEMP compliance provisions
	noise impacts, as well as monitoring and reporting requirements.	
<b>NSW</b>		
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 with regard to 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 10.

**Table 10 Relevant guidelines and standards**

Guidelines and standards
<ul style="list-style-type: none"> <li>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)</li> </ul>
<ul style="list-style-type: none"> <li>NSW Interim Construction Noise Guideline (ICNG) (DECC 2009)</li> </ul>
<ul style="list-style-type: none"> <li>NSW Industrial Noise Policy (EPA 2000)</li> </ul>
<ul style="list-style-type: none"> <li>NSW Assessing Vibration: A Technical Guideline (DE 2006)</li> </ul>
<ul style="list-style-type: none"> <li>German DIN 4150-3: Structural Vibration: Effects of Vibration on Structures</li> </ul>
<ul style="list-style-type: none"> <li>Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (1990) Australian and New Zealand Environment and Conservation Council (ANZECC)</li> </ul>
<ul style="list-style-type: none"> <li>Australian Standard AS 2187.2-2006: Explosives – Storage, Transport and Use</li> </ul>
<ul style="list-style-type: none"> <li>Liverpool Local Environmental Plan 2008 (NSW)</li> </ul>
<ul style="list-style-type: none"> <li>ISO 14001 – Environmental Management Systems</li> </ul>

## 4.2 Approvals and other specifications

- Functional Specifications;
- EPBC Act Part 13 Permit E2017-0138 (included as Attachment A of the Biodiversity CEMP);
- Western Sydney Airport Plan (2016);
- Western Sydney Airport Environmental Impact Statement;
- WSA Co Sustainability Plan;
- WSA Co Community and Stakeholder Engagement Plan; and
- WSA Co 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 11. 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 11 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 Co	This document (Noise and Vibration CEMP) and the WSA Co 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 Co	This document (Noise and Vibration CEMP) and the WSA Co Construction Plan
5.3	In carrying out a Preparatory Activity, the Site Occupier must: <ul style="list-style-type: none"> <li>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</li> <li>b) not act inconsistently with any approved CEMP or the approved Construction Plan.</li> </ul>	Ongoing	WSA Co	Section 2.4
6.1	The Site Occupier must not: <ul style="list-style-type: none"> <li>a) Commence Main Construction Works until a Noise and Vibration CEMP has been prepared and approved in accordance with this condition; or</li> <li>b) Carry out any development described in Part 3 of the Airport Plan inconsistently with the approved Noise and Vibration CEMP</li> </ul>	Prior to Main Construction Works	WSA Co	This document (Noise and Vibration CEMP)

Condition No.	Condition	Timing	Responsibility	Document reference
6.2	<p>The Site Occupier must:</p> <ul style="list-style-type: none"> <li>a) Prepare, and</li> <li>b) Submit to an Approver for approval;</li> </ul> <p>A Noise and Vibration CEMP in relation to the carrying out of the developments described in Part 3 of the Airport Plan.</p>	Prior to Main Construction Works	WSA Co	This document (Noise and Vibration CEMP)
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"> <li>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</li> <li>b) the Noise and Vibration CEMP complies with Table 28-3 in Chapter 28 of the EIS and is otherwise appropriate.</li> </ul>	Prior to Main Construction Works	Approver	Section 4
6.4	<p>The Noise and Vibration CEMP must:</p> <ul style="list-style-type: none"> <li>a) provide for respite periods for Sensitive Receptors from noise and vibration associated with construction activities; and</li> <li>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.</li> </ul>	Prior to Main Construction Works	WSA Co	Section 9 Section 10
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"> <li>(a) in preparing the plan, has consulted with any NSW Government agencies specified by the NSW Department of Premier and Cabinet; and</li> <li>(b) has provided: <ul style="list-style-type: none"> <li>i) the Approver; and</li> <li>ii) each consulted agency;</li> </ul> </li> </ul> <p>with an explanation of how any responses have been addressed.</p>	Ongoing	Approver	This document (Noise and Vibration CEMP)
37 to 42	<p>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.</p>	Ongoing	WSA Co and Approver	This document (Noise and Vibration CEMP)

### **4.3.1 Environmental Impact Statement requirements**

The requirements of noise and vibration management to be considered 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 12.

**Table 12 Summary of noise and vibration management requirements**

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
Table 28-2	Performance criteria	Performance criteria for managing construction noise and vibration are: <ul style="list-style-type: none"> <li>• Compliance with the approved Noise and Vibration CEMP;</li> <li>• Compliance with criteria provided for in the AEPR and any other criteria established for construction works in the approved Noise and Vibration CEMP;</li> <li>• Compliance with vibration criteria set out in German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures; and</li> <li>• Compliance with residential criteria for overpressure from blasting activities (ANZECC, 1990).</li> </ul>	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:	Note
		Detail the management and mitigation measures to be implemented, including those outlined in Table 28-3;	Sections 9 and 10 – Environmental control measures and Working outside of standard construction hours
		Describe the process for managing complaints, stakeholder engagement, and emerging environmental management issues as they arise;	Section 14 – Communication and complaints management
		Specify the process for monitoring implementation, reporting, and auditing; and	Section 12– Environmental inspection, monitoring and auditing
		Identify the party responsible for implementing the Noise and Vibration CEMP.	Section 11 – Environmental roles and responsibilities
Table 28-2	Monitoring	General monitoring requirements are set out under the AEPR. These include that: <ul style="list-style-type: none"> <li>• Monitoring must take place under direction of an appropriately qualified person; and</li> <li>• The results for the monitoring must be kept in a written record.</li> </ul>	Section 12– Environmental inspection, monitoring and auditing
		Additional monitoring requirements include that:	Note

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
		Noise and vibration monitoring locations will be determined in consultation with the NSW Environment Protection Authority;	Section 12 – Environmental inspection, monitoring and auditing
		Regular site inspections will be undertaken to monitor compliance with the Noise and Vibration CEMP and record inspection results;	Section 12– Environmental inspection, monitoring and auditing
		An inspection log will be made available to the Infrastructure Department upon request; and	Section 12– Environmental inspection, monitoring and auditing
		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 and auditing
Table 28-2	Auditing and reporting	General reporting requirements are set out under AEPR	Note
		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 and auditing
		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 and auditing
Table 28-2	Responsibility	Responsibilities include:	Note
		The Noise and Vibration CEMP will be prepared in consultation with the NSW Environment Protection Authority and NSW Health;	Section 1.5 – 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 1.6 – 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
		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 5 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

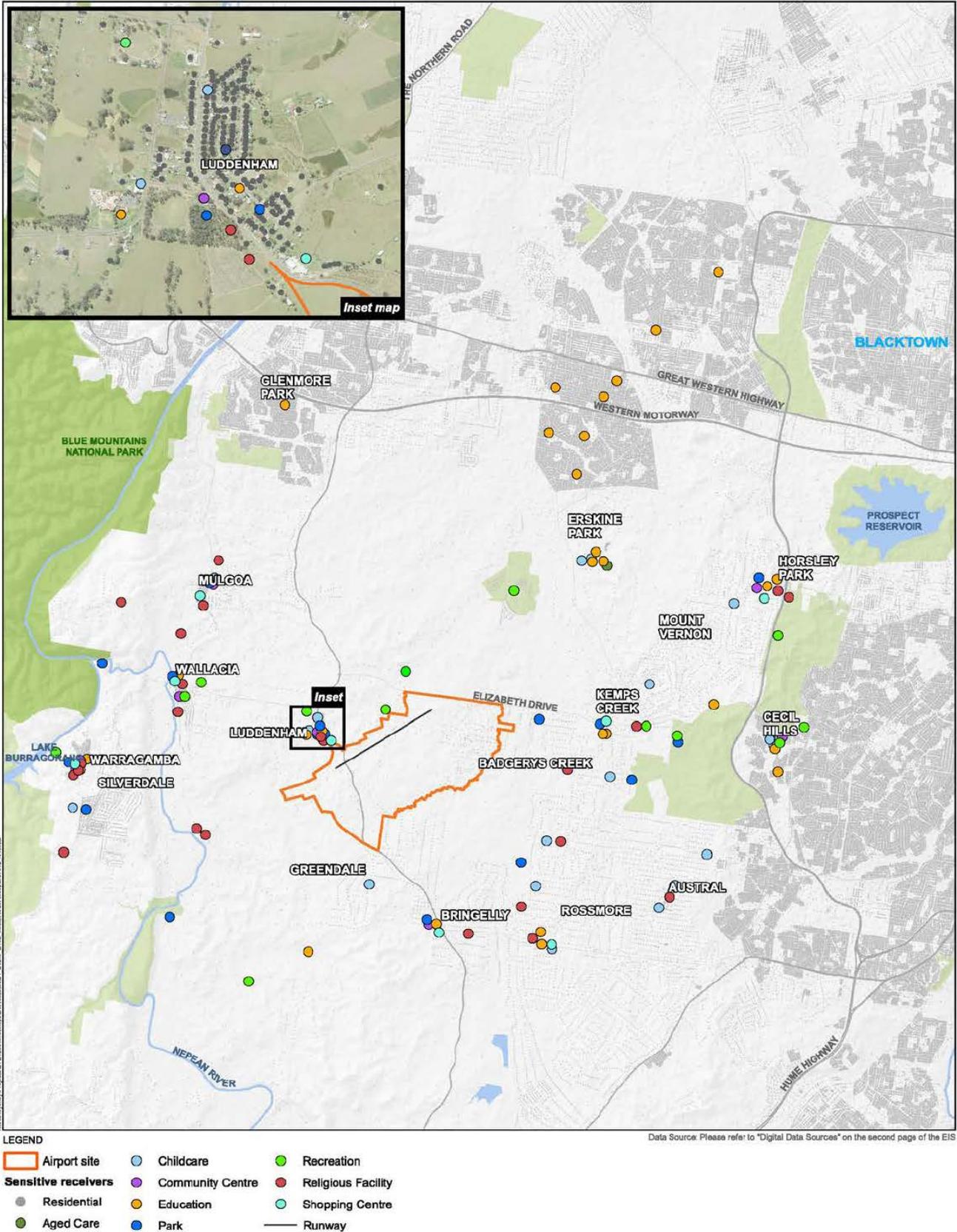
Ambient noise levels in the vicinity of the airport site are reflective of the mostly rural residential character of the area, with dominant existing noise sources including road traffic and industry. Background noise measurements were carried out at 11 locations selected to represent potentially affected areas. The location of the background noise monitoring locations is shown in Figure 6. 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 13 below.

**Table 13 Measured background noise levels (LA90)**

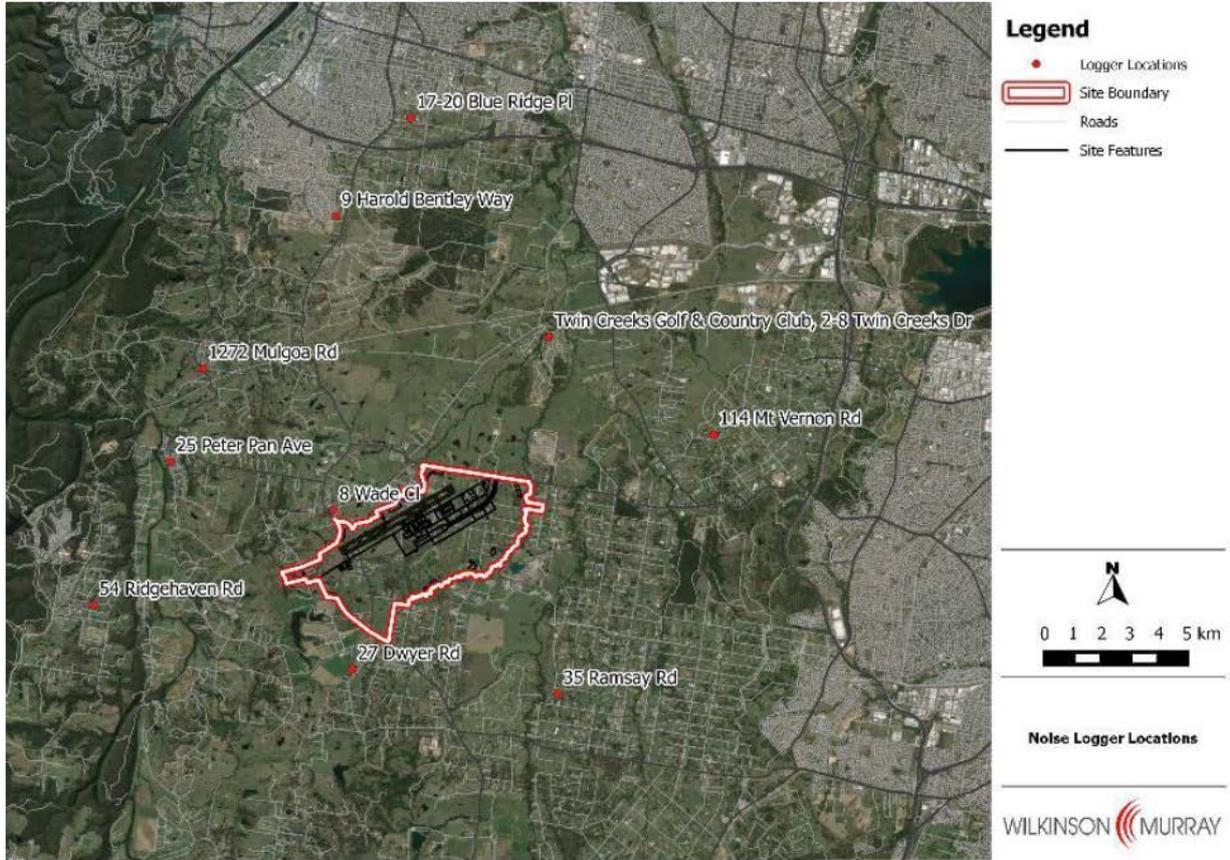
Location	Rating background level (dBA)*		
	Day (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
9 Harold Bentley Way, Glenmore Park	39	42	38
16 Park Avenue, Springwood	29 <sup>1</sup>	32	24 <sup>1</sup>
17 Blue Ridge Place, Orchard Hills	34	38	36
25 Peter Pan Avenue, Wallacia	37	34	28 <sup>1</sup>
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

<sup>1</sup> 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 5 Sensitive receiver locations surrounding the Airport Site**



**Figure 6 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

#### **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 considered to be 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 particular 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 particular 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).

#### ***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 13, 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 Section 15 of this CEMP.

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 14.

**Table 14 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 particular 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 15.

**Table 15 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

As discussed in Section 2.3, 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 Table 3), 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 including the Visitor Centre; and Site Accommodation;
- 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 earthworks package has been prepared. The results and findings of the assessment are presented in Section 8.

#### 7.2.1 Construction noise impacts

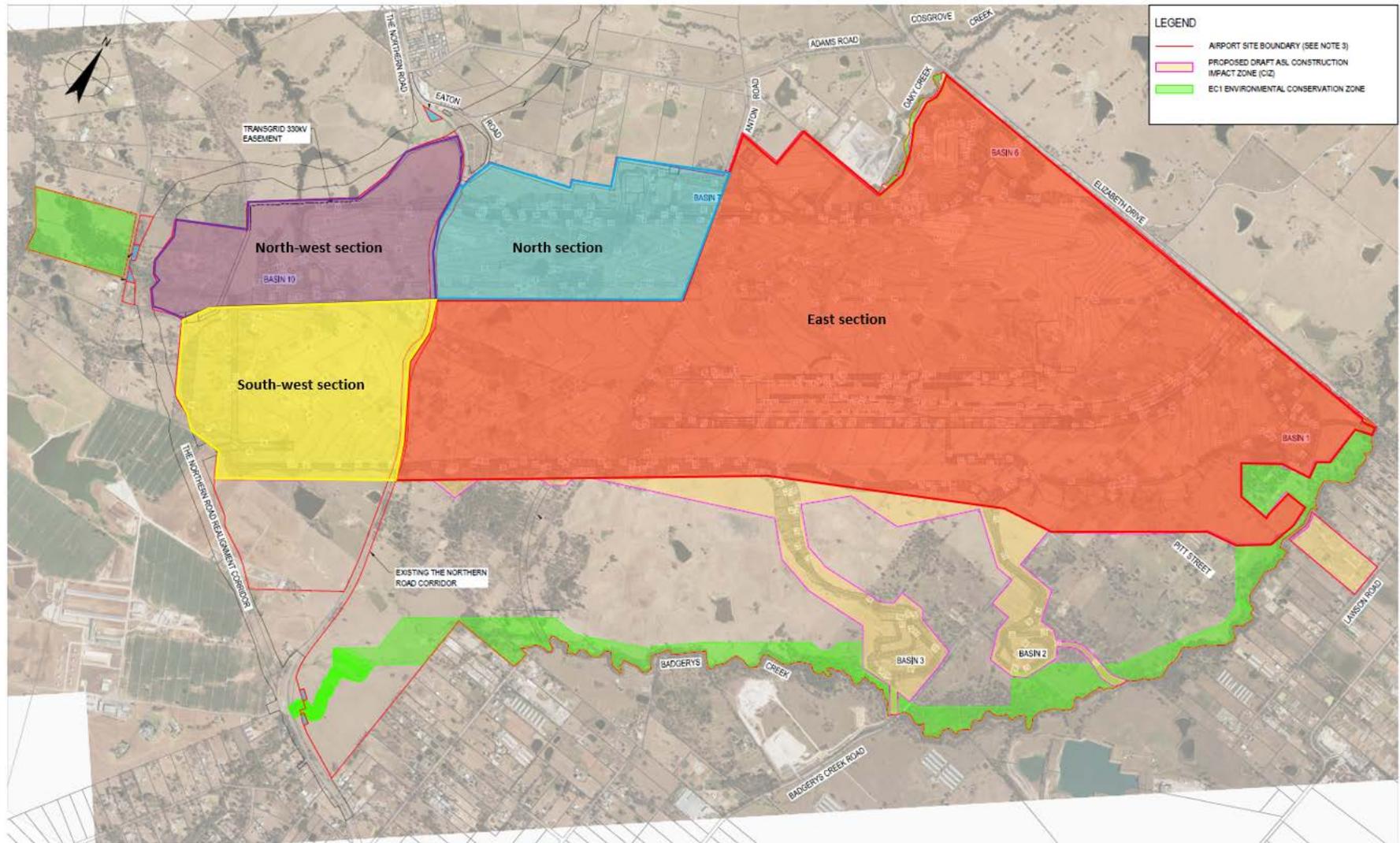
The EIS identified that under worst case conditions, noise emissions arising from construction activities will be predominantly limited to the airport site and immediate surrounds. The adopted construction noise management criteria, as detailed in Section 6.3, has been set to ensure noise and vibration impacts on sensitive receivers are managed and also 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 16. The sections referred to in the first column is based on the indicative sections shown in Figure 7

**Table 16 Estimated residential population affected by levels above noise management level - standard construction hours (worst case temperature inversion)**

Location*	Noise management level	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 7



**Figure 7 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 17.

**Table 17 Estimated residential population affected by levels above noise management level – outside standard construction hours (worst case temperature inversion)**

Location*	Noise management level	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 7

## 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). Table 18 presents predicted noise increases along Elizabeth Drive as a result of construction traffic. This change in noise level is unlikely to be perceptible.

**Table 18 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

## 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.

For an assumed sandstone thickness of up to five metres, an indicative blast design was assumed for the EIS assessment. The closest residential receptor will be approximately 150 metres from a potential blast site. The assessment suggested that a vibration level of 3.5 mm/s is predicted 150 metres away at the nearest residence, based on a maximum instantaneous charge (MIC) of 5 kg (scaled distance 67 m/kg<sup>0.5</sup>). To meet the ANZECC 95 per cent vibration criterion, a limitation to blast one hole per day or to limit the MIC to 5 kg will be required. At distances greater than 150 metres, these limitations could be relaxed.

Based on the assumed blast design, an air blast level of 113 decibels linear (dBL) is predicted at a distance of 150 metres. This indicates that the 115 dBL ANZECC 95 per cent criterion can be complied with if the MIC is limited to 5 kg. However, it will also be necessary to ensure that the burden (distance from the rock face to the charge) and stemming depth (depth of the charge below the surface) were maintained at no less than 2 metres.

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 and approved by WSA Co Environment Manager prior to the works being undertaken. A detailed blasting assessment has not been undertaken as part of this Plan as the location and actual blasting requirements are not known at this stage.

### 7.3 Risk assessment

A preliminary risk assessment has been undertaken as part of the CEMP. The parts of the overall risk assessment relevant to noise and vibration have been extracted and summarised in Table 22.

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. Each environmental risk was categorised, based on the following:

- The environmental aspect;
- Relative scale of the potential impact;
- Type of potential impact; and
- Likelihood of occurrence.

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.

The following risk assessment process has been implemented, together with a review of proposed activities and known risks based on past project experience.

#### ***Risk Assessment Process***

The following tables outline the risk assessment process using 3 steps to identify the appropriate management measures required.

Table 19 is used to determine the likelihood that the aspect will have an impact on the environment.

Table 20 is used to determine the potential consequence rating of the risk identified.

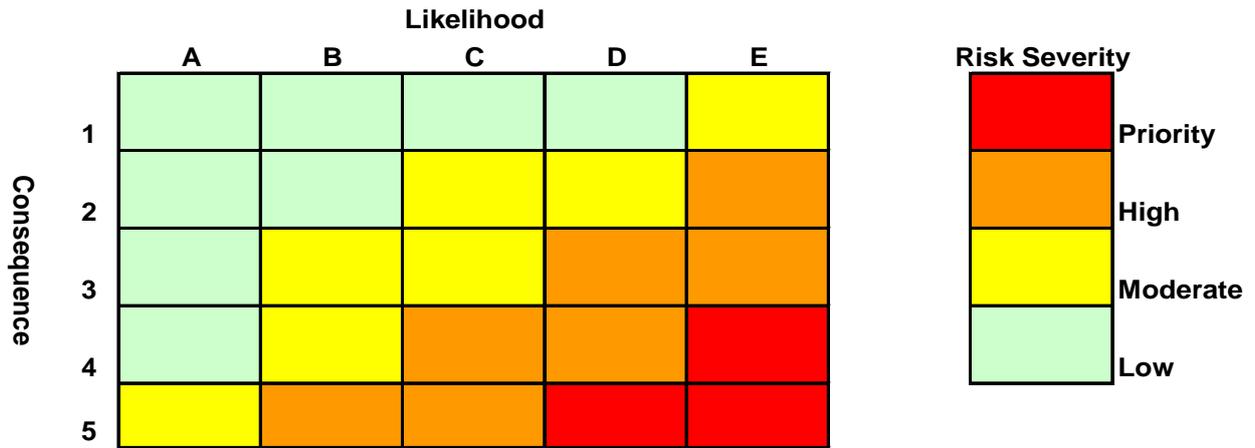
From these two tables, a risk rating can then be assigned using Figure 8 to determine the potential severity of the risk and the appropriate management response as per Table 21.

**Table 19 Likelihood descriptor**

	Likelihood	Description
A	Rare / improbable	The event may only occur in exceptional circumstances.
B	Unlikely / remote	The event may occur at some time (about once every five years).
C	Possible	The event is likely to occur at some time (about once every year).
D	Likely	The event will probably occur in most circumstances (at least once every six months).
E	Almost certain	The event is expected to occur in most circumstances (at least once every month).

**Table 20 Consequence descriptor**

	Consequence (impact)	Description
1	Insignificant/negligible	<ul style="list-style-type: none"> <li>• Short-term disturbance with minor environmental release or damage that is non-reportable.</li> <li>• No impact outside site boundary.</li> <li>• No community complaints or media reports.</li> </ul>
2	Minor/low	<ul style="list-style-type: none"> <li>• Minor violation of regulation or guideline with minimal damage to the environment and small clean-up.</li> <li>• Immediately contained on site.</li> <li>• Local government action, minor community complaints.</li> <li>• Potential or actual breach of legislation.</li> </ul>
3	Moderate	<ul style="list-style-type: none"> <li>• Violation of regulation or guideline with moderate temporary damage to the environment and significant clean-up costs.</li> <li>• Release of pollution off site.</li> <li>• Detrimental media reports, community concerns and complaints.</li> </ul>
4	Major	<ul style="list-style-type: none"> <li>• Major environmental damage with potentially permanent.</li> <li>• Release of pollution off site. Significant loss of environmental resources.</li> <li>• Detrimental media reports in the national or state media, organised community activity.</li> <li>• High likelihood of fine or court action.</li> </ul>
5	Catastrophic	<ul style="list-style-type: none"> <li>• Long-term environmental harm.</li> <li>• Permanent irreparable damage to the environment.</li> <li>• Sustained detrimental state and national media reports.</li> <li>• Sustained community protest activity prevents construction.</li> <li>• Penalty Infringement Notice/court action.</li> </ul>



**Figure 8 Risk severity rankings**

**Table 21 Risk severity and management response**

Risk severity	Management response
Priority	Immediate and detailed management action required. (e.g. stop or change activity)
High	Priority management action warranted
Moderate	Management action warranted
Low	Management action should be considered, particularly for low-level impacts that nevertheless occur on a continual basis

**Table 22 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	C2 (Mod)	NV01 NV07 NV09 NV11 NV15 NV28	B2 (Low)	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	D2 (Mod)	NV01 NV03 NV04 NV05 NV07 NV09 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
03		Compaction of materials	Vibration	Community disturbance and building damage	B2 (Low)	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	C2 (Mod)	NV01 NV07 NV10 NV16 NV17 NV20	B2 (Low)	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	C2 (Mod)	NV01 NV02 NV06 NV07 NV21 NV25 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
06	Enabling works	Demolition of structures	Noise generation	Community disturbance	B2 (Low)	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	B2 (Low)	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	C2 (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
09		Vegetation clearing	Noise generation	Community disturbance	C2 (Mod)	NV01 NV07	B2 (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	B2 (Low)	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	B2 (Low)	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	C2 (Mod)	NV01 NV07 NV09 NV10 NV11 NV14 NV15 NV17 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
13		Import and export of materials from site	Noise generation	Community and local road disturbance	C3 (High)	NV01 NV07 NV10 NV11 NV16 NV17 NV20 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
14	Culvert construction	Culvert excavation	Noise generation	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 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 (Mod)	NV01 NV07 NV08 NV09 NV11 NV15 NV18 NV22 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
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	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
20		Compacting materials	Vibration	Community disturbance	C3 (Mod)	NV01 NV07 NV09 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
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	B2 (Low)	NV01 NV06 NV09 NV10 NV11 NV12 NV13 NV15 NV16 NV17 NV18 NV20 NV21 NV22 NV23 NV25 NV26	B2 (Low)	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	B2 (Low)	NV01 NV06 NV09 NV10 NV11 NV12 NV13 NV15 NV16 NV17 NV18 NV20 NV21 NV22 NV23 NV25 NV26 NV27 NV28	B2 (Low)	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	B2 (Low)	NV01 NV06 NV09	B2 (Low)	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	C2 (Mod)	NV01 NV07 NV09 NV11 NV12 NV15 NV21 NV22 NV23	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
						NV24 NV25 NV26 NV27 NV28		
25	Out of hours works (continued)	Excavation	Noise generation	Community and local road disturbance	C2 (Mod)	NV01 NV07 NV09 NV11 NV12 NV13 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
26		Compaction	Vibration	Damage to residential structures	C2 (Mod)	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

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

<sup>1</sup> 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.

As such, for ease of reference, details of modelling for the construction activities including drawings and figures showing potential impacts are provided in Appendix E of this plan, and summarised in Section 8.2 Noise modelling requirements

Modelling of noise levels at nearby receivers resulting from construction activities should take into account the following:

- Aim to predict  $L_{Aeq(15 \text{ minute})}$  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. This will not occur at all times 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  $>3 \text{ m/s}$ .

### 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 23 and the zones are shown in Figure 9.

The zones are highlighted in Appendix E. 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.

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 ( $L_{A10}$ ), adjusted to take into account of tonal character and impulsive (if any) of the noise. Given the predicted noise levels, based on the  $L_{Aeq}$  (equivalent continuous sound level), the construction noise guideline of 75dB(A)  $L_{A10}$  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.

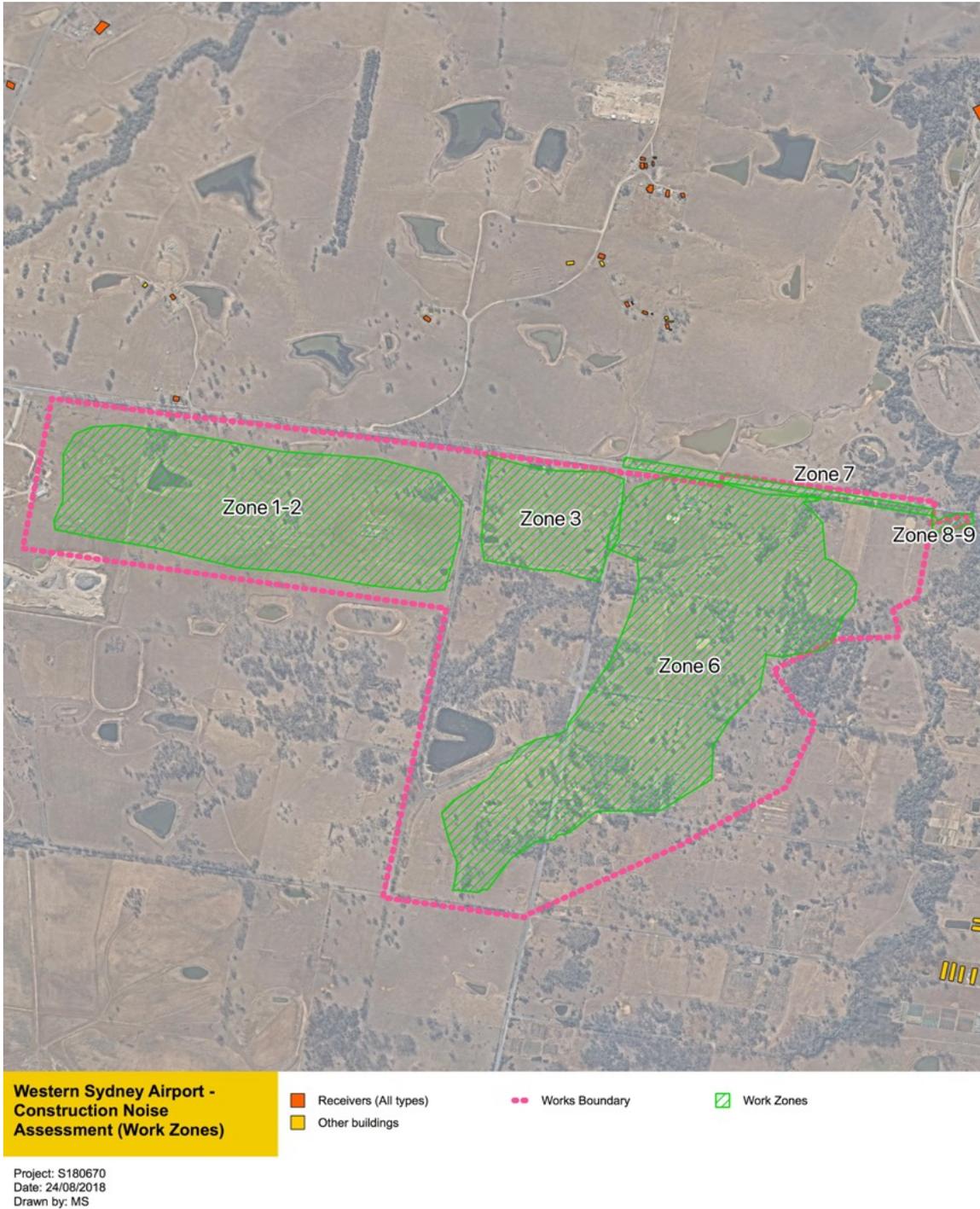
**Table 23 Early earthworks construction zone summary**

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 24 to Table 29.

Notwithstanding the above, the environmental control measures presented in Table 33 will be implemented.



**Figure 9 Early Earthwork Construction Zone Summary**

**Table 24 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 25 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 26 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 27 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)	<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 28 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 29 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 Visitor Centre and Site Accommodation

To present the potential noise impacts that may result from the works associated with the construction of the visitors centre and site accommodation, a noise assessment has been conducted. This assessment confirmed assumptions that the earthworks phase would result in the highest noise levels, as shown in **Table 30** below

**Table 30** Population affected by Visitor Centre and Site Accommodation and noise mitigation requirements

Construction Activity	Number of affected receivers	Noise level at most affected receiver	Noise mitigation requirements
Earthworks	6	72 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>

## 8.1.3 Material Importation

As noted in Section 2.4.4, prior to the commencement of out of hours work, 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.

## 8.2 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.

In order 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 31**.

**Table 31** 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 Visitor Centre and Site Accommodation

Construction traffic will use the nearby road network, with all construction traffic required to access the site via the southern intersection of The Northern Road and Eaton Road. The 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. Due to the scope of the work and estimated number of vehicles it is anticipated that the road traffic noise levels will not be equal or greater than 2dB(A).

## 8.2.3 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. As noted in Section 2.4.4, 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.

## 8.3 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 be complied with at all times. The distances are noted as being indicative and are likely to vary depending on the particular item of plant and local geotechnical conditions. The minimum working distances apply to addressing the risk of cosmetic (minor – easily repairable) 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 32 presents the recommended minimum working distances for vibration intensive plant.

**Table 32 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

Plant item	Rating / description	Minimum working distance – Cosmetic damage (BS7385)	Minimum working distance – Human response (DECC 2006)
	< 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

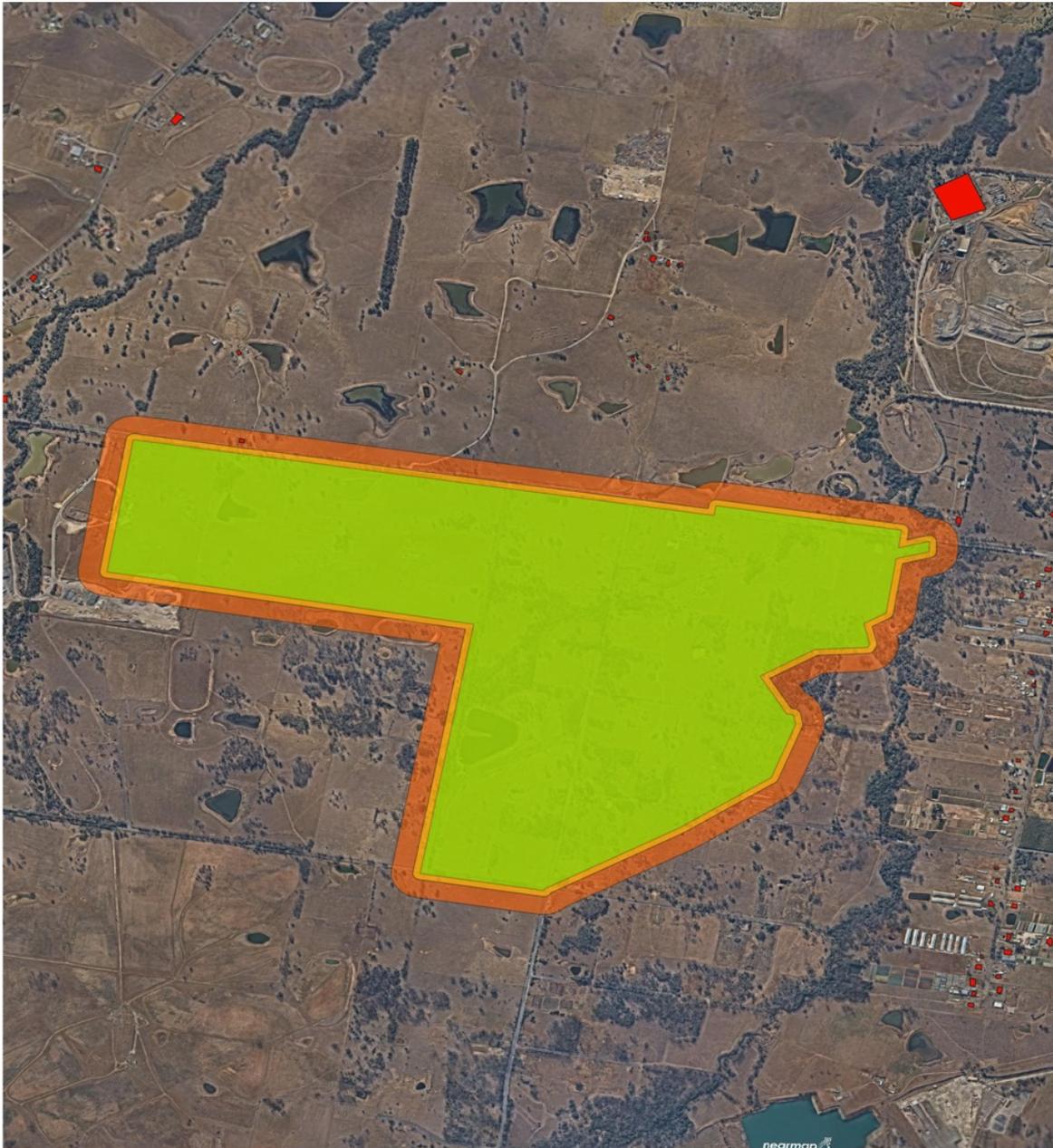
### 8.3.1 Early Earth Work Package

Figure 10 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 sufficient 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



**Figure 10 Vibration safe working distances**

### 8.3.2 Visitor Centre and Site Accommodation

Figure 11 shows the distance of the nearest receiver from the edge of the Visitor Centre and Site Office Accommodation earthworks foot print.

Assuming a worst case scenario (intensive vibration works occurring right on the edge of the foot print), the separation distance(s) between the proposed works and the nearest receiver located on Eaton Drive to the north west of the site would generally be sufficient so that these buildings are unlikely to suffer 'Cosmetic Damage' for most of the proposed construction equipment. However, as shown, the receptor is 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 equipment are within the safe working distances for cosmetic damage as detailed in Table 32. The selection of plant and construction methods used for works on the northern portion of the site will be aimed at minimising vibration levels which may be felt at the receptor.

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.



**Figure 11** Vibration safe working distances

### 8.3.3 Material Importation

Review of the material importation scope, it is considered that there is very limited risk of vibration impacts. As shown in Figure 4, 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.

## 9 Environmental control measures

Mitigation and management measures that will be implemented during construction are detailed in Table 33 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 4.3.1 and 4.3.2 of the SEMF.

**Table 33 Noise and vibration management and mitigation measures**

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
<b>GENERAL</b>					
NV_01	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 10.2 of this plan.	Pre-construction, construction	All personnel will be inducted before commencing works.	WSA Co Environmental Manager	Good Practice
NV_02	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.	Contractor	Good Practice
NV_03	Work compounds and their associated layout, parking areas, equipment and material stockpile sites will be positioned away from noise-sensitive locations.	Construction	Ancillary facilities will be designed to comply with this measure.	WSA Co Environmental Manager	Good Practice
NV_04	Site entry and exit points will be located as far as possible from sensitive receivers where possible, taking into account the importance of safe access.	Construction	The site layout will be designed in combination with the location of sensitive receivers.	Foreman	Good Practice
NV_05	Where possible, the compounds, refuelling areas and areas near potentially noise and vibration sensitive receivers, will be designed to promote one-way traffic so that vehicle reversing movements are minimised.	Construction	The traffic management plan is designed to comply with this.	Foreman	Good Practice

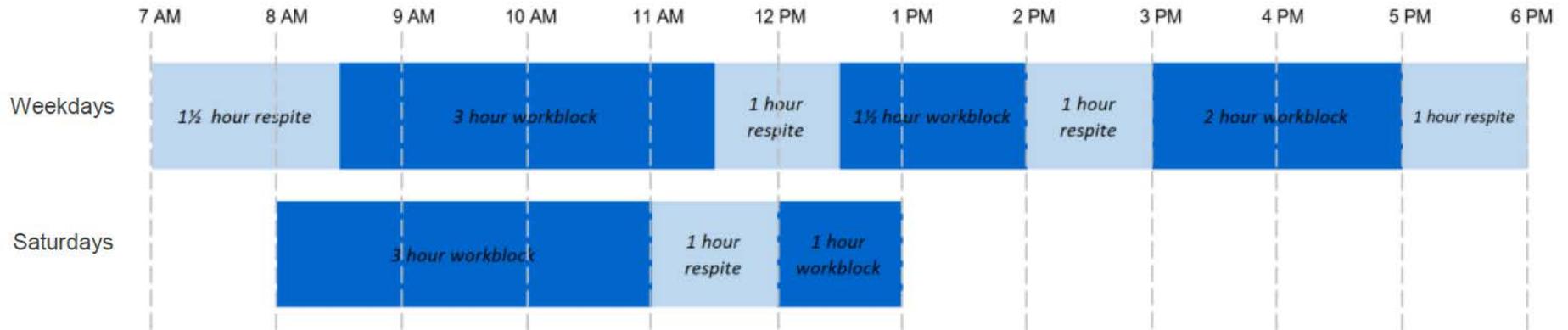
ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
NV_06	Site training / tool-box talks will reinforce expected behavioural practices on site such as no swearing or unnecessary shouting or loud stereos/ radios on site, no dropping materials from height where practicable, no throwing of items and no slamming of doors.	Construction	All personnel will undertake inductions and receive ongoing site training.	Foreman	Good Practice
NV_07	Where possible, work will be undertaken within the standard construction hours of: <ul style="list-style-type: none"> <li>- 7am – 6pm, Monday to Friday;</li> <li>- 8am – 1pm Saturday</li> <li>- 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.</li> </ul> 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	WSA Co Environmental Manager  Contractor	Airport Plan Condition 6(4) (Section 3.10.2)
NV_08	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 12with 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	WSA Co Environmental Manager  Contractor	Airport Plan Condition 6(4) (Section 3.10.2)
<b>PLANT AND EQUIPMENT</b>					
NV_09	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.	Contractor	Good Practice
NV_10	Plant or machinery will not be permitted to 'warm-up' before the nominated working hours.	Construction	All personnel will undertake inductions, which will be reiterated through ongoing site training.	WSA Co Construction Manager  Contractor	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
NV_11	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.	WSA Co Construction Manager Contractor	Traffic and Access CEMP
NV_12	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.	WSA Co Construction Manager Contractor	Good Practice
NV_13	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.	WSA Co Construction Manager Contractor	Good Practice
NV_14	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.	WSA Co Construction Manager Contractor	Good Practice
NV_15	Where possible, work will be undertaken away from noise sensitive receivers.	Construction	Works will be scheduled ahead of time, where possible.	WSA Co Construction Manager Contractor	Good Practice
NV_16	All construction plant and equipment used on the site will be, in addition to other relevant requirements: <ul style="list-style-type: none"> <li>- Fitted with properly maintained noise suppression devices in accordance with the manufacturer's specifications.</li> <li>- Maintained in an efficient condition.</li> <li>- Operated in a proper and efficient manner</li> </ul>	Construction	All vehicles on site will be tested and fitted with appropriate controls before commencing works.	WSA Co Construction Manager Contractor	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
NV_17	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.	WSA Co Construction Manager Contractor	Good Practice
NV_18	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.	WSA Co Construction Manager Contractor	Traffic and Access CEMP
NV_19	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.	WSA Co Construction Manager Contractor	Good Practice
NV_20	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.	WSA Co Construction Manager Contractor	Good Practice
NV_21	Truck drivers will limit compression braking as far as practicable.	Construction	All truck drivers will undertake induction that informs them of the appropriate measures.	WSA Co Construction Manager Contractor	Good Practice
NV_22	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.	WSA Co Construction Manager Contractor	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
NV_23	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.	WSA Co Construction Manager Contractor	Good Practice
NV_24	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.	WSA Co Construction Manager Contractor	Good Practice
NV_25	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.	WSA Co Construction Manager Contractor	Good Practice
<b>CONSULTATION AND COMPLAINTS MANAGEMENT</b>					
NV_26	All complaints received will be managed in accordance with the Community and Stakeholder Engagement Plan.	Construction	A Community and Stakeholder Engagement Plan will be prepared.	WSA Co Community Engagement Manager	Good Practice
NV_27	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 Co Community Engagement Manager	Good Practice
<b>SURVEY, MONITORING AND REPORTING</b>					
NV_28	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.	WSA Co Environment Manager Contractor	Good Practice
NV_29	Noise and vibration monitoring will be undertaken in accordance with Section 12.2. The program for construction noise and vibration	Construction	Monitoring and record keeping to be	WSA Co Environment Manager	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
	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.		undertaken in accordance with this plan.	Contractor	
<b>RESPITE FROM NOISY ACTIVITIES</b>					
NV_30	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 to be undertaken in accordance with this plan.	WSA Co Construction Manager  Contractor	AEPR Condition 6
NV_31	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 to be undertaken in accordance with this plan.	WSA Co Construction Manager  Contractor	AEPR Condition 6



**Figure 12 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 34.

### **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 C for the OOHW procedure and Appendix D 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; 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 34.

**Table 34 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 offer where agreeable					X
Negotiated agreement					X

## 10.5 Community notification

WSA Co will notify the potentially affected sensitive receivers of proposed works outside of the standard construction hours. This notification may include targeted letterbox drop, doorknock, phone call and/or email. 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.

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

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

### 11.1 External roles and responsibilities

#### **Environment Minister (or an SES employee in the Environment Department)**

- The Approver for the Biodiversity Offset Delivery Plan.
- On 24 August 2018 the Approver approved the Biodiversity Offset Delivery Plan in accordance with Condition 30 of the Airport Plan.
- Required to be included in the consultation process for the Biodiversity CEMP and the Soil and Water CEMP (in accordance with Condition 35 of the Airport Plan).
- The Environment Department receives notification regarding publication of annual reports under condition 39 of the Airport Plan and copies of independent audits under condition 40 of the Airport Plan.

#### **Infrastructure Minister (or an SES employee in the Infrastructure Department)**

- The Approver for the Construction Plan, CEMPs, the Community and Stakeholder Engagement Plan and the Sustainability Plan
- Approval for variation of an Approved Plan;
- Review and approve other matters (excluding Biodiversity Offset Delivery Plan); and
- The Infrastructure Department is responsible for administering and enforcing the Airports Act.

#### **Airport Environment Officer**

The responsibilities of the Airport Environment Officer (AEO) include the following:

- Monitoring compliance with the AEPRs;
- Facilitate an understanding of the obligations of the AEPRs;
- Ensure the best possible outcomes are achieved;
- Complete site inspections to review monitoring requirements and completion of works;
- Review and comment on CEMPs, incidents, and remedial activities;
- Issue an environmental protection order in accordance with Part 7 of the AEPR; and
- Issue an infringement notice in response to an offence against the AEPR.

### 11.2 WSA Co roles and responsibilities

#### **WSA Co Executive General Manager**

Environmental responsibilities of the WSA Co Executive General Manager include (but are not limited to):

- Approve this Noise and Vibration CEMP for issue;
- Mandate and ensure that environmental protection remains an integral element of all Project activities; and
- Authorise resourcing with regards to noise and vibration management.

### **WSA Co Environment Manager**

The WSA Co Environment Manager is responsible for leading the planning, approvals and environmental function and is responsible for the ongoing requirements associated with the management of noise and vibration as follows:

- Coordinate and manage the preparation of the Noise and Vibration CEMP (this Plan) and associated documents / plans / procedures;
- Liaise regularly with the stakeholders and contractors on environmental matters routinely and as required;
- Coordinate ongoing training in environmental awareness for all levels of WSA Co staff as required to implement this Noise and Vibration CEMP;
- Ensure that an appropriate environmental induction and training program is developed such that personnel are aware of their environmental responsibilities under relevant legislation and the contract, including the requirements associated with noise and vibration management;
- Ensure compliance of Stage 1 development activities with this Noise and Vibration CEMP;
- Implement, maintain, monitor, report and advise the Executive General Manager on all environmental matters including those associated with noise and vibration management;
- Liaise with the AEO and Approver on environmental issues, including the written notification of non-conformances;
- Monitor the implementation of all environmental management requirements as detailed in this Plan;
- Provide direction and guidance on implementation of this Noise and Vibration CEMP to all levels of the Project, including to the contractors as required;
- Ensure Project contractors comply with all relevant statutes, regulations, rules, procedures, standards and policies as detailed in this Noise and Vibration CEMP;
- Ensure the timely review and assessment of environmental monitoring, auditing and inspection outcomes to ensure identification and implementation of continual improvement with regards to environmental management; and
- Overall reporting of the environmental performance of the Project.

### **WSA Co Site Environment Officer**

The environmental responsibilities of the WSA Site Environmental Officer include (but are not limited to):

- Daily interaction and coordination with Project contractor representatives to ensure their environmental management requirements are discharged; and
- Work collaboratively with the WSA Co Environment Manager to ensure desired environmental outcomes are achieved.

## **11.3 Western Sydney Airport Delivery Partner roles and responsibilities**

The Western Sydney Airport Delivery Partner is responsible for the coordination and management of contractors ensuring all necessary planning approvals and environmental management activities and documentation are undertaken in accordance with WSA Co requirements.

In summary, the environmental requirements of the Western Sydney Airport Delivery Partner in relation to management of noise and vibration impacts are as follows:

- Ensure that this Noise and Vibration CEMP is effectively implemented by the contractor as required;

- Ensure that the required noise and vibration monitoring and reporting, including environmental auditing, is undertaken and reported to WSA Co as required;
- Ensure that all necessary planning approvals, licenses and permits are obtained, as required by this Noise and Vibration CEMP, prior to commencement of applicable works;
- Liaise with the WSA Co Environment Manager on noise and vibration related issues, including the written notification of non-conformances;
- Participate in regular workplace inspections to ensure compliance;
- Provide direction and guidance on implementation of this Noise and Vibration CEMP; and
- Liaise between contractors and relevant government stakeholders as required and provide notification / information where environmental incidents / events have occurred.

## **11.4 WSA Co Contractor roles and responsibilities**

### **Contractor responsibilities**

The responsibilities of the relevant contractor with regards to the management of impacts associated with noise and vibration are:

- Identify resources required for implementation of the Noise and Vibration CEMP;
- Report to the WSA Co Environment Manager as required to inform community and stakeholder notifications and to provide information where environmental incidents / events have occurred;
- Report to WSA Co Environment Manager (or delegate) on environmental performance monthly or at other times as necessary;
- Ensure that all personnel receive appropriate induction training, including details of the environmental obligations associated with noise and vibration management;
- Responsible for implementing site specific environmental procedures and work method statements applicable to the proposed works in accordance with Section 9 of this CEMP and also in accordance with Section 4.4 of the SEMF;
- Ensure suppliers and subcontractors comply with requirements regarding noise and vibration management;
- Undertake weekly inspections, ensuring all works comply with relevant regulatory and Project requirements, including noise and vibration management objectives;
- Provide other information as required from time to time, in order to demonstrate to WSA Co that environmental management requirements are being met by the contractor;
- Program toolbox talks and daily pre-start meetings to include any relevant noise and vibration management requirements;
- Report any activity that has resulted, or has the potential to result, in an environmental incident immediately to WSA Co Environment Manager;
- Stop activities where there is an actual or immediate risk of harm to the environment and advise WSA Co Environment Manager;
- Ensure steps are taken to rectify and prevent future incidents from occurring;
- Ensure that noise and vibration management controls are properly maintained and effective; and
- Carefully select suppliers and subcontractors based upon their ability to meet stated requirements.

## 12 Environmental inspection, monitoring and auditing

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

#### ***WSA Co environmental inspections***

Environmental site inspections will be undertaken by the WSA Co Environment Manager (or delegate) on a monthly basis to evaluate the effectiveness of environmental controls implemented by the contractor.

The monthly 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 Co site environmental inspection will be recorded on a WSA Co *Site Environmental Inspection Checklist* with an accompanying photographic style inspection report.

Refer to the SEMF for further details with regards to completing the *Site Environmental Inspection Checklist*.

#### ***Contractor environmental inspections***

Weekly site inspections will be undertaken to monitor compliance with this plan. 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 procedures will need to identify the responsible person in the EWMS or similar (refer to Section 4.4 of the SEMF).

#### ***Pre-start inspection***

Prior to the commencement of works on each shift, an 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.

## 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 35.

**Table 35 Noise and vibration monitoring requirements**

Reference	Requirement	Timing	Responsibility
<b>Noise Monitoring</b>			
NV_M_01	Noise monitoring will be conducted at the nearest sensitive receptor locations to determine the effectiveness of mitigation measures against predicted impacts (Noise and vibration monitoring locations will be determined in consultation with the NSW EPA). 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 Co
NV_M_02	An inspection log will be prepared following each monitoring event and will made available to DIRDC upon request.	As required	WSA Co
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	WSA Co
NV_M_04	Noise monitoring may be carried out for the purpose of refining construction methods or techniques to minimise noise.	During construction	WSA Co
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	WSA Co
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	WSA Co
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 implemented to either reduce noise emissions or reduce the impacts on receptors.	During construction	WSA Co
<b>Vibration Monitoring</b>			
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 5	During construction	WSA Co

Reference	Requirement	Timing	Responsibility
	are not exceeded and to confirm safe working distances.		
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	WSA Co
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	WSA Co
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	WSA Co

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 Section 15 will be implemented.

### 12.2.1 Noise monitoring program

In addition to the targeted noise monitoring as required under monitoring requirement NV\_M\_01 (refer to Table 35), WSA Co will continue to run a concurrent program of noise monitoring / logging at representative locations which have been identified in consultation with the NSW EPA.

The current locations of the noise loggers for the noise monitoring program are shown in Figure 13. 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 will be reflected in the next revision of CEMP documentation.

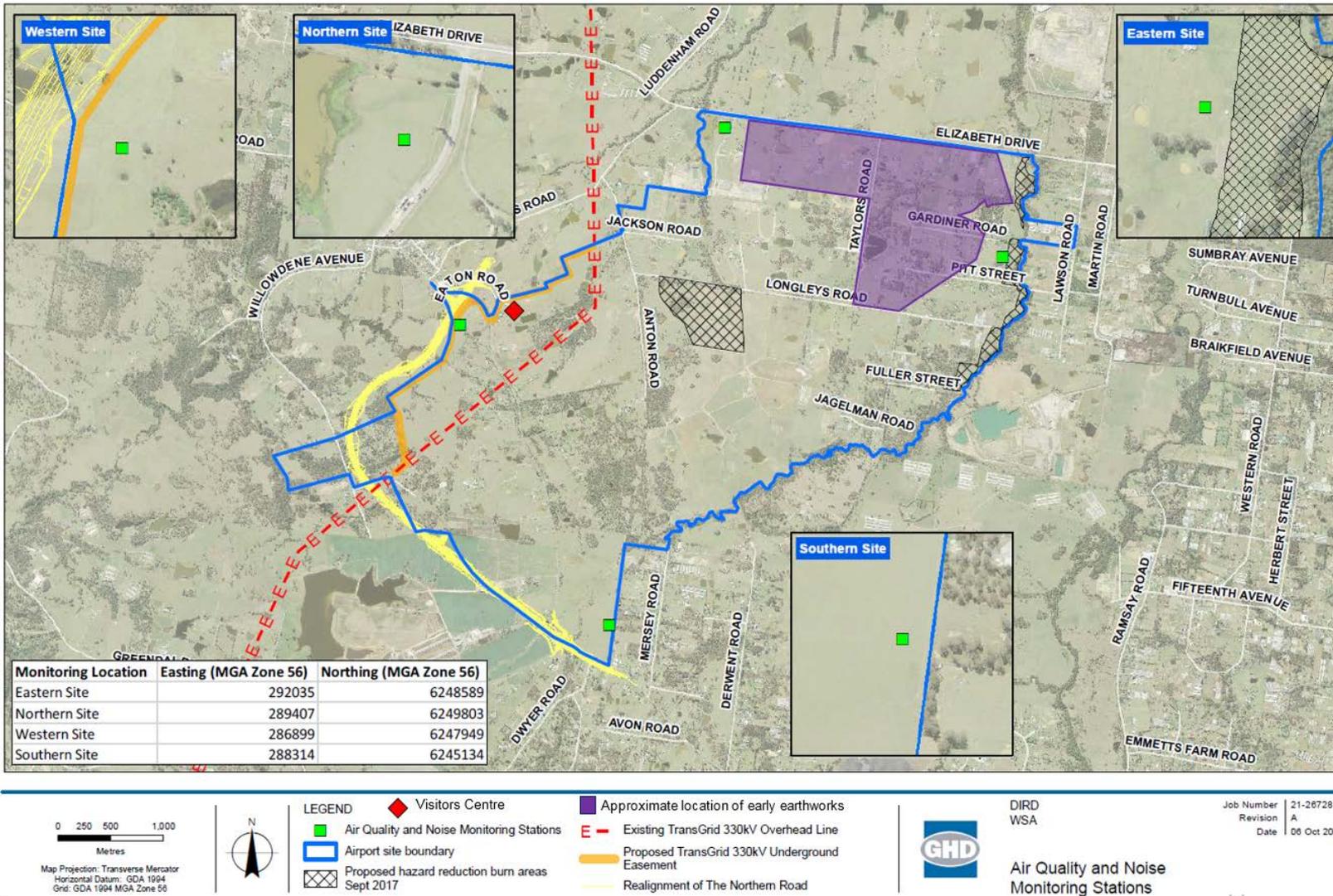
Noise monitoring will be undertaken using the *Svantek SV200* or equivalent noise monitoring stations. The noise monitoring stations are programmed to accumulate 15-minute period of LA90, LA10, LAeq and LAm<sub>ax</sub> sound pressure levels continuously over the entire monitoring period. At monthly 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 13) are provided in Table 36.

**Table 36 Noise monitoring station details**

Monitoring site	Equipment	Serial Number	Photo
Northern	SV200	SN: 57061	
Southern	SV200	SN: 57068	
Eastern	SV200	SN: 57070	
Western	SV200	SN:57067	

Figure 13 Noise monitoring locations



## 12.3 Environmental auditing

Refer to Section 8 of the SEMF for environmental auditing requirements, including internal WSA Co 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 37.

**Table 37 Noise and vibration reporting**

Action	Scope	Timing / Frequency	Responsibility
Annual reporting	<p>Unless otherwise agreed in writing by an Approver, an annual report will be prepared in relation to compliance with the Visual and Landscape CEMP (Condition 39).</p> <p>Unless otherwise agreed in writing by an Approver, WSA Co 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).</p>	Annually	WSA Co Environment Manager
Compliance reporting	Undertaking monitoring as required by this Noise and Vibration CEMP. Contractor is to provide WSA Co with a monthly summary of all Noise and Vibration monitoring undertaken and advise of compliance with criteria.	Monthly	Contractor Environment Manager
Complaints reporting	Recording of complaints and stakeholder interactions.	As required	WSA Co Environment Manager and Contractor Environment Manager
Pollution and or excessive noise reporting	<p>In accordance with the AEPR, WSA Co 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.</p> <p>For further information regarding non-conformance reporting, refer to Section 15 of this Noise and Vibration CEMP.</p>	As required	WSA Co
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 Co SEMF.	As required	WSA Co and Contractor

Action	Scope	Timing / Frequency	Responsibility
Environmental Site Register (required under the 6.02(3) of the AEPR)	<p>Environmental Site Register to be kept and maintained to include written record of environmental conditions of the Airport and its environmental management generally.</p> <p>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</p>	As required	All

## 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 Co 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 the SEMF. A summary of these requirements is provided in the sections below.

### 13.1 Environmental project induction

All Project personnel working on the Stage 1 Development (including sub-contractors) are required to attend a compulsory Project induction that includes an environmental component prior to commencement of works on site, which will include:

- The standard construction hours;
- The process for undertaking planning and obtaining approvals for out-of-hour construction works;
- The requirement to undertake pre-start checks on plant and machinery to ensure they are running as per standard operations, including the effectiveness of noise controls (e.g. mufflers / exhausts); and
- The procedure for taking and managing complaints.

Short-term visitors to site for purposes such as deliveries will be required to be accompanied by inducted personnel at all times. A visitors' induction will also be undertaken for visitors onsite for short periods as agreed with the WSA Co Safety Manager.

The WSA Co Environment Manager (or delegate) will be responsible for providing the environmental component of the Project inductions, ensuring that the environmental management requirements of this plan are incorporated.

A WSA Co *Induction and Training Register* will be maintained at all times including the details of all personnel who have completed the WSA Co Project induction and any other pertinent environmental training and or awareness forums (workshops, presentations etc.).

### 13.2 Contractor-specific site inductions

In addition to the WSA Co Project induction, contractors will develop and implement their own environmental training and induction program relevant to their scope of works. A record of all environment inductions is to be maintained by the contractor and provided weekly to WSA Co.

### 13.3 Toolbox talks, training and awareness

Toolbox talks or similar will be one method of raising awareness and educating personnel on issues related to aspects of construction including environmental issues. The toolbox talks are used to ensure environmental awareness continues throughout construction.

Toolbox attendance is mandatory and attendees of toolbox talks are required to sign an attendance form and the records maintained as part of the Induction and Training Register.

Environmental issues associated with noise and vibration management to be considered for toolbox talks may include (but are not limited to):

- Adherence to the required hours of construction, including deliveries and external transport movements;

- Proper maintenance and inspection of plant and machinery to ensure compliance with manufacturer specifications;
- Identification of activities with the potential to generate high noise impacts and consideration of additional mitigation measures and controls, and an increased frequency of monitoring; and
- Complaints handling procedure – what to do if approached by a member of the public or stakeholder with a complaint or enquiry.

For activities with high environmental risk (as identified through the risk assessment process undertaken as part of the CEMP), targeted environmental awareness training is to be provided.

The WSA Co Environment Manager will establish a schedule of environmental training.

### **13.4 Daily pre-start meetings**

The pre-start meeting is a tool for informing the workforce of the day's activities, safe work practices, environmental protection practices, work area restrictions, activities that may affect the works, coordination issues with other trades, hazards and other information that may be relevant to the day's work.

Specifically, with regards to this Noise and Vibration CEMP, the daily pre-start forum can be used as an opportunity to discuss the following:

- Forecast high noise potential activities;
- Ideas for additional noise and vibration management measures that could be considered during the works;
- Planning of works to manage impact potential associated with a specific community / local event (if required); and
- Daily activities that may have impact on noise and vibration.

## **14 Communications and complaints management**

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

### **14.1 Complaints management**

A Complaints and Enquiries Procedure, consistent with AS 4269: Complaints Handling, has been developed for the work, in accordance with the requirements of Condition No. 15 (Airport Plan, Section 3.10.2). Refer to Section 7.3 of the SEMF for further details regarding the Complaints and Enquiries Procedure.

All community inquiries and complaints related to the construction activities will be referred to the 24-hour community information line (1800 972 972). A postal address ((PO BOX 397 Liverpool NSW 1871) and email address (info@wsaco.com.au) has been provided for receipt of complaints and enquiries. The telephone number, the postal address and the email address will be published in newspapers circulating in the local area prior to the commencement of construction and is provided on the Project website.

The community and stakeholder engagement team will take the lead in responding to complainants. Attempts will be made to resolve all complaints in accordance with the Community and Stakeholder Engagement Plan. Timeframes for initial responses to complaints are outlined below.

- Telephone complaints received during work hours will be provided a response within two hours. Complaints received outside of work hours will be provided a response within two hours of the next working day; and
- Email and postal complaints will be responded to within two (2) business days of receipt.

The aim is to resolve the complaint at the first point of contact, by providing a solution or negotiating an agreed course of action. The complainant will be provided updates on the progress of their complaint and a written response will be provided within 10 working days if the complaint cannot be resolved by the initial or follow up verbal response.

The community contacts database will be used as a complaints register. The database will be used to record, track and respond to complaints efficiently. Information on all complaints received, the means by which they were addressed, and whether resolution was reached with or without mediation shall be included in the construction compliance reports. Further details with regards to the complaints database can be found in the WSA Co Community and Stakeholder Engagement Plan.

The WSA Co Environment Manager in consultation with the relevant contractor where required, will apply an adaptive approach to ensure that corrective actions are applied in consultation with the appropriate construction staff to allow modifications and improvements in the management of any environmental issues resulting in community complaints.

### **14.2 Community and stakeholder communication**

Construction of the Stage 1 Development will involve a number of interactions with local residents, local councils and NSW Government agencies, among others. To ensure a consistent approach with regards to community and stakeholder management, WSA Co has developed a Community and Stakeholder Engagement Plan to address broader stakeholder engagement objectives during construction and to coordinate engagement activities for all environmental management issues during construction. For further detail with regards to community and stakeholder engagement, refer to Section 7.3 of the SEMF.

## **15 Environmental incidents, non-conformance and improvement opportunities**

The management and reporting requirements of environmental non-conformances and improvement opportunities will be in accordance with Section 8 of the SEMF. The management and reporting of environmental incidents shall be undertaken by the appropriate person as detailed in Section 6 of the SEMF.

It should be noted that the management and reporting requirements associated with major accidents and emergency situations (for example a major chemical or hydrocarbon spill, fuel storage tank failure, surface fires, sediment basin failure) should be undertaken in accordance with the WSA Co Emergency Preparedness and Response Procedure.

## 16 Review and improvement

### 16.1 Continuous improvement

Continuous improvement of this plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement. This process is detailed in Section 9 of the SEMF.

The continuous improvement process will be designed to:

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

### 16.2 Change management

Further refinements to the Stage 1 Development may result from detailed design refinement or changes identified during the construction phase of the works. Any design changes or changes in scope of works will be communicated to the WSA Co Environmental Manager.

WSA Co would be responsible for assessing any potential inconsistencies with the Airport Plan and formally seeking approval from the Infrastructure Minister for any project modifications as required, prior to commencement of the scope of works in question.

### 16.3 Variation of approved plans

WSA Co will seek approval for variation of an Approved Plan from the Infrastructure Minister or an SES Officer (SES employee under the *Public Service Act 1999*) in the Infrastructure Department by submitting a version of the plan with the proposed variation clearly marked. All variations to an Approved Plan must be approved in accordance with Condition 41 of the Airport Plan. As each package of work is developed the SEMF and associated CEMPs documents will be reviewed and where applicable updated to ensure the environmental aspects of the work package are managed. Where necessary the document will be updated and submitted for approval in accordance with the Airport Plan prior to the work commencing. A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure, including update of the publicly available copy of the document on the Project website.

The Infrastructure Minister or an SES Officer in the Infrastructure Department may vary an Approved Plan or request WSA Co prepare and seek approval for a specified variation if the Infrastructure Minister or an SES Officer in the Infrastructure Department believes on reasonable grounds that:

- A Condition of Approval has been contravened and the nature of the contravention is relevant to the subject matter of the Approved Plan;
- The variation will address the contravention; and
- WSA Co will comply with any such request within three months.

## **16.4 Review of approved plans**

WSA Co 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. Specifically, to this Noise and Vibration CEMP, 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 Co may initiate reviews of Approved Plans at other times in response to improvement opportunities, non-conformances 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 Co Approved Plan and subsequent training and awareness (refer to Section 5 of the SEMF).

## 17 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**

### **WSA Co Noise and Vibration CEMP consultation**

---

## A1 Stakeholder consultation – NSW Environment Protection Authority

**Table A1 NSW Environment Protection Authority CEMP consultation summary**

Input	Response / where addressed
<b>Consultation prior to Rev 0 approval</b>	
<p>A response to an invite for comment on the Noise and Vibration CEMP was received from NSW Environment Protection Authority (NSW EPA) on 26 July 2018 and 13 September 2018. The relevant comments were addressed and considered in the preparation of the CEMP. Details with regards to how the NSW EPA comments were addressed are summarised below. A letter acknowledging receipt of the review comments from NSW EPA and how the comments (if applicable) were addressed was prepared and issued from WSA Co to NSW EPA in September 2018.</p>	
<p>The EPA notes the consultation requirements relating to the preparation of a CEMP, however does not approve or endorse these documents. The EPA's role is to set environmental objectives for environmental management, rather than being directly involved in the development of strategies and management plans to achieve those objectives.</p>	<p>Noted</p>
<p>The EPA provided advice in 2016 regarding environmental objectives during the exhibition of the Environmental Impact Statement.</p> <p>As a general recommendation, the CEMP should outline the measures that will be implemented to manage and mitigate all impacts assessed during the Environmental Impact Statement. All proposed mitigation and management measures in the CEMP should implement best practice to a level that is feasible and reasonable and clearly demonstrate how the proponent will meet the designated environmental objectives.</p>	<p>All CEMP documentation includes measures that will be implemented to manage and mitigate identified impacts assessed during the Environmental Impact Statement.</p> <p>Risk assessment approach has been adopted for the implementation of the CEMP documentation, with linked reference to applicable mitigation measures and controls as required under the Airport Plan (and EIS) in addition to known implementation of a 'best-practice' approach.</p>
<b>Monitoring</b>	
<p>The EPA notes that they will not have a direct regulatory role</p>	<p>Noted.</p>
<p>The locations of air and noise monitoring stations appears to reasonably reflect the location of sensitive receivers surrounding the site.</p>	<p>Noted.</p>
<p>In addition to fixed monitoring sites, a holistic monitoring program should also include reactive monitoring protocols and processes to respond to changing construction areas and processes, the proximity of sensitive receiving environments .as construction progresses, and to respond to community concerns.</p>	<p>Noted. In addition to fixed monitoring sites, WSA Co. will implement a program to undertake ad hoc monitoring in response to construction activities and community concerns. Refer to Section 9 – Environmental Control Measures, for more information.</p>
<b>Consultation prior to Rev 1 approval</b>	
<p>A request to provide comments on the CEMPs (Revision 0) was submitted to the NSW Department of Premier and Cabinet (DPC) on 30th October 2018. The request included an outline of the Visitor Centre, Site Accommodation and Material Importation phase. A response to the invitation for comment on the Noise and Vibration CEMP was received from NSW EPA and is summarised below. The relevant comments were addressed and considered in the preparation of this revision CEMP.</p>	
<p>A letter acknowledging receipt of the review comments from NSW EPA and how the comments (if applicable) were addressed was prepared and issued from WSA Co to NSW EPA in December 2018.</p>	

Input	Response / where addressed
<p>The NSW Government provided a detailed submission on the Western Sydney Airport (WSA) EIS that included advice on the environmental aspects of the proposal. The EPA also provided a response to a request from WSA for comments on monitoring locations in the CEMPs and on the illegal dumping strategy, dated 13 September 2018. This information should be considered for the VSA.</p>	<p>Noted</p>

## A2 Stakeholder consultation – NSW Health

**Table A2 NSW Health CEMP consultation summary**

Input	Response / where addressed
<b>Consultation prior to Rev 0 approval</b>	
<p>A response to an invite for comment on the Noise and Vibration CEMP was received from NSW Health on 26 July 2018. The relevant comments were addressed and considered in the preparation of the CEMP. Details with regards to how the NSW Health comments were addressed are summarised below</p> <p>A letter acknowledging receipt of the review comments from NSW Health and how the comments were addressed was prepared and issued from WSA Co to NSW Health in September 2018.</p>	
<p>There is emerging evidence of the adverse health impacts of environmental noise, including evidence of a causal relationship between noise exposure, and cardiovascular disease and sleep disturbance. Measures to limit community exposure to noise are important to protect public health.</p>	<p>Noted.</p> <p>This CEMP has included the need to implement reasonable and feasible noise mitigation and control measures to ensure associated construction impacts are minimised and managed where required.</p> <p>Specifically, refer to Section 9 of the CEMP for further details with regards to environmental mitigation measures and controls.</p>
<p>Sensitive receptors are locations where the occupants are likely to be more susceptible to the adverse health effects of exposure to environmental contaminants or stressors (such as noise) including residences, healthcare facilities, childcare centres, schools, and aged care facilities.</p>	<p>Noted.</p> <p>The CEMP has been prepared with the inclusion of a noise and vibration risk assessment, in addition to predictive noise modelling, allowing identification of potentially impacted receivers and likely severity of impacts so that appropriate mitigation measures and controls can be implemented to manage those impacts.</p> <p>All standard construction works will be undertaken during the construction hours of 7am - 6pm Monday to Friday, 8am - 1pm on Saturdays and at no time on Sundays or public holidays unless in accordance with approved out-of-hour construction works. The process for the application and approval of out-of-hour construction works is detailed in Section 10.3 of the CEMP.</p>
<p>The final Environmental Impact Statement predicted that noise levels during construction may exceed noise criteria set by the NSW Environmental Protection Authority (EPA) during and outside standard construction hours for several residential and other sensitive receptors, including childcare centres and schools in Luddenham and Badgerys Creek.</p>	<p>Predictive noise modelling has been undertaken and presented in the CEMP - refer to Section 8. The modelling indicates that the maximum noise level for the works associated with the Early Earthworks at the most impacted receiver will be 66 dB(A), assuming construction on all work fronts associated with the works covered by the CEMP (refer to noise heat maps and correlating construction zones presented in the CEMP).</p> <p>The noise criteria under the Airport (Environmental Protection) Regulations 1997 is 75 dB(A). The</p>

Input	Response / where addressed
	<p>associated construction activities to be undertaken during standard construction hours will not exceed the AEPR criteria. A range of mitigation and management measures listed in Section 9 of the CEMP will be adopted to further mitigate and where possible reduce impacts on potential sensitive receivers.</p> <p>The villages of Luddenham and any potential sensitive receivers in Badgerys Creek are outside of the predicted 45-50 dB(A) contour and therefore are not considered to be impacted by the construction activities during standard working hours.</p>
<p>The noise and vibration Construction Environmental Management Plans (CEMP) should implement all reasonable and feasible measures to minimise noise exposure, particularly during the night time, and prevent exceedances of noise criteria.</p>	<p>This CEMP has included the need to implement reasonable and feasible noise mitigation and control measures to ensure associated construction impacts are minimised and managed where required. Specifically, refer to Section 9 of the CEMP for further details with regards to environmental mitigation measures and controls.</p>
<p>There should be a full range of measures documented in the CEMP to minimise noise exposure through choice and location of works through to temporary barriers, if necessary.</p>	<p>This CEMP has included the need to implement reasonable and feasible noise mitigation and control measures to ensure associated construction impacts are minimised and managed where required. Specifically, refer to Section 9 of the CEMP for further details with regards to environmental mitigation measures and controls.</p>
<p>The CEMP should include tailored mitigation and communication strategies for vulnerable community members who are likely to be more susceptible to the adverse effects of noise, especially those who are elderly, do not speak English, are housebound, or who may be unwell.</p>	<p>The CEMP has been prepared with the inclusion of a noise and vibration risk assessment, in addition to predictive noise modelling, allowing identification of potentially impacted receivers and likely severity of impacts so that appropriate mitigation measures and controls can be implemented to manage those impacts.</p> <p>The undertaking of any approved out-of-hour construction activities, or works with likelihood of impact on sensitive receivers, will also be undertaken in accordance with the Community and Stakeholder Engagement Plan which includes the requirement for targeted consultation including culturally and linguistically diverse communities.</p>
<p>Regular noise monitoring at boundary and key offsite locations should be implemented to ensure construction noise effects are circumscribed and meet EPA standard requirements.</p>	<p>All monitoring requirements, in accordance with the conditions set out in the Airport Plan, have been addressed in Section 12 of the CEMP.</p>

#### **Consultation prior to Rev 1 approval**

A request to provide comments on the CEMPs (Revision 0) was submitted to the NSW Department of Premier and Cabinet (DPC) on 30th October 2018. The request included an outline of the Visitor Centre and Site Accommodation phase and Material Importation (and stockpiling) phase additional scope of work, i.e. the Visitor Centre, Site Accommodation and Material Importation. A response to the invitation for comment on the Noise and Vibration CEMP was received from NSW Health and is summarised below. The relevant comments were addressed and considered in the preparation of this revision CEMP.

A letter acknowledging receipt of the review comments from NSW Health and how the comments (if applicable) were addressed was prepared and issued in December 2018.

Input	Response / where addressed
<p>There are no additional health considerations involved in construction of the visitor Centre other than its proximity to residents on the north-western boundary.</p> <p>The controls in the existing Construction Environmental Management Plans for Noise and Vibration and Air Quality are adequate and have incorporated previous comments from South Western Sydney Local Health District.</p>	<p>Noted</p>

## **Appendix B**

### **Schedule 4 of the AEPR – Excessive noise guidelines**

---

## **Appendix C**

### **Out-of-hour works procedure**

---

# Out-of-hours 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 the course of 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 Co 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 Co 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.

### 1.4.1 Noise and vibration impact assessment

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 taking into account:
  - 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 Co Noise and Vibration CEMP. Monitoring will be completed for audible (Categories B to E) that will be ongoing for three or more nights.

### **1.4.3 Community notification**

WSA Co 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 Co Community Manager.

## **1.6 Record keeping**

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

All attended noise monitoring results will be recorded using “Noise Monitoring Field Sheet” and data entered into the noise monitoring database as required. The noise monitoring database will be managed by the WSA Co Environment Manager.

## Appendix D

### Out-of-hour works permit

#### Out-of-hours works permit

<b>Title:</b>	
<b>Application Date:</b>	
<b>Person requesting the work:</b>	
<b>Justification why OOHW required:</b>	

Out of Hours Works Report		
Item	Description	Information / Comments
<b>Description of the Works</b>		
1.	Description of the works:	
	Details on any concurrent construction activities being undertaken OOHW adjacent/ in close proximity to the proposed works:	
2.	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	Include <b>number</b> of each plant Include <b>Type/size</b> of plant Include lighting if required
	Are alternative, more quiet/less vibration intensive equipment options feasible for the activity?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	If yes, why are these not being used?	
3.	Names of Forman supervising the work:	
4.	Subcontractor Details (if applicable):	
5.	Location of Work: Attach a map of the work area	
	Distance to Nearest Residential Receiver:	
6.	Proposed Dates/duration:	
7.	Start Time:	
8.	Finish Time:	

<b>Traffic Management</b>		
9.	Will the work require traffic control?	
	Describe the location and nature of disruption to traffic proposed	
	Who is planning the traffic control?	
	Who will be responsible for the traffic control during the work?	
10.	What lighting is to be provided for night work?	
11.	Does the work team comprise a minimum of two persons?	
12.	Who in the work team holds current senior first aid qualifications?	
13.	Where is the first aid kit to be located?	
14.	What means of communications is to be used to summon assistance in an emergency?	
15.	Has a check of the functionality of the proposed emergency means been made?	
16.	Who from the project team will be supervising the work?	
<b>Noise and Vibration Assessment</b>		
17.	Reference NMC Reference Noise Objective Noise Management Level (NML) Sleep disturbance level (nightly only) Predicted $L_{max} / LA1$	
18.	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
19.	Describe the activities generating noise	
	What measures are being taken to reduce noise impacts?	If Category A and B, No specific measures required.  High noise/vibration emitting works will be undertaken during least sensitive periods.
20.	Noise monitoring required? <sup>1</sup>	<input type="checkbox"/> Yes <input type="checkbox"/> No Category B – E affecting sensitive receiver occurring for more than 2 consecutive nights
21.	Are vibration impacts expected/is vibration monitoring required? <sup>2</sup>	<input type="checkbox"/> Yes <input type="checkbox"/> No

<sup>1</sup> Noise monitoring will be undertaken at the nearest affected residential receiver.

<sup>2</sup> Vibration monitoring will be undertaken at the nearest affected residential receiver.

22.	Community notification required for all works RBL +5dB(A)																														
<b>Category D and E Works</b>																															
23.	Address(es) of the affected residential receivers and their associated RBL	<table border="1"> <thead> <tr> <th data-bbox="564 427 1117 465">Address</th> <th data-bbox="1117 427 1267 465">RBL</th> <th data-bbox="1267 427 1439 465">NML</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Address	RBL	NML																										
Address	RBL	NML																													

- Attach map of location of works (engineer)
- Attach map of zone of influence (enviro)

- Map Illustrating location of works, affected sensitive receivers and notification area



APPROVALS		
1	WSA Co Construction Manager	Mitigation Measures:  NAME: ..... SIGNATURE: _____ DATE: _____ .....
2	WSA Co Environment Manager	Consultation requirements:  NAME: ..... SIGNATURE: _____ DATE: _____ .....
3	WSA Co Community Manager	NAME: ..... SIGNATURE: _____ DATE: _____ .....
4	WSA Co Safety Manager	NAME: ..... SIGNATURE: _____ DATE: _____ .....
5	Contractor – Project Manager	NAME: ..... SIGNATURE: _____ DATE: _____ .....

Hard copy to be maintained by foreman on site during works and surrendered to WSA Co Environmental Manager upon completion of works.

## Appendix E

### Noise Modelling

#### Appendix E-1: Early Earthworks

This section provides a detailed summary of the noise assessment carried out for the EEW and includes figures showing location of receptors in relation to modelled noise contours.

##### Modelling Approach

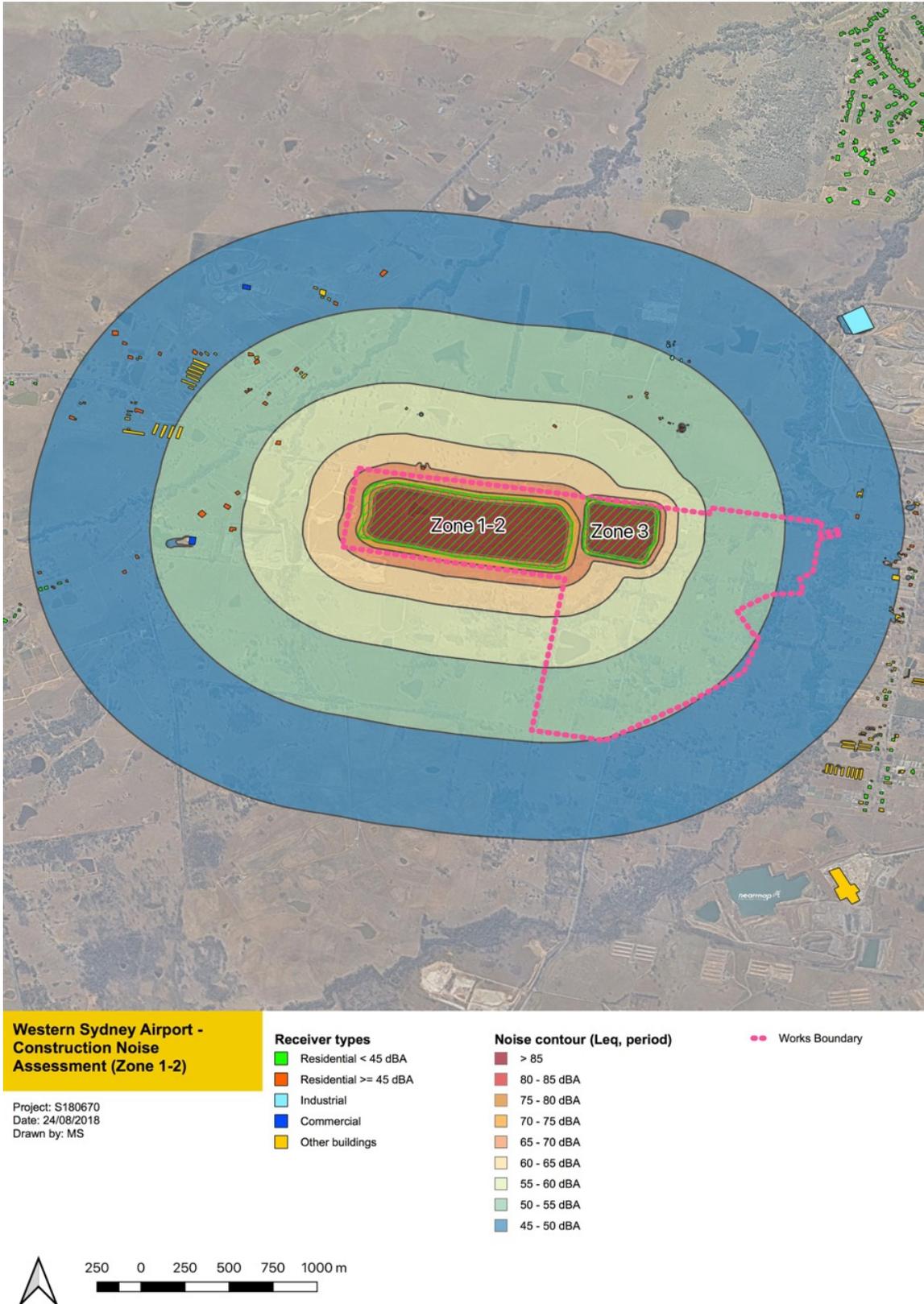
- Noise modelling software (SoundPLAN v8.0) has been utilised to predict the  $L_{Aeq(15\text{ minute})}$  noise levels at nearby receivers
- Construction works have been assumed to be occurring at the nearest point to each receiver and that the receiver is located at the most exposed position;
- The site compound in Zone 3 would be operational through all scenarios.
- The noisiest construction sources are operating continuously for the entire 15-minute period (Note: This will not occur at all times as equipment will regularly be stood down or idled while other activities are undertaken); and
- A worst-case meteorological Category 6 has been assumed, where the receiver is downwind of the source and the wind speed is >3 m/s.

Sound power levels are provided in the table below

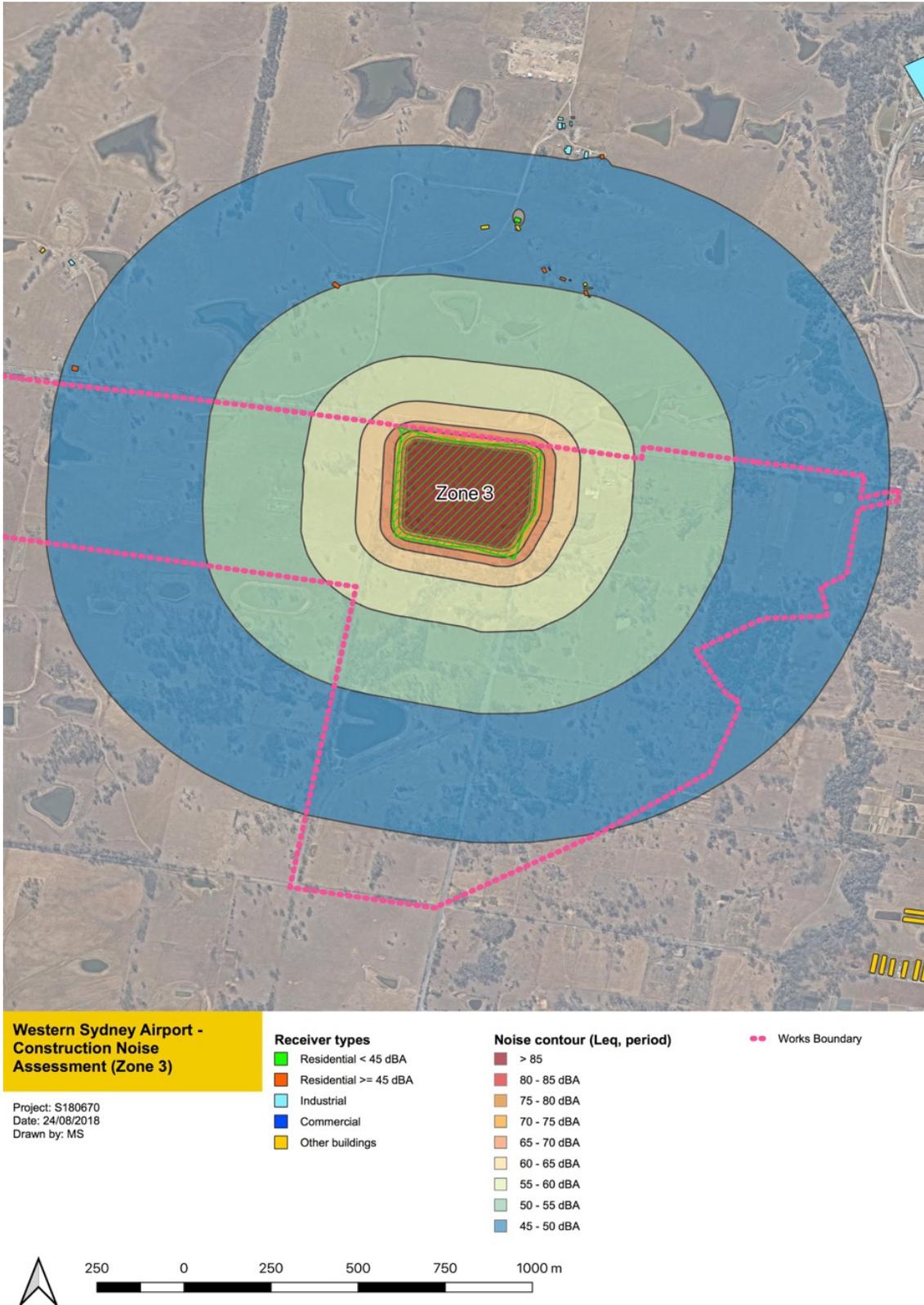
#### Appendix E-1: Early Earthworks Construction scenarios and associated plant and equipment

Construction Activity	Plant item	Number of plant items	Associated sound power level dB(A)
Zone 1 and 2	D11 Bulldozer	2	123
	Dump Truck	3	110
	30t Excavator	4	116
	<b>Total</b>		<b>124</b>
Zone 3	D8 Bulldozer	1	110
	Dump Truck	6	113
	Ute/Crew Truck	10	113
	Generator	2	106
	<b>Total</b>		<b>117</b>
Zone 6	D11 Bulldozer	1	119
	Caterpillar 657 Scraper	1	118
	Dump Truck	3	110
	Water Cart	3	112
	Grader	1	111

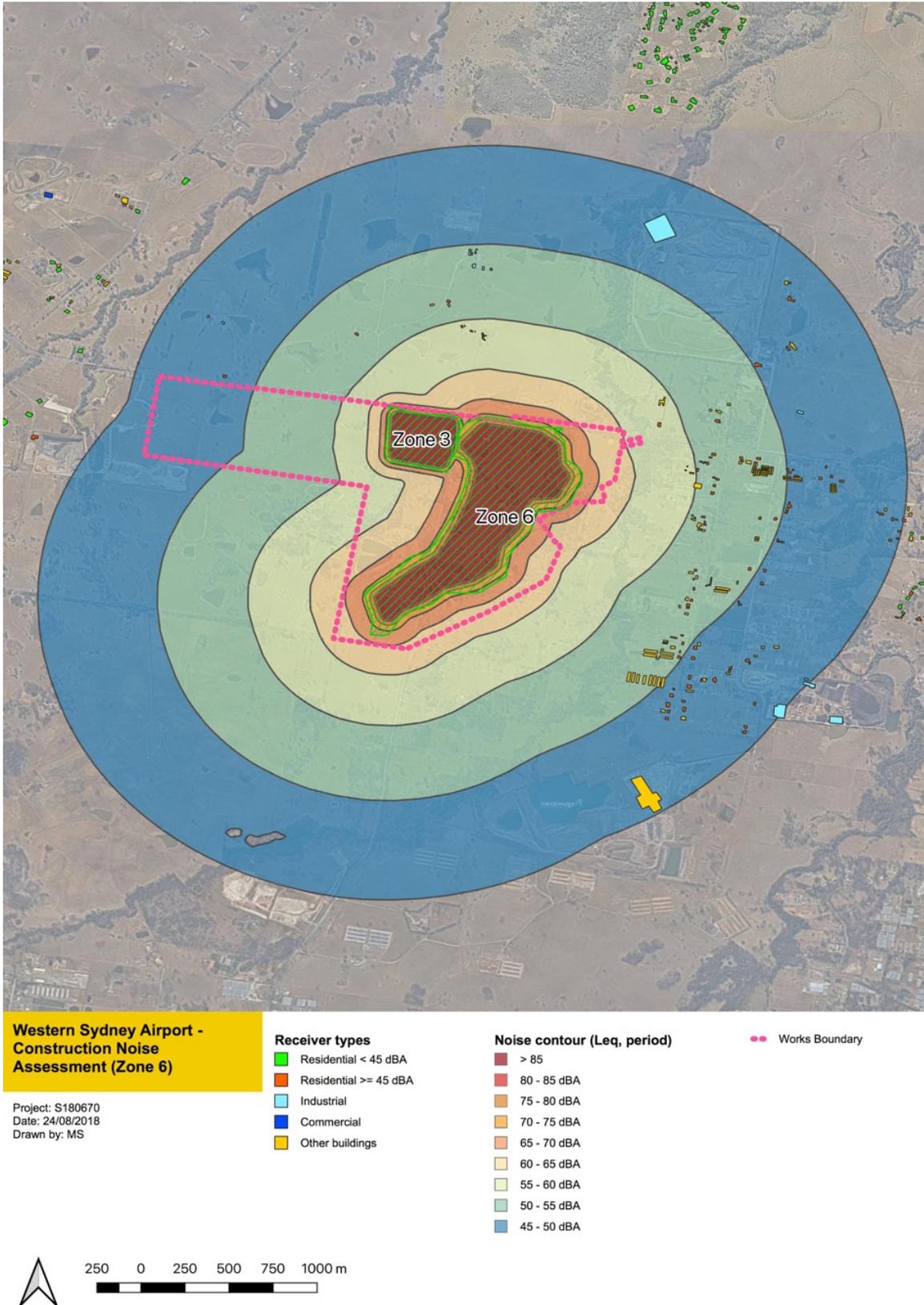
Construction Activity	Plant item	Number of plant items	Associated sound power level dB(A)
	Excavator with hammer	1	119
	30t Excavator	3	115
	<b>Total</b>		<b>124</b>
Zone 7	200t Excavator	1	117
	D8 Bulldozer	1	108
	Caterpillar 657 Scraper	1	118
	Dump Truck	2	108
	Water Cart	1	103
	Excavator with Hammer	1	116
	30t Excavator	2	105
	<b>Total</b>		<b>122</b>
Zone 8 and 9	30t Excavator	2	113
	Dump Truck	2	108
	Ute/Crew	1	103
	Water Cart	1	103
	Generator	2	106
	<b>Total</b>		<b>115</b>



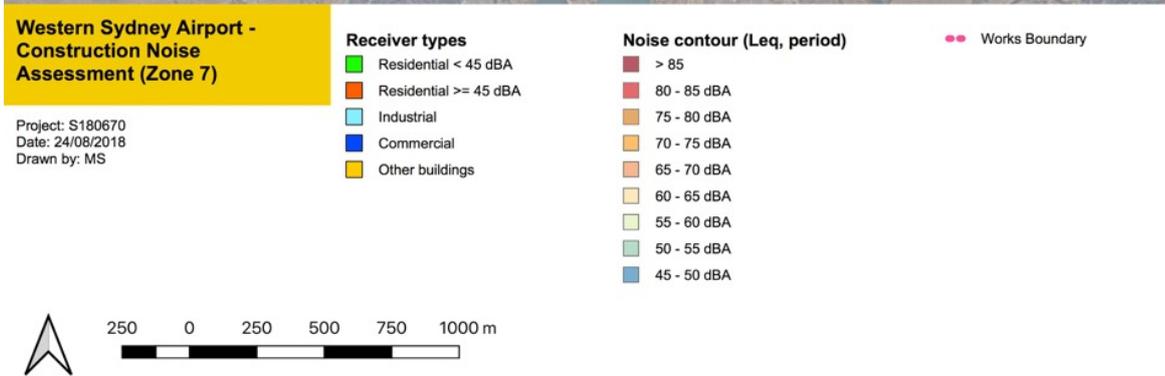
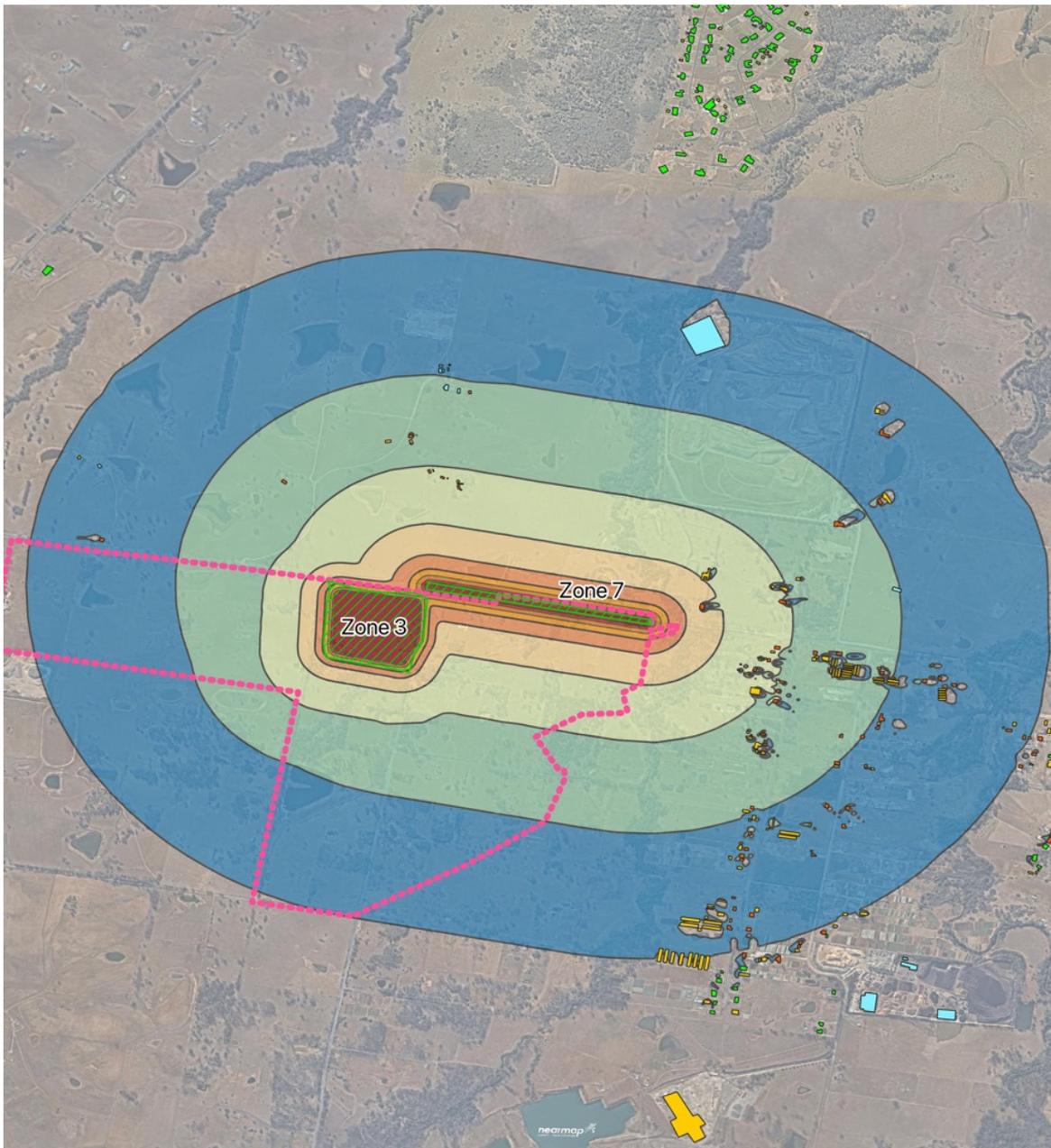
**Figure 14 Zone 1 and 2 noise propagation**



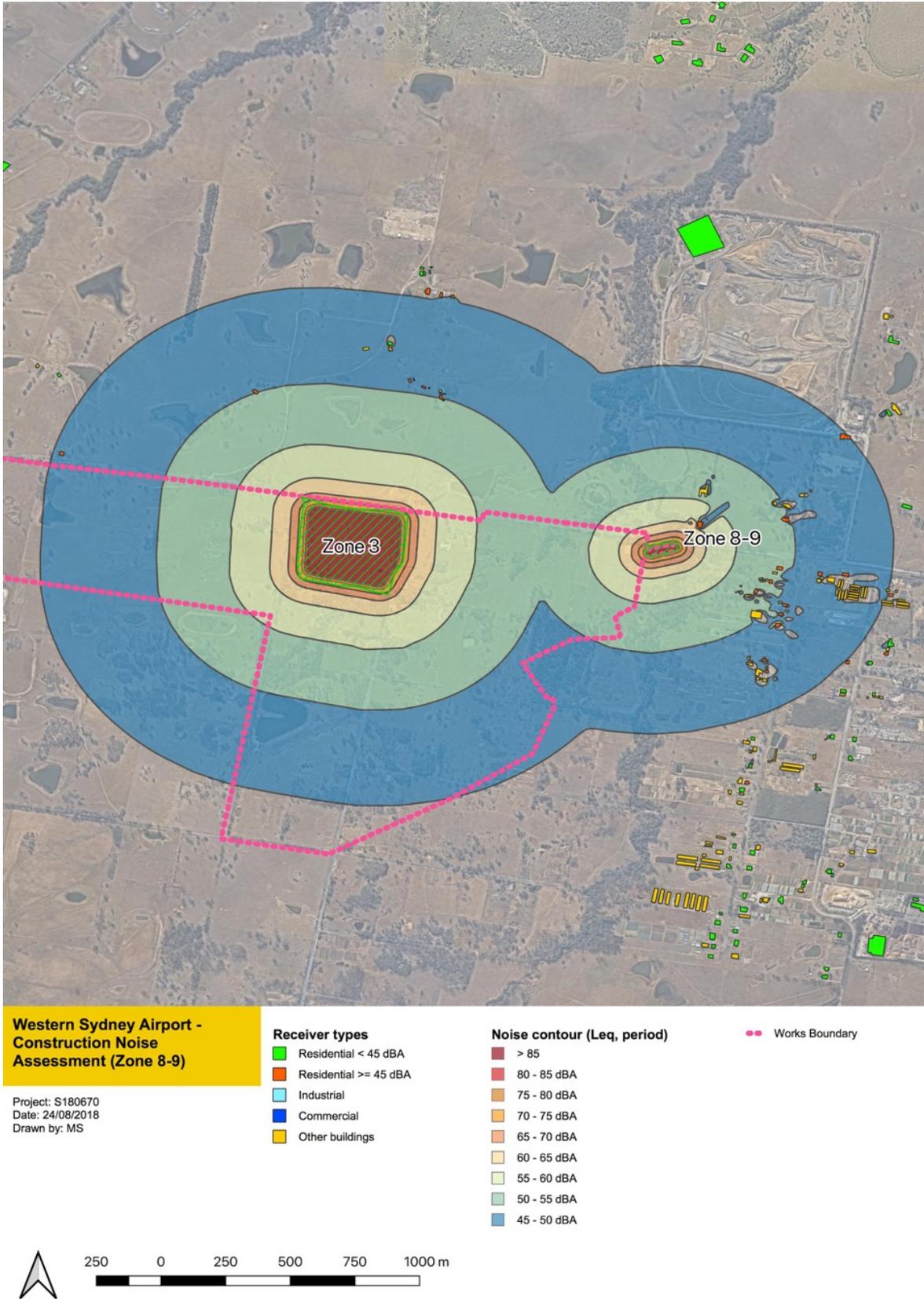
**Figure 15** Zone 3 noise propagation



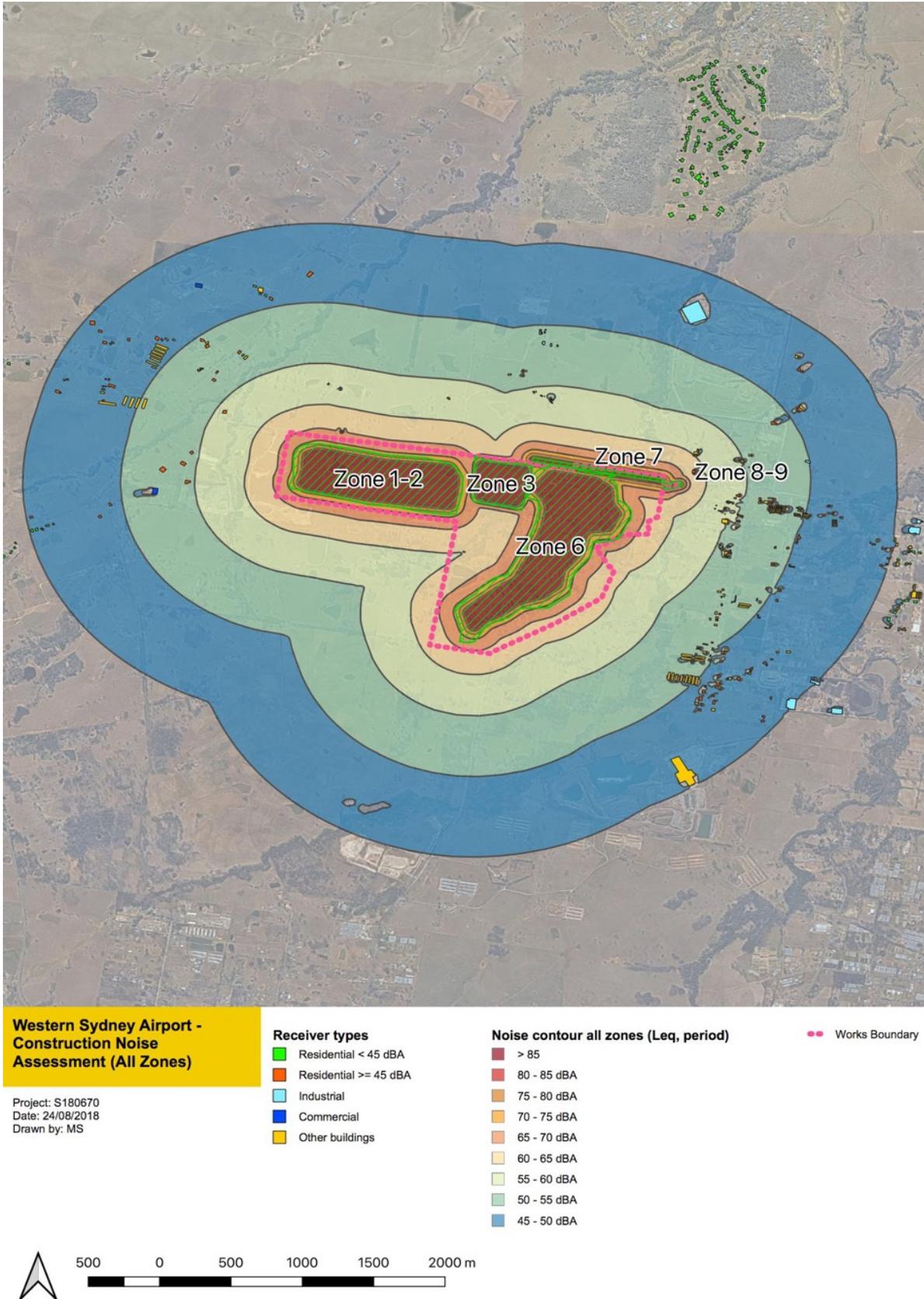
**Figure 16** Zone 6 noise propagation



**Figure 17 Zone 7 noise propagation**



**Figure 18 Zone 8 and 9 noise propagation**



**Figure 19 All Zones noise propagation**

## Appendix E-2: Visitors Centre and Site Accommodation

This section provides a detailed summary of the noise assessment carried out for the Visitors Centre and Site Accommodation

**Appendix E-2 Table 1 – Visitor Centre and Site Accommodation Sound Power Levels**

<b>Construction Activity</b>	<b>Equipment / Process (Number of Items)</b>	<b>Sound Power Level<sup>1 2</sup> dB(A)</b>
Bulk Earthworks	Hitachi ZX450-3 Excavator – 50 Tonne x 1	115
	Caterpillar D6 Dozer x 1	109
	Bell B50 Dump Truck x 2	110
	Caterpillar 815 Compactor x 1	110
	Mack Water Cart – 11 000 Litre x 1	108
Pavements	Caterpillar 140 Grader x 1	110
	Caterpillar Smooth Drum Roller – 12 Tonne x 1	102
	Mack Water Cart – 11 000 Litre x 1	108
	Caterpillar 259 Skid Steer x 1	115
Stormwater	Doosan DX140W Excavator – 14 Tonne x 1	110
	Caterpillar 328 Excavator – 28 Tonne x 1	115
	Truck & Quad Dog - 48T x 1	110
Importing Pavement Materials – Trucks	Truck & Quad Dog - 48T x 3	110
	Truck & Super Quad Dog - 57.5T x 2	110
Subsoil Drainage	Vermeer RTX1250 Trencher x 1	112

**Table Notes:**

1 Where applicable, the Sound Power Levels listed above include a 5dB(A) penalty for tonality and Impulsiveness.

2 The noise levels presented in the above table are derived from the following sources:

- Table D2 of Australian Standard 2436-1981.
- Data held by this office from other similar studies.

**Table 1 – Visitor Centre and Site Accommodation Predicted Noise Levels**

Construction Hours	Phase	Cumulative Predicted Level at Receiver – dB(A)Leq(15minute)	NML dB(A)Leq(15min)	“Max Allowable Noise dB(A)Leq(15min)	Comment
Outside Standard Construction Hours (BG + 5dB(A)Leq(15-minute))	Bulk Earthworks	72 to 67	BG + 5 Period 39dB(A)Leq(15min))	75dB(A)Leq(15min)	33 to 28 above Noise Affected Level, below Highly Noise Affected Level
	Pavements	71 to 66			32 to 27 above Noise Affected Level, below Highly Noise Affected Level
	Stormwater	71 to 66			32 to 27 above Noise Affected Level, below Highly Noise Affected Level
	Importing Pavement Materials – Trucks	67 to 62			28 to 23 above Noise Affected Level, below Highly Noise Affected Level
	Subsoil Drainage	66 to 61			27 to 22 above Noise Affected Level, below Highly Noise Affected Level
Standard Construction Hours (BG + 10dB(A)Leq(15-minute))	Bulk Earthworks	72 to 67	BG + 10 Period 45dB(A)Leq(15min)	75dB(A)Leq(15min)	28 to 23 above Noise Affected Level, below Highly Noise Affected Level
	Pavements	71 to 66			27 to 22 above Noise Affected Level, below Highly Noise Affected Level
	Stormwater	71 to 66			27 to 22 above Noise Affected Level, below Highly Noise Affected Level
	Importing Pavement Materials – Trucks	67 to 62			23 to 18 above Noise Affected Level, below Highly Noise Affected Level
	Subsoil Drainage	66 to 61			22 to 17 above Noise Affected Level, below Highly Noise Affected Level

### **Appendix E-3: Material Import**

As per Section 8.2.3, noise modelling for the material importing will be included in the out of hours permit