11. Noise (ground operations, construction, road and rail)

Ground-based noise can be generated on site from a number of potential sources, including taxiing, the ground running of aircraft engines for maintenance testing, construction activities and road traffic associated with the proposed airport.

Existing noise sources in the area around the airport site include road traffic noise and local industry, reflecting the predominantly rural residential nature of the area. Construction and operation of the proposed airport would introduce new noise sources into the area.

Noise during construction of the proposed airport would be largely confined within the airport boundary, although there would also be impacts on the Luddenham and Badgerys Creek areas. While heavy and light vehicles would need to access the airport during the construction stage, the resulting increase in traffic noise would not be significant. Vibration generated by construction activities is considered unlikely to cause building damage.

Ground-based operational noise would be generated primarily by aircraft engine runs (e.g. fixed-wing engine maintenance testing) and taxiing. Under worst case meteorological conditions, noise associated with engine run-up has the potential to affect Luddenham, Badgerys Creek, Bringelly and Greendale. The impact of noise from taxiing extends over a much smaller area and would primarily affect Luddenham.

During operation of the proposed airport, increased noise levels due to airport generated road traffic in the surrounding area are not expected to be significant.

Mitigation measures have been proposed to address noise during construction of the proposed airport. These include the implementation of a construction noise and vibration plan and the development of a strategy to manage ground-based noise during operation. Operation of the proposed airport would be subject to further detailed design including further analysis of the location of noise generating airport facilities and detailed consideration of practicable noise mitigation measures.

11.1. Introduction

This chapter provides a review of the potential construction, road traffic and ground-based operational noise and vibration impacts associated with the proposed airport. This includes consideration of:

- construction activities, including the noise generated by construction equipment and construction traffic accessing the airport site;
- ground running of aircraft engines for maintenance testing;
- taxiing of aircraft; and
- road traffic changes in the surrounding area as a result of airport operation.

This chapter draws upon a comprehensive assessment of ground-based noise undertaken for the proposed airport, included as Appendix E2 of Volume 4. It addresses the requirements of the EIS guidelines issued by the Australian Government Department of the Environment.

Aircraft overflight and runway operations noise is addressed separately in Chapter 10 and by the comprehensive assessment of aircraft overflight noise included in Appendix E1 in Volume 4.

11.2. Methodology

11.2.1. Construction noise and vibration assessment methodology

Construction activities for the proposed Stage 1 development are expected to occur in three major work phases:

- site preparation works (including major earthworks);
- aviation infrastructure; and
- site commissioning activities.

The major earthworks component of construction is expected to generate the most noise and therefore has been used as the basis of a 'worst case' construction noise assessment.

To predict construction noise levels in the surrounding area, typical sound power levels of the plant likely to be used during major earthworks were incorporated in a CadnaA noise model. Worst case weather consistent with a temperature inversion was also incorporated in the model. Temperature inversions cause sound to be deflected back toward the ground resulting in higher noise levels at receivers. Temperature inversions tend to occur in the evening and at night and can extend into the morning under calm conditions.

Vibration assessment for the construction phase included consideration of vibration generating plant proposed for use, the distance to vibration sensitive receivers and relevant guidelines values set out in German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*.

11.2.2. Ground-based operations noise assessment methodology

Ground-based operational noise levels were predicted for the proposed Stage 1 development based upon a demand of 10 million annual passenger movements in around 2030. Noise levels were reported as A-weighted decibels (dBA), which are an expression of the relative loudness of sounds as perceived by the human ear. The following noise sources were considered:

- aircraft engine run-up noise – it has been assumed that aircraft engine running would occur at a maintenance area nominally located in southern part of the airport site as shown in Figure 11–1. While the orientation of an aircraft during run-up would change depending on prevailing wind conditions, a conservative approach was adopted for this assessment by assuming that the emitted noise would be omnidirectional and at a level of 151 dBA. High power engine runs are expected to be relatively rare at the proposed Stage 1 airport and it has been conservatively assumed that no more than one run on full power would occur during any night and for no more than five minutes; and
- Taxiing noise – the proposed aircraft taxi path is shown in Figure 11–1. A sound power level for each aircraft of 138 dBA has been assumed, being the highest level measured for aircraft taxiing (B777, B747, B737, B717 and A330).

The assessment of noise impacts in this EIS has been based on aircraft types that are commonplace today, including the Boeing 747 and the Airbus A320. As indicated in Chapter 10, it is expected that quieter aircraft like the Airbus A350XWB, A320neo, and Boeing 737MAX would be introduced during the operation of the proposed Stage 1 development and consequently the ground-based noise modelling is considered conservative. The Boeing 747 is the loudest aircraft anticipated to operate at the proposed airport and airlines are already beginning to retire it from regular passenger services.

Noise contours were generated for aircraft ground running and taxiing using CadnaA noise prediction software. Certain meteorological conditions such as temperature inversions and light winds may increase noise levels at nearby receivers, by focussing sound wave paths at a single point. Worst case weather consistent with a temperature inversion was assumed in the modelling. For engine run-up noise predictions, it was also assumed that there would be shielding from a maintenance building near the run-up area as shown on Figure 11–1.

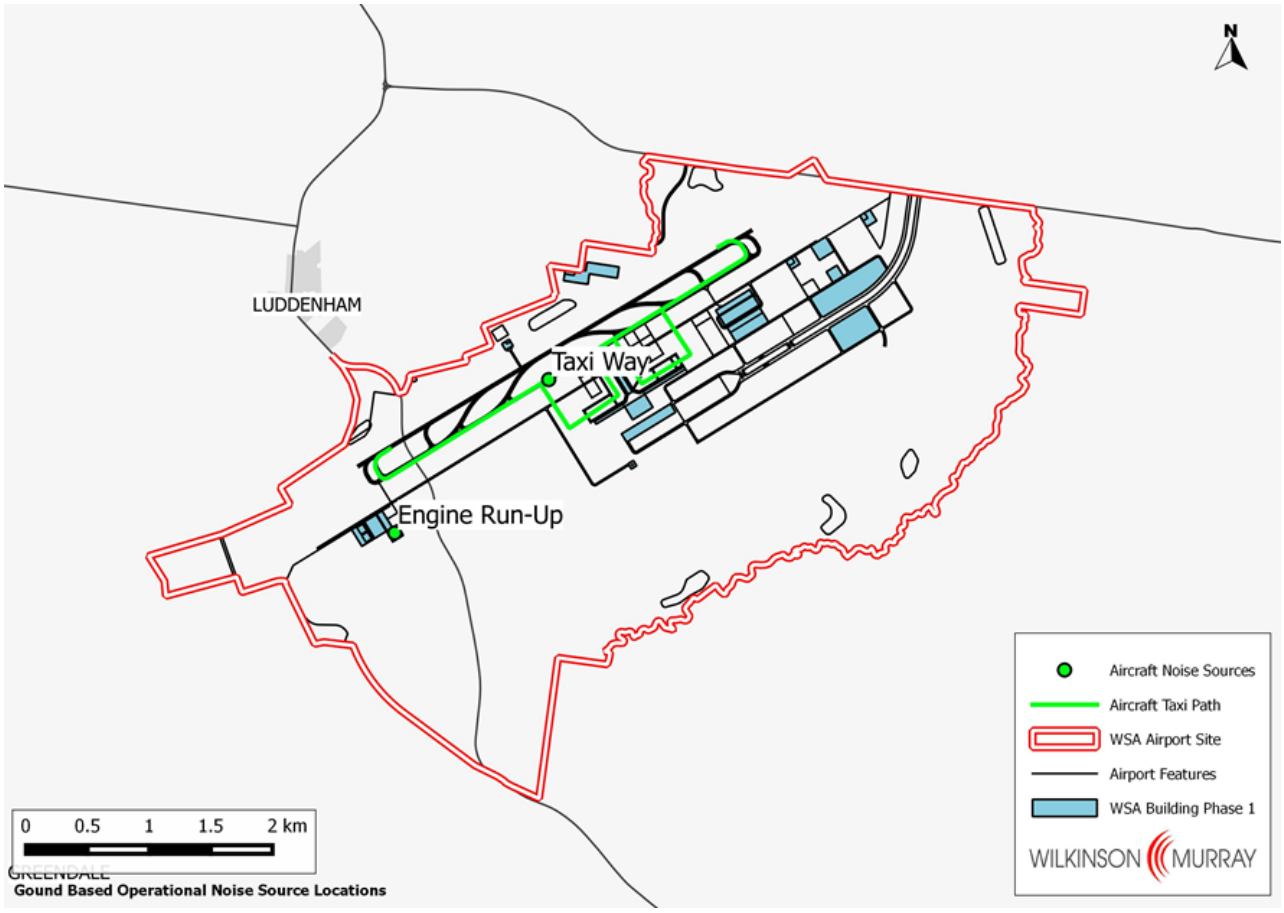


Figure 11–1 – Ground-based noise source locations

Noise from vehicle movements and mechanical plant at the airport site has not been specifically assessed because it would be at a much lower level than the above noise sources. The use of auxiliary power units on aircraft has not been assessed because they are not generally expected to be used at the proposed airport.

11.2.3. Road traffic noise assessment methodology

The traffic and transport assessment presented in Chapter 15 of Volume 2 modelled road traffic projections for major roads in the vicinity of the airport site both with and without the proposed airport. The traffic projections were used to calculate noise levels at typical distances from roads near the airport site using the 'Calculation of road traffic noise' procedure (CoRTN). CoRTN was developed by the United Kingdom Department of the Environment in 1988 and has been modified for Australian conditions and extensively tested.

11.3. Existing environment

The airport site is located in a rural and rural residential area which is reflective of the existing ambient noise environment, with existing noise sources including road traffic and industry. Understanding the background noise environment is important as this sets a benchmark against which the potential impacts associated with the construction and operation of the proposed airport can be assessed.

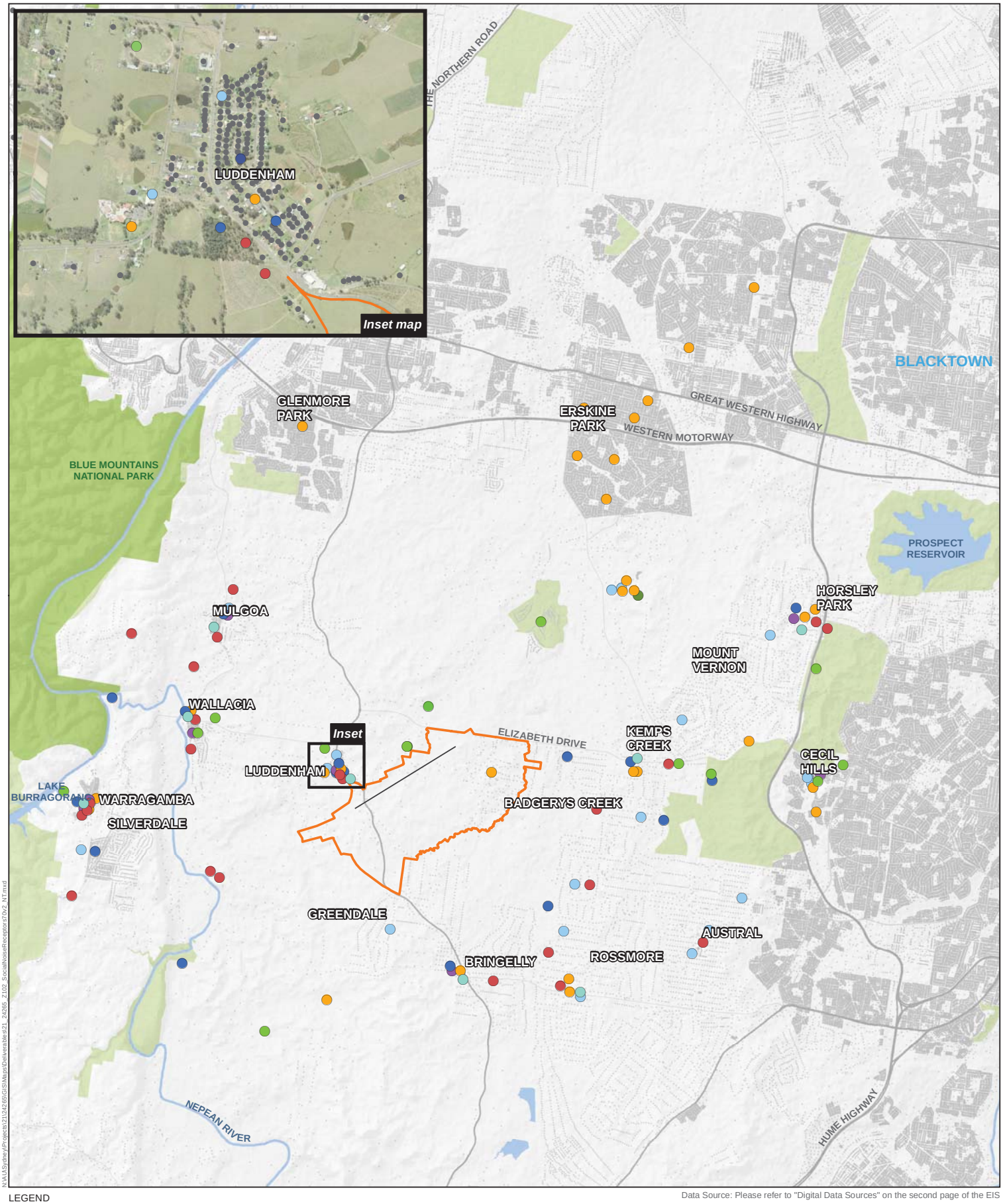
Noise measurements were carried out at 10 locations representing potentially affected areas, generally over the period Monday, 23 March to Thursday, 2 April 2015. The noise measurements were carried out in accordance with AS1055: 1997 and are presented in Appendix E2 in Volume 4.

From the measurement data, the Rating Background Level (RBL) as defined in the NSW Industrial Noise Policy has been determined and presented in Table 11–1.

Table 11–1 – Measured background noise levels

Location	Measurement duration	Rating background level (dBA)		
		Day (7am–6pm)	Evening (6pm–10pm)	Night (10pm–7am)
9 Harold Bentley Way, Glenmore Park	Mon 23/3/15 – Thu 2/4/15	39	42	38
16 Park Avenue, Springwood	Wed 25/3/15 – Thu 2/4/15	29	32	24
17 Blue Ridge Place, Orchard Hills	Mon 23/3/15 – Tue 31/3/15	34	38	36
25 Peter Pan Avenue, Wallacia	Mon 23/3/15 – Thu 2/4/15	37	34	28
27 Dwyer Road, Bringelly	Mon 23/3/15 – Thu 2/4/15	33	38	35
35 Ramsay Road, Rossmore	Fri 27/3/15 – Thu 2/4/15	35	37	35
54 Ridgehaven Road, Silverdale	Thu 26/3/15 – Thu 2/4/15	36	36	31
114 Mount Vernon Road, Mount Vernon	Mon 23/3/15 – Thu 2/4/15	34	35	33
120 Vincent Avenue, Mulgoa	Mon 23/3/15 – Tue 31/3/15	38	42	35
Twin Creeks Golf Club, 2 Twin Creeks Drive, Luddenham	Thu 26/3/15 – Thu 2/4/15	34	38	33

Noise-sensitive receivers in the area around the proposed airport include residences, schools and other educational facilities, hospitals and other health care facilities. The identified sensitive receivers are mapped in Figure 11–2.



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LEGEND

Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

- Airport site
- **Sensitive receivers**
  - Residential
  - Aged Care
  - Childcare
  - Community Centre
  - Education
  - Park
  - Recreation
  - Religious Facility
  - Shopping Centre
  - Runway

Figure 11-2 - Sensitive Receivers surrounding the airport site

0 1 2 4
Kilometres

N

11.4. Regulatory framework, guidelines and criteria

11.4.1. Airports (Environment Protection) Regulations 1997

The *Airports (Environment Protection) Regulations 1997* (Cth) aim to promote better environmental conditions on leased Federal airports. They include standards for pollution and excessive noise and rules for monitoring, cleaning up or rectifying environmental issues.

Noise generated by an aircraft in flight, landing, taking off or taxiing is considered an operational issue. Table 11–2 includes some relevant provisions from the Regulations.

Table 11–2 – Relevant Airports (Environment Protection) Regulations 1996 provisions

Reference	Subject	Provision
2.04	What is offensive noise	1. For these Regulations, noise that is offensive occurs when noise is generated at a volume, or in a way, or under a circumstance, that, in the opinion of an airport environment officer, offensively intrudes on individual, community or commercial amenity. 2. In forming an opinion, an airport environment officer must have regard to: a. the volume, tonality and impulsive character (if any) of the noise; and b. the time of day, and duration, of the noise; and c. background noise levels at the time the noise is generated; and d. the location, in relation to the source of the noise, of: i. sensitive receptors; or ii. if there is no affected sensitive receptor — commercial receptors; and e. the excessive noise guidelines in Schedule 4.
4.06	General duty to prevent offensive noise occurring	3. The operator of an undertaking at an airport must take all reasonable and practicable measures: a. to prevent the generation of offensive noise from the undertaking; or b. if prevention is not reasonable or practicable — to minimise the generation of offensive noise from the undertaking An operator of an undertaking at an airport is complying with that duty if the noise meets the guidelines in Schedule 4 (or any local standard set by or authorisation given by the Minister).
Schedule 4 – 2.02	Noise from construction, etc	4. 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.
Schedule 4 – 2.03	Noise from road traffic	Noise generated from road traffic on the site of an operator of an undertaking at an airport should not exceed: a. 60 dB(A), calculated as the equivalent continuous A−weighted sound pressure level for a 24 hour period of measurement; and b. 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.
Schedule 4 – 2.05	Noise from ground−based aircraft operations	5. For ground−based aircraft operations, there are no indicators of noise that is excessive, but the following considerations apply in determining whether noise is

Reference	Subject	Provision
		excessive. Noise from ground-based aircraft running for any reason should only be generated in a manner that is consistent with the masterplan for the airport (which is required to include a noise management plan). 6. In relation to other ground−based operations and in relation to ground−based aircraft running at times other than a time to which subclause (2) applies, matters to be considered are: a. the distance between the source of the noise and the site of the sensitive receptor; and b. the background noise level; c. the time of day when the noise occurs; d. if the noise source is an aircraft engine — the power setting of the engine; and e. anything included in the final master plan (if any) for the airport at which ground running is being conducted that is relevant to this clause. Ground based aircraft operations means operation of APU, test operation of an aircraft engine attached to an aircraft or removed from an aircraft
Schedule 4 – 2.06	Noise from other airport operations	7. This clause applies to noise generated from any of the following activities: a. aircraft refuelling; b. activities in connection with aircraft that do not involve the operating of an aircraft engine (for example, moving, maintaining or repairing aircraft); c. operation of plant or machinery; d. assembling of passengers or goods in connection with embarkation or disembarkation of aircraft; and e. operation of fixed audible alarm or warning systems. 8. Noise generated from an activity mentioned in subclause (1) should not exceed the background noise level at the sensitive receptor site: a. between the hours of 07:00 and 22:00 — by more than 5 dB(A); and b. between 22:00 hours of a day and 07:00 hours of the next day — by more than 3 dB(A).

11.4.2. Construction noise criteria

As noted in Section 11.4.1, the Airports (Environment Protection) Regulations 1997 provide a guideline level of 75 dBA for construction noise (refer to Schedule 4 – 2.02 of the Regulations).

The NSW Department of Environment and Climate Change (DECC) *Interim Construction Noise Guideline* (DECC 2009) was also used for the purposes of this assessment. The Guideline recommends noise management levels to assist the management of noise on construction sites both during and outside standard construction hours (Monday to Friday, 7.00 am to 6.00 pm and Saturday 8.00 am to 1.00 pm). Where noise at sensitive receivers is expected to exceed noise management levels implementation of reasonable and feasible noise mitigation is recommended and consultation with affected people is 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.

Based on the daytime background noise levels shown in Table 11–1, the residential noise management level for standard construction hours would be between 39 dBA and 49 dBA. For assessment of construction noise, a noise management level of 45 dBA may reasonably be adopted. A noise management level of 40 dBA has been adopted for weekend works and early morning works (outside standard construction hours).

11.4.3. Construction vibration criteria

To protect buildings from vibration damage the most stringent vibration standard typically used in Australia is German Standard DIN 4150-3: *Structural Vibration: Effects of Vibration on Structures*. This standard recommends frequency based guideline values and the lowest and most conservative values are normally adopted, as shown in Table 11–3.

Table 11–3 – Vibration damage guideline values (DIN 4150-3)

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

11.4.4. Ground-based operations noise criteria

This section provides criteria to form the basis of consideration of potential impacts of ground-based noise from ground based operations within the airport site. It discusses general noise criteria which are applied to industrial noise in NSW as the basis for setting criteria for the relatively constant ground-based noise such as taxiing. It then sets specific noise criteria for the particular types of noise such as intermittent sources such as engine ground running and road traffic noise based upon industry standard noise assessment procedures. It is important to recognise in setting these criteria that the character of noise from ground-based activities at an airport is different from the character of noise from many other developments, such as industrial developments.

As noted in Section 11.4.1, the Airports (Environment Protection) Regulations 1997 do not apply to noise from ground-based aircraft operations (landing, taking off or taxiing). For other airport operations the Regulations provide that noise at sensitive receivers should not exceed the background noise level as indicated below:

- between 7 am and 10 pm — by no more than 5 dBA; and
- between 10 pm and 7 am of the next day — by no more than 3 dBA.

In addition to the above, the recommended criteria in the *NSW Industrial Noise Policy* (EPA 2000) and in *AS 2021: 2015 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction* were also considered. These are discussed below.

11.4.4.1. Criteria for taxiing

The *NSW Industrial Noise Policy* intrusiveness criteria for residences apply to relatively continuous noise such as that produced by taxiing. The intrusiveness noise criteria used in relation to residential land uses were determined by adding 5 dBA to the measured background levels shown in Table 11–1. This is generally consistent with section 2.05(3) of Schedule 4 of the Airports (Environment Protection) Regulations, which states that background noise levels should be considered when determining if noise levels are excessive. The results are presented in Table 11–4.

Table 11–4 – Industrial Noise Policy intrusiveness noise criteria for residential locations

Location	L_{Aeq},15 min noise criteria (dBA)		
	Day (7am–6pm)	Evening (6pm–10pm)	Night (10pm–7am)
9 Harold Bentley Way, Glenmore Park	44	47	43
16 Park Avenue, Springwood	35	37	35
17 Blue Ridge Place, Orchard Hills	39	43	41
25 Peter Pan Avenue, Wallacia	42	37	35
27 Dwyer Road, Bringelly	38	43	40
35 Ramsay Road, Rossmore	40	42	40
54 Ridgehaven Road, Silverdale	41	41	36
114 Mount Vernon Road, Mount Vernon	39	40	38
120 Vincent Avenue, Mulgoa	43	47	40
Twin Creeks Golf Club, 2 Twin Creeks Drive, Luddenham	39	43	38

By the time the proposed airport becomes operational, background noise levels in the general area would have increased due to increased road traffic as well as associated residential and commercial development. This would, in turn, raise the value of the appropriate noise criteria for the assessment of airport operational noise. For this reason, and to allow easy interpretation of the operational noise contours discussed below, an overall intrusiveness noise criterion of 40 dBA averaged over 15 minute intervals ($L_{Aeq\ 15\ mins}$) can be taken as appropriate for residential locations.

For other land uses, the taxiing noise criteria were determined by reference to the amenity criteria in the *NSW Industrial Noise Policy*. Table 11–5 provides the adopted noise criteria for taxiing.

Table 11–5 – Noise criteria taxiing

Receiver type	Measure	Criterion dB(A)
Residential	$L_{Aeq,15min}$	40
School	$L_{Aeq,15min}$	50
Hospital	$L_{Aeq,15min}$	55
Place of worship	$L_{Aeq,15min}$	55
Passive recreation	$L_{Aeq,15min}$	55
Active recreation	$L_{Aeq,15min}$	60

11.4.4.2. Criteria for engine run-up

Engine run-up noise would be intermittent and subject to limitations during the night. It has been assumed that high power run-up would occur for less than five minutes on any night. In this context, the night time residential criterion for these activities has been set as five dBA over the general *NSW Industrial Noise Policy* night time criterion for residential receivers. The criteria for other land uses have been set at five dBA over the relevant amenity criteria. Table 11–6 provides the adopted noise criteria for engine run-up.

Table 11–6 – Noise criteria for aircraft engine run-up

Receiver type	Measure	Criterion dB(A)
Residential	$L_{Aeq,15min}$	45
School	$L_{Aeq,15min}$	55
Hospital	$L_{Aeq,15min}$	60
Place of worship	$L_{Aeq,15min}$	60
Passive recreation	$L_{Aeq,15min}$	60
Active recreation	$L_{Aeq,15min}$	65

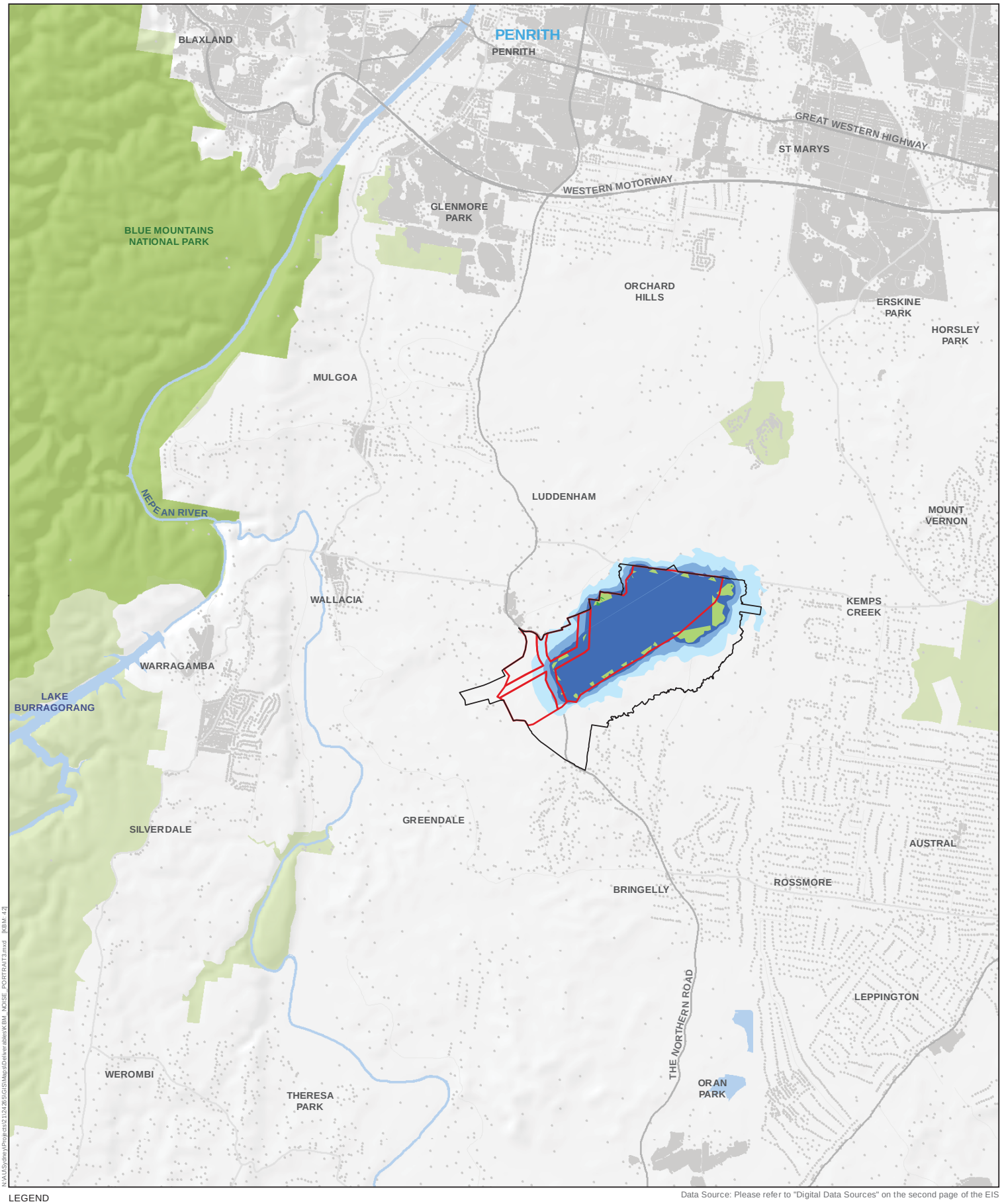
11.4.5. Road traffic noise criteria

The *NSW Road Noise Policy* (DECCW 2011) recommends noise assessment criteria for residential and non-residential land uses affected by traffic generating developments. The policy indicates that an increase of up to 2 dBA represents a minor impact that is considered barely perceptible to the average person. This has been used as the reference point for the assessment of potential construction and operational road traffic noise.

11.5. Assessment of impacts during construction

11.5.1. Noise from construction works

Figure 11–3 to Figure 11–6 show worst case construction noise contours for construction sectors (east, north, north-west and south-west). These figures show the worst weather condition that may occur, representing a temperature inversion early in the morning in winter. A still, isothermal weather condition was also modelled and resulted in construction noise contours more confined to the airport site (refer to Appendix D2 in Volume 4).



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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Western Sydney Airport
- Buildings
- Greater Blue Mountains World Heritage Area
- Parks and reserves
- Earthworks Boundary

LAeq, 15 min

- 40-45 dBA
- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- >60 dBA

Figure 11-3 - East Sector Bulk Earthworks LAeq,15min Contours Temperature Inversion

0 0.75 1.5 3
Kilometres

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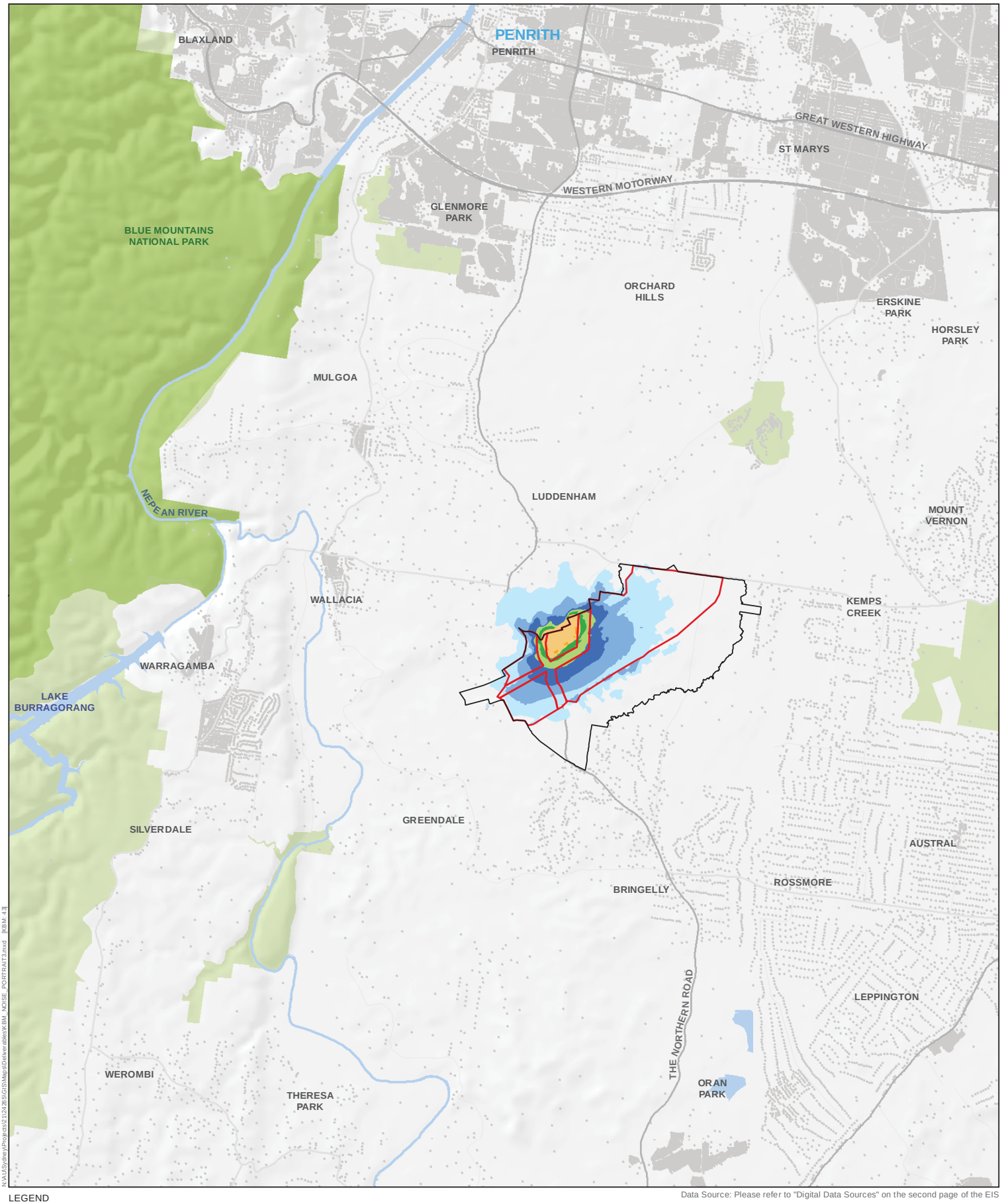

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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Western Sydney Airport
- Buildings
- Greater Blue Mountains World Heritage Area
- Parks and reserves
- Earthworks Boundary

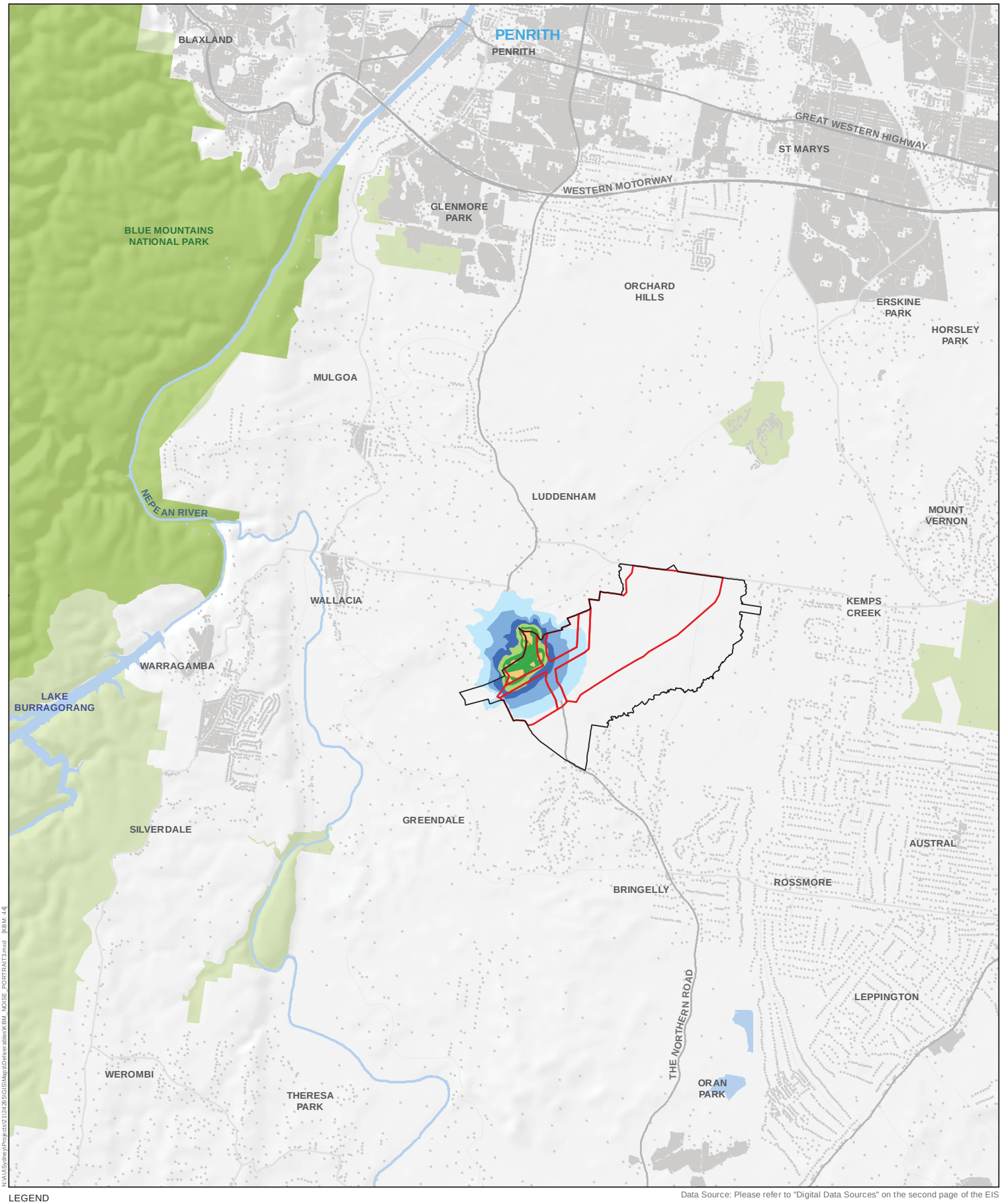
LAeq, 15 min

- 40-45 dBA
- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- 60-65 dBA
- 65-70 dBA
- >70 dBA

0 0.75 1.5 3
Kilometres

N

Figure 11-4 - North Sector Bulk Earthworks LAeq,15min Contours Temperature Inversion



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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Western Sydney Airport
- Buildings
- Greater Blue Mountains World Heritage Area
- Parks and reserves
- Earthworks Boundary

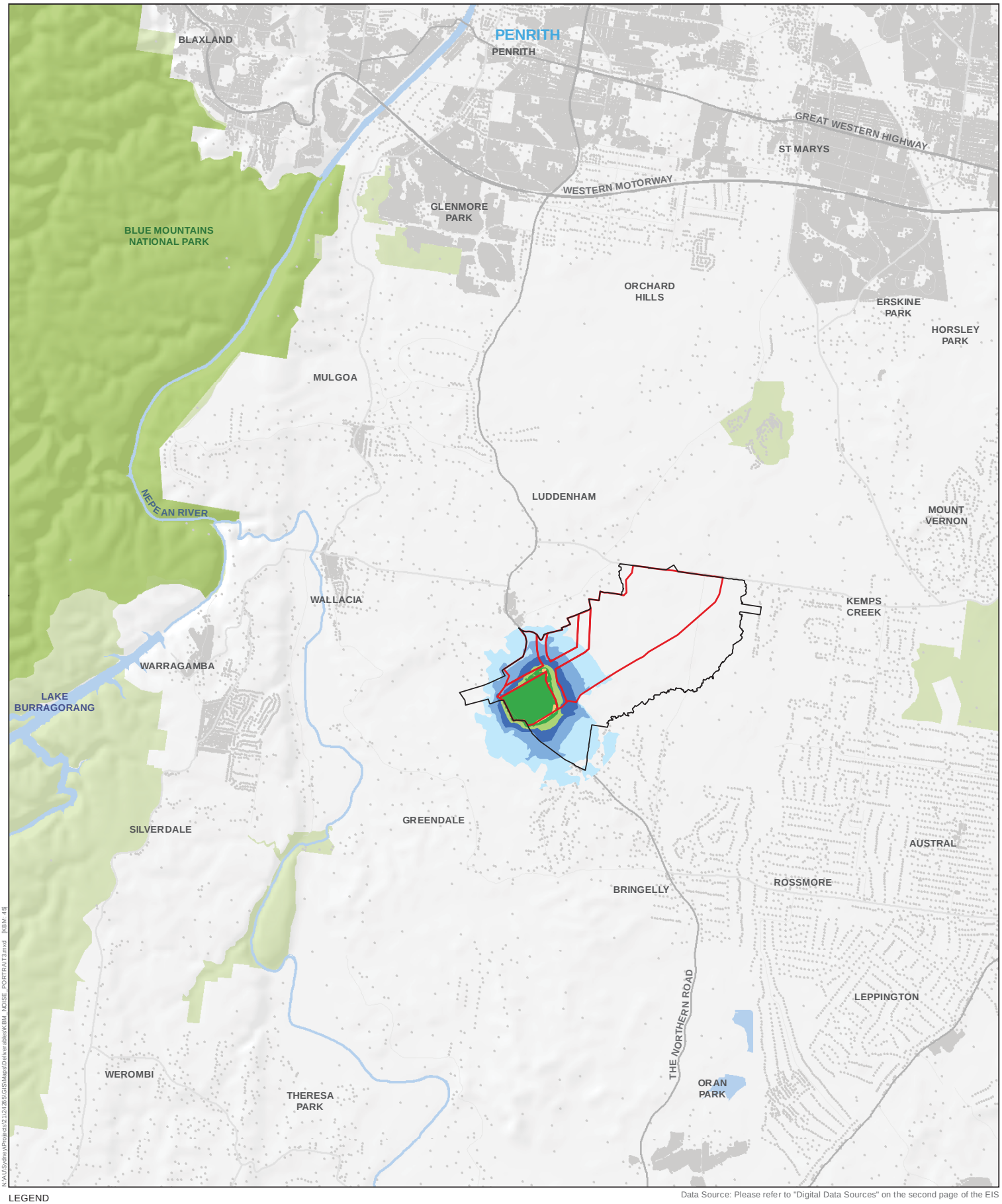
LAeq, 15 min

- 40-45 dBA
- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- 60-65 dBA
- 65-70 dBA
- >70 dBA

0 0.75 1.5 3
Kilometres

N

Figure 11-5 - North West Sector Bulk Earthworks LAeq,15min Contours Temperature Inversion



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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Western Sydney Airport
- Buildings
- Greater Blue Mountains World Heritage Area
- Parks and reserves
- Earthworks Boundary

LAeq, 15 min

- 40-45 dBA
- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- 60-65 dBA
- >65 dBA

0 0.75 1.5 3
Kilometres

N

Figure 11-6 - South West Sector Bulk Earthworks LAeq,15min Contours Temperature Inversion

The predicted number of residences likely to be affected by noise levels above the adopted noise management level during standard hours is shown in Table 11–7.

Table 11–7 – Residences affected by levels above noise management level – standard construction hours

Location	Noise management level	Residential buildings affected above criterion
East section	45 dBA	0
North section	45 dBA	36
North-west section	45 dBA	64
South-west section	45 dBA	44

The predicted number of residences likely to be affected by noise levels above the adopted noise management level outside standard hours is shown in Table 11–8.

Table 11–8 – Residences affected by levels above noise management level – outside standard construction hours

Location	Noise management level	Residential buildings affected above criterion
East section	40 dBA	22
North section	40 dBA	189
North-west section	40 dBA	192
South-west section	40 dBA	52

Noise emissions arising from construction activities would be predominantly limited to the airport site and immediate surrounds. The airport site covers a broad area, and a range of management measures such as the placement of temporary noise barriers or exclusion buffers within the airport site may be adopted as required to mitigate disturbance to nearby receivers, particularly for construction activity outside of standard construction hours. It should be noted that the construction noise guideline level of 75dBA in the Airports (Environment Protection) Regulations 1997 are met for all surrounding receivers.

11.5.2. Construction traffic noise

Construction traffic would use of the nearby road network, with most traffic directly accessing Elizabeth Drive. Table 11–9 presents predicted noise increases along Elizabeth Drive as a result of construction traffic. Along all sections of Elizabeth Drive the predicted increase in noise from construction traffic is less than 2 dBA. This change is unlikely to be perceptible.

Table 11–9 – Predicted construction traffic noise increases (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

11.5.3. Construction vibration assessment

Vibration would be generated by the proposed construction works. As a very conservative approach, the lower guideline value applying to vibration sensitive buildings (3 mm/s) has been considered to test the risk of damage from construction vibration.

Figure 11–7 shows vibration levels previously measured on construction sites at a range of distances. The vibration levels from impact piling during the construction works would likely generate the highest vibration levels.

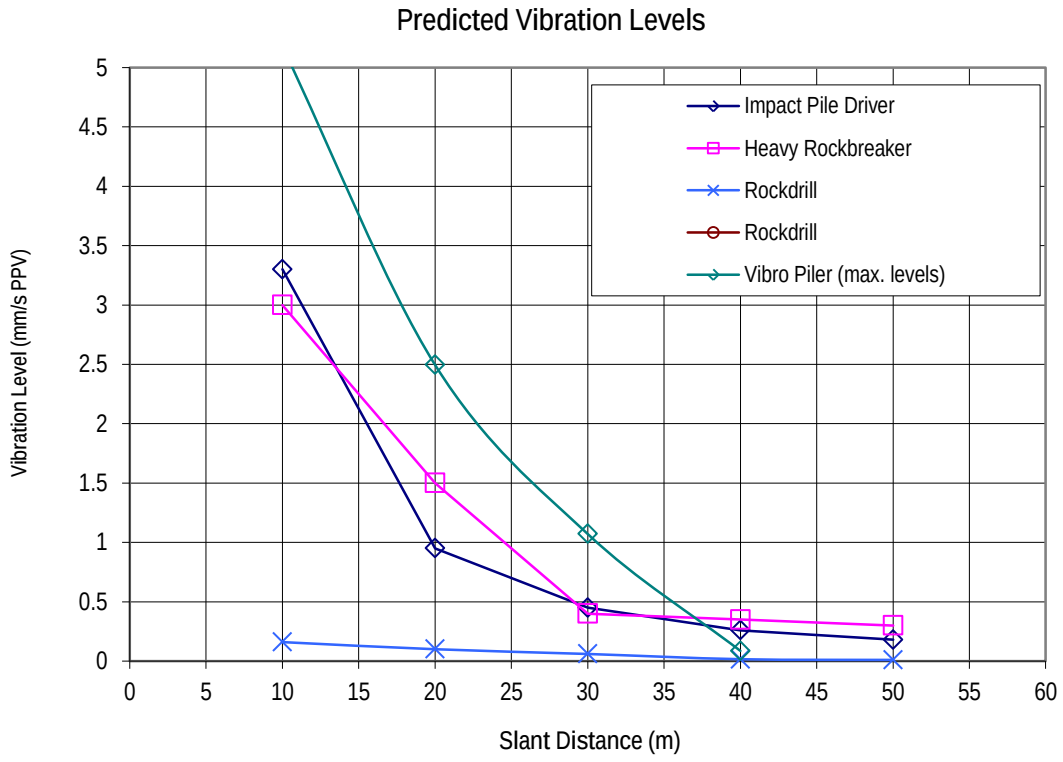


Figure 11–7 – Previously measured vibration levels

The results indicate that the 3 mm/s value would not be exceeded beyond a distance of 20 metres from a source even when using the piling method which would generate the highest vibration levels from the anticipated construction activities. Given that piling would occur well within the proposed airport boundary to construct the buildings, there would be no risk of damage to buildings from vibration outside of the proposed airport site.

Vibration may also be generated by the ripping of rock, but again the 3 mm/s guideline value is likely to be complied with inside the airport boundary and there is no risk of damage outside the airport boundary.

11.6. Assessment of impacts during operation

11.6.1. Ground-based operations noise

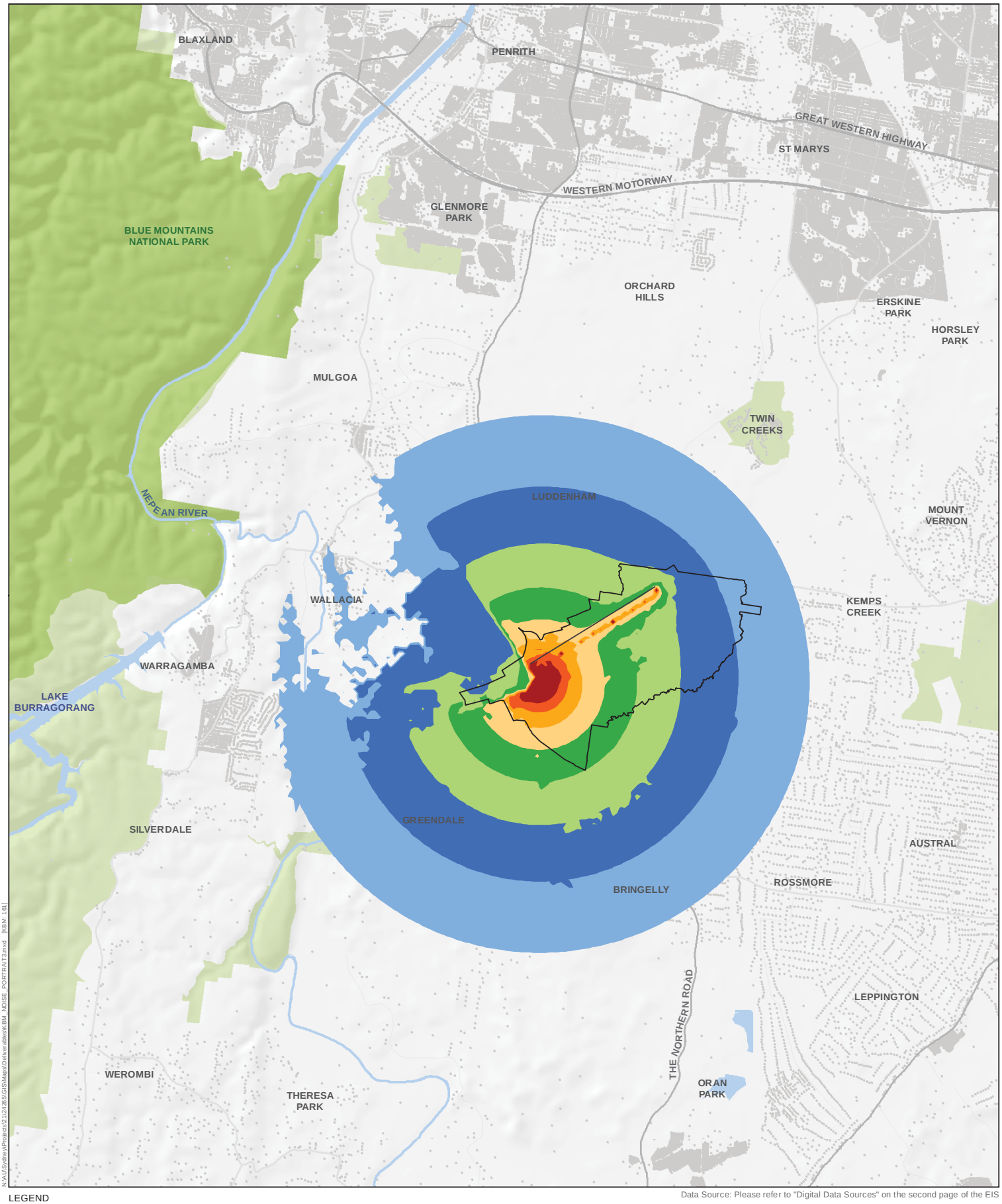
Figure 11–8 to Figure 11–9 show predicted 2030 contours for noise exposure associated with engine ground running (run-ups) and taxiing.

The contours show that under worst case conditions and in the absence of operational controls (e.g. restriction of engine run-ups), ground-based operational noise has the potential to extend over a large area surrounding the airport site. Table 11–10 shows the number of residential buildings likely to be affected by noise above adopted criteria.

Table 11–10 – Residential noise impact of ground-based operational noise

Noise type	Noise criterion	Residential buildings affected above criterion
Engine run-up	45 dBA	1,356 residences
Taxiing	40 dBA	659 residences

Under worst case meteorological conditions, noise associated with engine run-ups has the potential to affect Luddenham, Badgerys Creek, Bringelly, Wallacia and Greendale. The predicted noise exposure from aircraft taxiing extends over a much smaller area and would primarily affect Luddenham.



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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Western Sydney Airport
- Runway
- Buildings
- Greater Blue Mountains World Heritage Area
- Parks and reserves

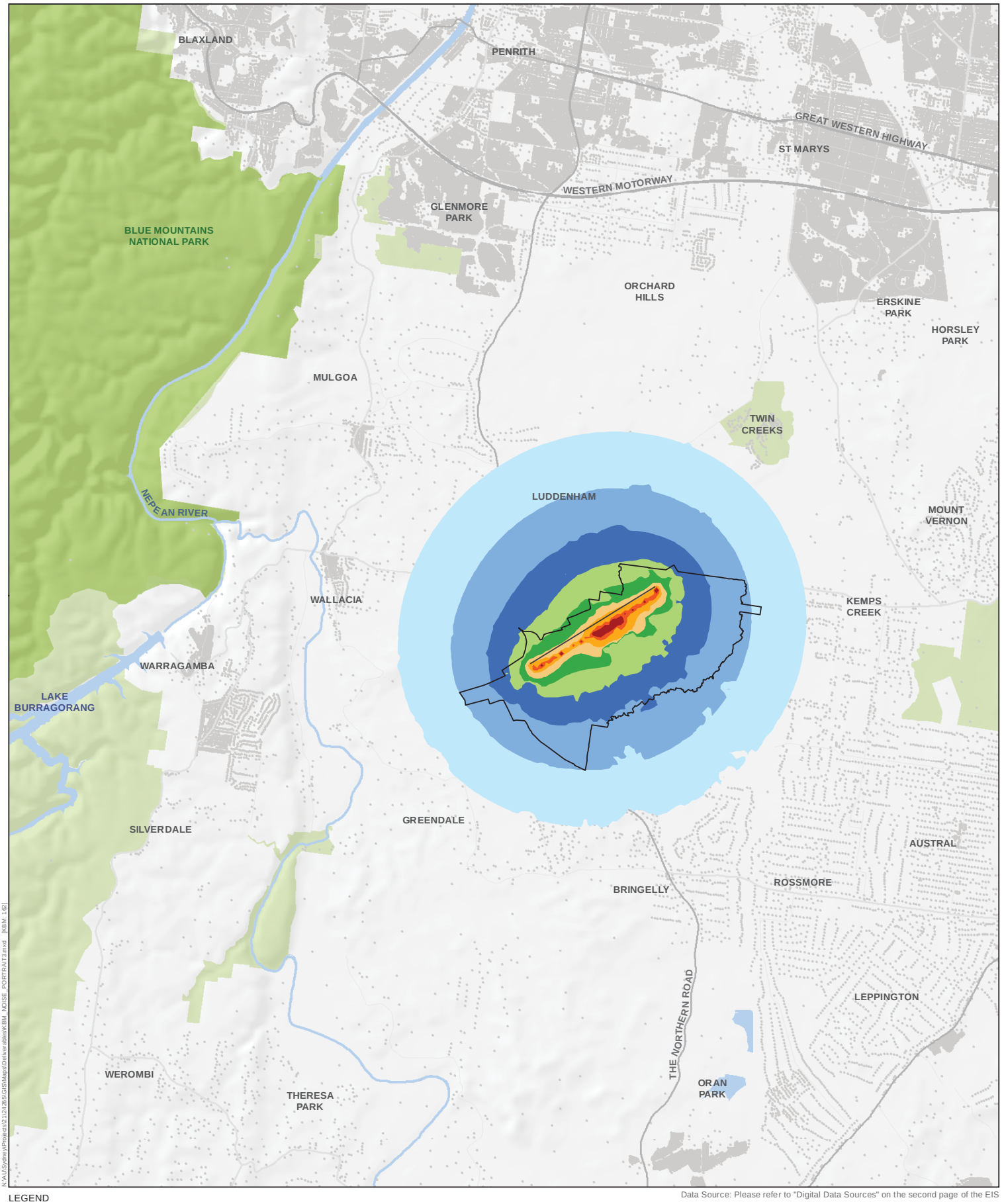
LAeq, 15min

- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- 60-65 dBA
- 65-70 dBA
- 70-75 dBA
- 75-80 dBA
- >80 dBA

0 0.75 1.5 3
Kilometres

N

Figure 11-8 - Engine run-up noise contours - worst case (2030)



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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Western Sydney Airport
- Runway
- Buildings
- Greater Blue Mountains World Heritage Area
- Parks and reserves

LAeq, 15min

- 40-45 dBA
- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- 60-65 dBA
- 65-70 dBA
- 70-75 dBA
- 75-80 dBA
- >80 dBA

0 0.75 1.5 3
Kilometres

N

Figure 11-9 - Taxiing noise contours - worst case (2030)

The predicted impact of ground-based operational noise on other noise sensitive uses surrounding the airport site is summarised in Table 11–11.

Table 11–11 – Noise impact of ground-based operational noise on other uses

Noise type	Building/land use type	Criterion	Number affected (above criterion)
Engine run-up	Educational institution	55 dBA	5
	Hospitals	60 dBA	0
	Place of worship	60 dBA	2
	Passive recreation	60 dBA	2
	Active recreation	65 dBA	0
Taxiing	Educational institution	50 dBA	1
	Hospitals	55 dBA	0
	Place of worship	55 dBA	0
	Passive recreation	55 dBA	0
	Active recreation	60 dBA	0

11.6.2. Road traffic noise

As explained in Section 10.2.3, road traffic noise levels for roads near the airport site were calculated using the traffic projections discussed in Chapter 15 and the CoRTN procedure.

Table 11–12 shows the change in noise level expected as a result of the proposed airport on the major roads that airport related traffic is expected to use. There would be a decrease in road traffic noise on some roads due to the proposed M12 motorway. The highest noise level increase expected is less than 2 dBA and would be unlikely to be perceptible at the nearest sensitive receivers.

Table 11–12 – Road traffic noise level increases due to proposed airport (2030)

Road	Location	Noise level increase (dB)	
		Day	Night
Elizabeth Drive	West of Mamre Road	0.8	0.5
	West of Devonshire Road	1.3	0.8
	West of Lawson Road	-0.4	-1.8
	West of Badgerys Creek Road	1.6	0.0
	West of Luddenham Road	1.3	-0.1
Luddenham Road	South of South Creek	-0.4	-0.6
	South of Twin Creeks Golf Club	-0.8	-1.4
Mamre Road	North of Elizabeth Drive	-0.1	-0.1
	North of Bakers Lane	0.5	0.4

Road	Location	Noise level increase (dB)	
		Day	Night
	North of Banks Drive	0.0	0.0
The Northern Road	North of Homestead Road	-0.4	-0.6
	South of Glenmore Parkway	-0.6	-1.1
	North of Littlefields Road	-0.9	-1.3
	North of Adams Road	-0.6	-0.9
	North of Northern Road	-0.1	-0.4
	North of Cobbitty Road	-0.2	-0.3
	North of Camden Valley Way	-0.1	-0.2

11.7. Mitigation and management measures

Table 11–13 outlines the broad mitigation and management measures that are proposed to address noise associated with ground operations, construction and airport generated road traffic. All major airports have procedures in relation to engine runs, which restrict the time and location for ground running to limit noise impacts. The proposed airport is expected to have similar procedures which would limit the circumstances and manner in which night time engine runs would be conducted. Restricting the amount of high power engine runs at night would substantially reduce the impact of engine ground running noise.

It may also be practical to construct buildings, mounds or barriers near the run-up area to provide greater noise shielding. It is possible that reductions of around 10 dBA could be achieved with provision of a purpose-built ground running enclosure, mounds or buildings at least 10 metres high, but moderate residual impacts would still occur under worst case meteorological conditions. Alternate locations for the run-up facility may also be considered during detailed design.

Table 11–13 – Mitigation and management measures – ground operations, construction and road traffic

ID	Issue	Mitigation/management measure	Timing
11.1	Construction noise and vibration	A noise and vibration management plan would be developed prior to construction of the proposed airport as part of the construction environmental management framework. The plan would: • assist in ensuring that the noise during construction complies where feasible with the construction noise management levels set for the project including Schedule 4 of the Airports (Protection of the Environment) Regulations where relevant; • determine noise and vibration monitoring, reporting and response procedures. • describe specific mitigation treatments, management methods and procedures to be implemented to control noise and vibration during construction; • describe construction timetabling to minimise noise impacts including time and duration restrictions, respite periods and frequency; • describe procedures for notifying residents of construction activities likely to affect their amenity through noise and vibration; and • define contingency procedure to be implemented in the event of noncompliance and/or noise complaints.	Pre-construction
11.2	Operational ground-based noise	The airport-lessee company would establish and operate a community aviation consultation forum and a planning coordination forum consistent with practice at other airports.	Pre-construction Construction Pre-operation Operation

ID	Issue	Mitigation/management measure	Timing
11.3	Operational ground-based noise	A ground-based noise amelioration management strategy would be developed that identifies reasonable and feasible noise mitigation measures. The Issues to be addressed in the strategy would include but not be limited to: • the identification of reasonable and feasible noise mitigation measures for on-ground noise generating activities, including: ▪ aircraft ground running operating procedures; ▪ opportunities to refine the location and design of airport features to reduce noise impact; ▪ aircraft taxiing operating procedures; and ▪ other measures to address excessive noise where noise mitigation by physical features (e.g. noise barriers) is deemed ineffective. • additional noise modelling and assessment conducted during the detailed airport design phase to examine with the objective of examining the effectiveness of any proposed noise amelioration mitigation measures and identifying any residual excessive noise levels in areas surrounding the airport site; • if off-site noise exposure cannot be managed appropriately by operational and other on-site mitigation measures, a detailed noise amelioration plan for affected residences and other sensitive receivers surrounding the airport site should be developed for consideration by the Australian Government and any reasonable and feasible noise mitigation measures; • stakeholder engagement with affected residences and other stakeholders regarding potential noise impacts, and potential mitigation and amelioration measures; • similar to other airports, implementation of aircraft ground running operating procedures including investigations of feasible measures to reduce the impact of noise; • other specific measures to address noise exceedances where physical noise mitigation is ineffective; and • noise monitoring and reporting arrangements.	Pre-operation Operation
11.4	Operational ground-based noise	The airport-lessee company would incorporate noise monitoring and reporting into any future master plan in accordance with the *Airports Act 1996*.	Operation

11.8. Conclusion

Noise during the construction of the proposed airport would be largely confined within the airport boundary, although there would be some impacts on the Luddenham and Badgerys Creek areas. While heavy and light vehicles would need to access the airport site during the construction stage, the increase in traffic noise as a result would not be significant. Vibration generated by construction activities is considered unlikely to cause building damage.

Ground-based operational noise would be generated primarily by aircraft engine ground running and taxiing. Under worst case meteorological conditions, noise associated with engine runs has the potential to affect residences and other sensitive receivers in Luddenham, Badgerys Creek, Bringelly, Wallacia and Greendale. The impact of noise from taxiing is predicted to extend over a much smaller area and would primarily affect Luddenham.

During operation of the proposed airport, noise level increases in the surrounding area due to airport generated road traffic are not expected to be significant.

Mitigation and management measures have been proposed to address noise associated with ground operations, construction and airport generated road traffic.

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