



Millennium Expansion Project

Environmental Impact Statement

CHAPTER 12:

NOISE AND VIBRATION

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12.0 NOISE AND VIBRATION

12.1 EXECUTIVE SUMMARY

12.1.1 Values

The Millennium Expansion Project (MEP) seeks to maintain the existing environmental noise values such that noise levels at nearby sensitive receptors are conducive to human health and well-being, ensuring a suitable acoustic environment for individuals to sleep, study or learn, be involved in recreation, including relaxation and conversation; and preserve the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

12.1.2 Issues

Potential noise and/or vibration issues at the MEP include:

- operation of mining equipment being audible at nearby sensitive receptors;
- blasting being felt (vibrations) or heard at nearby sensitive receptors; and
- noise from mining operations disturbing normal sleep patterns at nearby sensitive receptors.

12.1.3 Mitigation Strategies

Mitigation strategies that will be implemented as required to prevent or minimise noise and/or vibrations impacts from the MEP include:

- blasting will only be scheduled as approved in the Environmental Authority – nominally during daylight hours;
- the closest permanently occupied homestead to the MEP is Moorvale and it is 7.3 km from the proposed MEP. Noise outside the homestead at this closest sensitive receptor is predicted to be a maximum of 29 dB (a worst case scenario: night with wind) which is well below noise standards and is unlikely to cause any disturbance to natural sleeping patterns or impact on normal daily routines. No specific noise mitigation strategies are considered necessary at any existing homesteads;
- railway noise and road noise are both below the recommended 3 dB noise increase, therefore no specific mitigation measures are proposed;
- due to distance from the operations and the existing undulating topography and vegetation establishment acting as natural noise barriers, no further specific strategies are proposed for the MEP; and
- the MEP will keep a record of any noise or vibration complaints received and will investigate management options for verified complaints.

The noise modelling demonstrated that the acoustic quality objectives were achieved at all sensitive receptors, and that noise levels at all sensitive receptors are below the relevant recommended guideline limits.

12.2 INTRODUCTION

This section identifies the noise and vibration values present for the MEP and is based on detailed noise and vibration assessments undertaken on the MEP area by Noise Mapping Australia between 2006 and 2010 (NMA, 2010). The MEP occupies the following Mining Leases (ML) 70313, Mining Lease Application (MLA) 70401 and Mineral Development Licence (MDL) 136. The potential impacts from the noise and vibrations associated with MEP on environmental values are discussed and where appropriate, mitigation measures are proposed.

12.3 LEGISLATION AND GUIDELINES

12.3.1 Environmental Protection Act 1994

The objective of the *Environmental Protection Act 1994* (*EP Act*) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

The *EP Act* states a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm. The definition of environmental harm includes environmental nuisance, which incorporates noise nuisance.

12.3.2 Environmental Protection (Noise) Policy 2008

The noise level goals for operations may be determined from the *Environmental Protection (Noise) Policy 2008* (*EPP Noise*). There are two main considerations for the MEP from the *EPP Noise*, namely:

1. acoustic quality objectives-noise levels that are conducive to human health and wellbeing, ensuring a suitable acoustic environment for individuals to sleep, study or learn, be involved in recreation, including relaxation and conversation; and preserve the qualities of the acoustic environment that are conducive to protecting the amenity of the community; and
2. controlling background creep.

12.3.3 Acoustic Quality Objectives

Acoustic quality objectives seek to protect the amenity of an acoustic environment. The indoor night-time goals effectively address sleep disturbance and sleep awakenings, while during the day it protects conversation.

Acoustic quality objectives are expressed as indoor noise level goals for dwellings at Night (10 pm-7 am) and outdoor noise level goals during the Day (7 am-6 pm) and Evening (6 pm-10 pm). Furthermore the *EPP Noise* also includes acoustic quality objectives for critical habitats as defined in a conservation plan *(Nature Conservation Act 1992)*, however there are no critical habitats identified for the MEP. The acoustic quality objectives are contained in **Table 12-1**.

Table 12-1 Acoustic Quality Objectives for Dwellings During the Day (7am-6pm), Evening (6pm-10 pm) and Night (10pm-6am)

Location	Time of Day	Acoustic Quality Objectives (Measured at the Receptors) dB(A)			Environmental Value
		$L_{Aeq, adj, 1 hour}$	$L_{A10, adj, 1 hour}$	$L_{A1, adj, 1 hour}$	
Dwelling outdoors	Daytime and evening	50	55	65	Health and well being
Dwelling indoors	Daytime and evening	35	40	45	Health and well being
Dwelling indoors	Night-time	30	35	40	Health wellbeing in relation to the ability to sleep
Protected area or critical habitat	Anytime	The level of noise that preserves the amenity of the existing area or place			Health and biodiversity of ecosystems

Source: EPP (Noise) 2008

12.3.3.1 Controlling Background Creep

Controlling background creep seeks to avoid intrusiveness. To the extent that it is reasonable to do so, noise from an activity must not be:

- greater than the existing acoustic environment for noise that is continuous ; or
- more than 5 dB(A) greater than the existing acoustic environment for noise that varies over time.

12.3.4 DERM Ecoaccess Guideline-Low Frequency Noise

Industrial sources may exhibit a noise spectrum that shows an increase in sound pressure level with a decrease in frequency. Annoyance due to low frequency noise can be significant, even though the dB(A) level measured is relatively low. Generally, low level/low frequency noises become annoying when the masking effect of higher frequencies is absent. This loss of high frequency components may occur as a result of transmission through the fabric of a building or over long distances.

Where a noise emission occurs exhibiting an unbalanced frequency spectra, the overall sound pressure level inside residences should not exceed 50 dB.

12.3.5 Blasting Noise and Vibration Criteria

DERM's *Guideline for Noise and Vibration from Blasting* has been referenced when assessing impacts from the MEP and when proposing mitigation measures.

Open-cut coal mining procedures often include drilling and blasting of overburden before the coal seam can be accessed. Holes are drilled into the overburden at regular intervals, then charged with explosives e.g. ANFO (Ammonium Nitrate/Fuel Oil) and detonated.

Blasting should generally be limited to the daylight hours and should not generally take place on Sundays or public holidays when it is expected people will be at their residences.

Blasting activities must be carried out in such a manner that at a sensitive receptor:

- the airblast overpressure must be not more than 115 dBpeak for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts;
- the airblast overpressure must not exceed 120 dBpeak for any blast;
- blasting operations must be carried out in such a manner that if ground vibration should propagate to a vibration-sensitive place;
- the ground-borne vibration must not exceed a peak particle velocity of 5 mm per second for nine out of any 10 consecutive blasts, regardless of the interval between blasts; and
- the ground-borne vibration must not exceed a peak particle velocity of 10 mm per second for any blast.

12.3.6 Railway Noise Goals

Queensland Rail (QR) is responsible for setting noise level limits from rail traffic. The planning levels for a railway, assessed 1 m in front of the most exposed part of an affected noise sensitive place are:

- 65 dB(A), assessed as the 24 hour average; and
- 87 dB(A), assessed as a single event maximum sound pressure level.

The proposed wagon and locomotives that will be utilised for the MEP are currently in service at the Millennium Mine, as is the train configuration and other operational considerations. The only difference to the existing noise environment will be a slight increase in train movements (refer to **Chapter 8-Transport**) on the existing Goonyella line (less than 1.0%).

There are currently no specific criteria applicable to assess the impact of noise from a railway noise generating development. It is recommended that railway noise be limited to a 3 dB(A) increase over the existing noise levels. Hence, the railway noise assessment is limited to assessing the increase in railway noise.

12.3.7 Road Traffic Noise Goals

The Queensland Department of Transport and Main Roads (DTMR) is responsible for setting noise level limits from road traffic. The planning levels apply for major roads, such as Peak Downs Highway, but there are currently no criteria in Queensland to assess the impact of noise from a road traffic generating development.

Chapter 8–Transport identifies the proposed increase of road traffic resulting from the MEP as less than 2.0% of the existing Peak Downs Highway traffic. Given the MEP will not result in a significant increase in traffic numbers, and will utilise transport methods that are currently regularly used throughout the region, no significant increase of road traffic noise is predicted for the MEP.

It is recommended that road noise be limited to a 3 dB(A) increase over the existing noise levels. Hence, the road traffic noise assessment is limited to assessing the increase in road traffic noise.

12.4 EXISTING ENVIRONMENT

The MEP is situated approximately 22 km east of Moranbah in a well-established grazing and mining region. The area surrounding the site has undulating topography, comprising mines, open farmlands and native scrublands.

Potential sources of noise and/or vibration from the surrounding environment primarily comprise:

- farming and grazing activities;
- residential activity noise;
- environmental noise e.g. insects, wind etc;
- existing mines; and
- road and rail traffic.

There are several existing mines that border the MEP including Millennium Mine itself, Daunia and Poitrel open-cut mines to the south and Carborough Downs underground mine to the north. BMA's Peak Downs Mine is the largest mine in the region and is situated approximately 20 km south-west of the MEP.

12.4.1 Climate

The region has a warm climate with two distinct seasons, a dry winter season and a wet summer season. Winter temperatures average from 10 - 25ºC, while summer temperatures range from around 20 - 35ºC. The region averages approximately 600 mm of rainfall each year, falling mostly between November and March.

The warm wet season encourages crickets, cicadas and other wildlife which usually causes higher ambient noise levels than during the dry winter season. The greatest noise impact from mining will usually occur during the cool dry season since these cooler conditions are more favourable to the propagation of noise at large distances, particularly at night, and the cooler conditions also result in lower ambient noise levels.

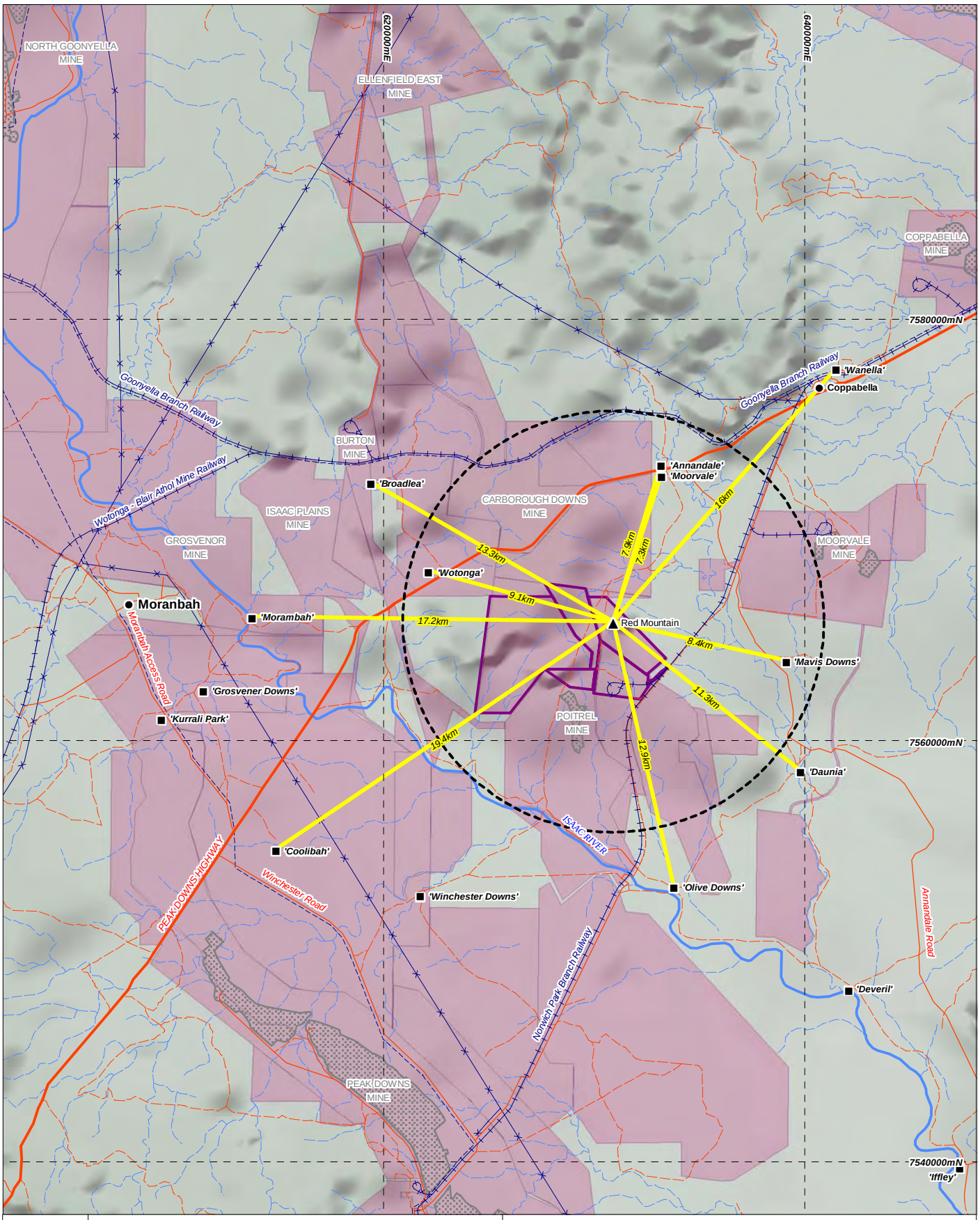
12.4.2 Noise Sensitive Places

The closest noise sensitive locations to the MEP are shown on **Figure 12-1,** with the separation distances shown in **Table 12-2**. It is relevant to note that each of the homesteads in the vicinity of the MEP is generally already closer to one of the other existing mines.

Table 12-2 Homesteads in the MEP Vicinity

Homestead	Distance to MEP (approximate)
Winchester Downs	15 km south west
Wotonga	9.1 km west
Broadlea	11 km north west
Moorvale	7.3 km north east
Annandale	7.9 km north east

Given the closest noise sensitive location is over 7 km from the MEP, indications prior to modelling are that noise impacts will not be significant for the MEP.



LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- Powerline
- Pipeline
- River
- Watercourse
- Town
- Homestead
- Peabody tenement
- Other ML & MDL tenement
- Existing mine
- 10km radius from Red Mountain

Data Source:
Peabody tenement - Minserve. Other tenement - EEDI.
Topography (250k) - Geoscience Australia.

MET SERVE

Peabody

S:\Projects\PE001 Millennium Coal EIS_MapInfo\Workspaces\PE001_M243A.wor

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Location of Homesteads near the MEP

0 5 10

Kilometres

Scale: 1:250,000 (A4)

20/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-1

12.4.3 Baseline Noise Monitoring Data

Baseline noise monitoring was undertaken at the Winchester Downs, Wotonga and Moorvale Homesteads during the following periods:

- Winchester Downs over a period of 8 days from Tuesday 31 March 2009 to Tuesday 7 April 2009;
- Wotonga Homestead over a period of 8 days from 25 May 2010 to 1 June 2010. (The actual location was on the Millennium mining lease but at a setback distance from the Peak Downs Highway similar to the Wotonga Homestead setback); and
- Moorvale Homestead over a period of 9 days from Saturday 6 May 2006 to Saturday 13 May 2006.

The noise sources noted during attended measurements are typical of those that will be expected in a rural, grazing area. It is likely the noise levels at these residences are due to road traffic, residential activity noise or farming noise rather than existing mining operations.

This was confirmed by attended noise monitoring that was carried out during the day, evening and night on public roads close to Winchester Downs and Wotonga Homesteads. The purpose of the attended monitoring was to establish whether mining noise was currently audible at these properties. Mining-related noise was not audible at any of these locations during the attended monitoring period.

More information about the existing noise environment, including detailed monitoring results, can be found in the noise technical report in **Appendix F6 - Noise**.

12.5 NOISE MODELLING

A digital terrain noise model of the site and surroundings has been developed using PEN3D as detailed in the noise technical report in **Appendix F6 - Noise**. PEN3D is an advanced environmental noise model incorporating a 3D terrain model that permits accurate representation of the ground topography, ground cover, tree zones, mounds, barriers and weather conditions. In comparison to other noise modelling methods available, PEN3D is deemed to provide a conservatively high estimate of noise impacts at sensitive receptors, particularly for night-time and downwind calculations (Noise Mapping Australia, 2010).

12.5.1 Modelling Parameters

The Digital Terrain Model (DTM) for the MEP is based on NASA Shuttle Radar telemetry. The model has a default ground cover of long grass and does not include any tree zones.

The noise sources modelled comprise:

- shovel operation in the pit;
- dump truck, haul truck, shovel, excavator, rock drill and dozer contained within the pit;
- dump truck in an exposed position on the top of the 60 m high out of pit overburden dump;
- haul trucks between the pit and CHPP; and
- various earth working machines on the natural surface.

The likely equipment noise levels are contained in **Table 12-3**. The noise levels are expressed as a sound power level and a sound pressure level at 100 m from a working machine. The octave band sound power levels are 'linear' while the overall sound pressure levels are 'A' weighted. Refer to the Glossary in **Appendix F6–Noise** for standard noise definitions.

Table 12-3 Summary of Maximum Noise Levels From Mining Equipment

Item	Maximum Sound Power Levels (dB) in Octave Band Centre Frequency [Hz]								Overall dB(A)	Overall Sound Pressure Level at 100 mdB(A)
	63#1	125	250	500	1,000	2,000	4,000	8,000#2		
998 Loader	97	114	110	113	112	114	107	101	118	70
Haul Truck	107	115	110	110	108	107	102	97	113	65
Dump Truck	115	123	118	118	116	115	110	105	121	73
D11 Dozer	110	112	114	106	108	105	103	97	113	65
Rock Drill	113	117	112	116	115	114	116	115	122	74
Grader	106	108	110	102	104	101	99	93	109	61
Excavator (25 m^3)	111	122	118	117	115	110	104	99	119	71

Note 1: All energy in the audible frequencies below 63 Hz is added to the 63 Hz octave band

Note 2: All energy in the audible frequencies above 8000 Hz is added to the 8000 Hz octave band

Two mine operation cases have been modelled for the MEP.

Case 1: Out-of-Pit Waste Rock Emplacement until 2015: The out-of-pit emplacement case is a short-term scenario to allow mining operations to commence in the new Mavis pit for the MEP, and progress far enough to allow in pit emplacement to commence. During this phase the overburden will be hauled to the external waste rock emplacement. The waste rock emplacement is at most 50 m higher than natural terrain, although modelling has allowed for a maximum of 60 m as a worst case.

Case 2: In-Pit Waste Rock Emplacement from 2015 until Mine Closure: The in-pit emplacement case is the proposed standard operating condition for the mine, once mining has advanced far enough to allow in-pit emplacement to commence. During this phase there will be in-pit waste rock emplacements with trucks placing the overburden. The in-pit waste rock emplacement is also likely to exceed the height of the natural terrain and it is expected to exceed the natural surface by at most 50 m, although modelling has allowed for a maximum of 60 m as a worst case **Table 12-4** below shows the actual equipment that was used in the two noise modelling scenarios.

Table 12-4 Equipment List for MEP Noise Modelling

Equipment	L_{Amax} to L_{Aeq} Correction [dB]	Number of Equipment - Modelling Case 1, Out-of-Pit Waste Rock Placement	Number of Equipment - Modelling Case 1, In-Pit Waste Rock Placement
Excavator 25 m³	-5	1	1
Loader 998	-5	2	2
Dump truck	-8	4	4
D11 Dozer	-10	1	1
Rock drill	-2	1	1
Grader	-3	1	1
Haul truck	-3	3	3

The L_{Amax} to L_{Aeq} correction figure represents the difference between the absolute maximum noise level and the average noise levels of an operating machine having various loads and operating conditions, and moving around a site changing direction and orientation.

Further details of the PEN3D model and noise modelling for the MEP are included in **Appendix F6 - Noise.**

12.5.2 Noise Modelling Results

The noise models have been developed for both of the identified mining stages for the fully operational MEP:

1. Case 1: Out-of-pit Waste Rock Emplacement, and
2. Case 2: In-pit Waste Rock Emplacement.

The modelling involved using actual noise data collected from the existing noise environment, and then incorporating the predicted noise for the mining equipment in **Table 12-4** at the MEP to calculate the new noise contours that include the MEP.

The noise levels at each of the homesteads for each of the modelling cases are contained in **Table 12-5** and **Table 12-6** for the out-of-pit and in-pit placement phases respectively.

The noise contours for the out-of-pit waste rock emplacement case are contained in **Figure 12-2** to **Figure 12-5** for the meteorological cases Day, Evening, Night and Night with Wind respectively.

The noise contours for the in-pit waste rock emplacement case are contained in **Figure 12-6** to **Figure 12-9** for the meteorological cases Day, Evening, Night and Night with Wind respectively.

The low frequency noise level predictions at night are contained in **Table 12-7** for both the in-pit and out-of-pit placement cases.

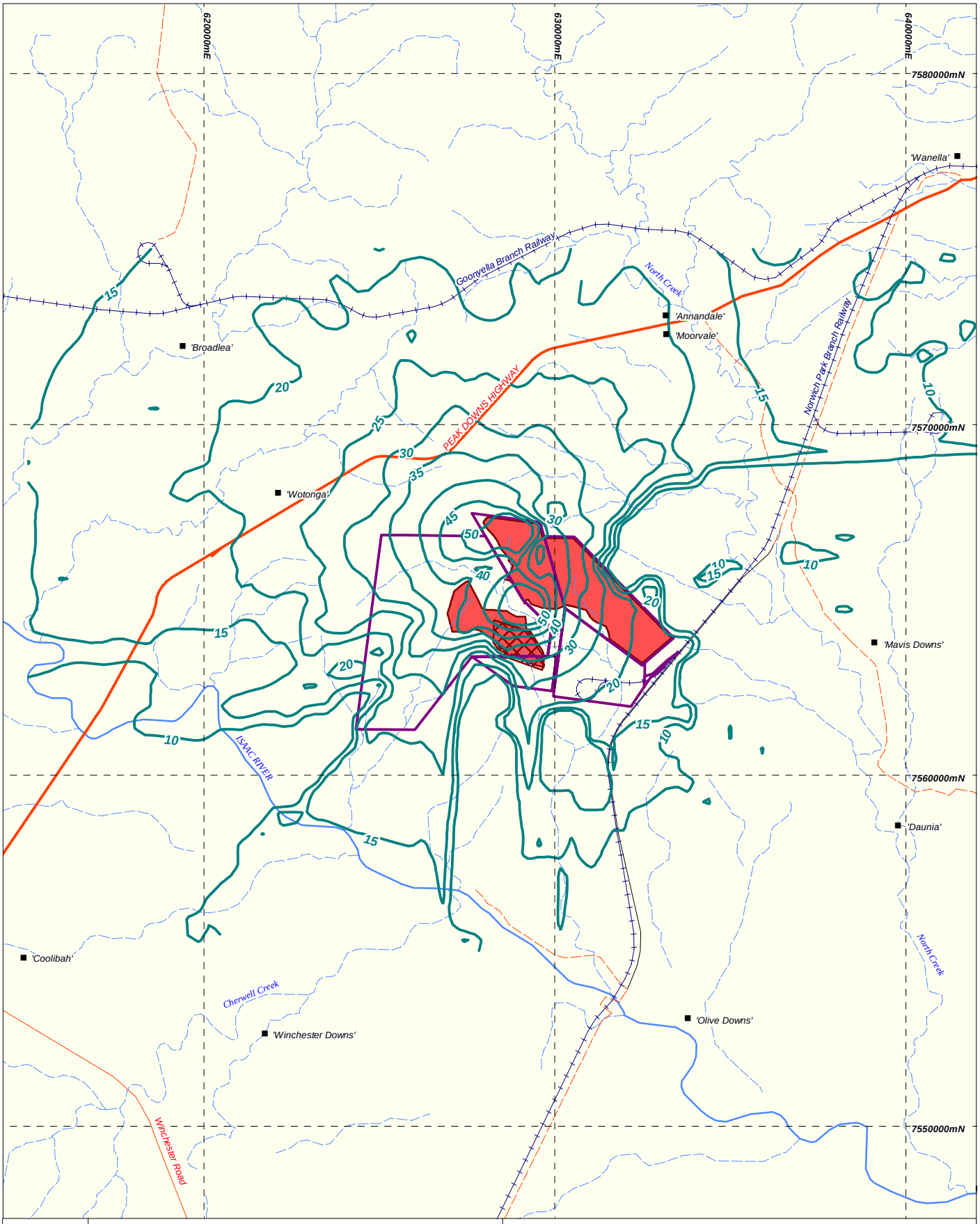
Table 12-5 Noise Level Goals for Out-of-Pit Emplacement Phase

Homestead	Calculated of $L_{Aeq(1\ hour)}$ Noise Level at Homestead in [dB(A)] for Meteorological Cases			
	Day	Evening	Night	Night with Wind
Acoustic Quality Objective	**40**	**40**	**35**	**35**
Background Creep Goal (Winchester Downs and Broadlea)	**37**	**35**	**32**	**32**
Background Creep Goal (Wotonga, Annandale and Moorvale)	**41**	**30**	**29**	**29**
Winchester Downs	9	10	15	14
Wotonga	19	13	23	28
Broadlea	16	10	20	25
Annandale	18	18	24	27
Moorvale	18	18	24	27

Table 12-6 Noise Level Goals for In-Pit Emplacement Phase

Homestead	Calculated of $L_{Aeq(1\ hour)}$ Noise Level at Homestead in [dB(A)] for Meteorological Cases			
	Day	Evening	Night	Night with Wind
Acoustic Quality Objective	**40**	**40**	**35**	**35**
Background Creep Goal (Winchester Downs and Broadlea)	**37**	**35**	**32**	**32**
Background Creep Goal (Wotonga, Annandale and Moorvale)	**41**	**30**	**29**	**29**
Winchester Downs	<thh	<thh	15	13
Wotonga	19	8	22	26
Broadlea	20	4	19	21
Annandale	24	16	24	29
Moorvale	24	16	24	29

Note: <thh are noise levels below the threshold of human hearing



LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Case 1 Day Meteorology

0 3 6

Kilometres

Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-2

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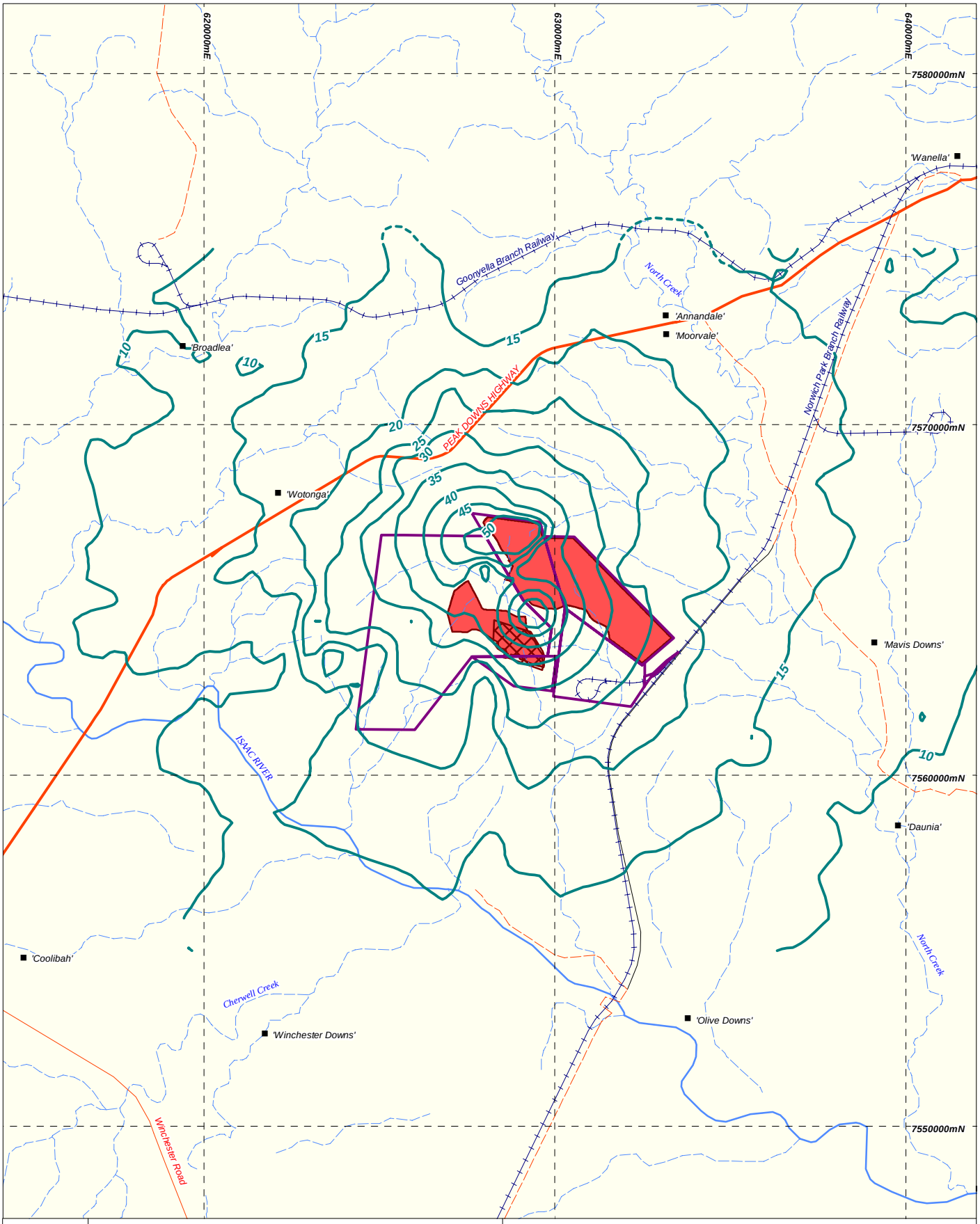

LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd
Millennium Expansion Project

Case 1 Evening Meteorology

0 3 6
Kilometres
Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-3

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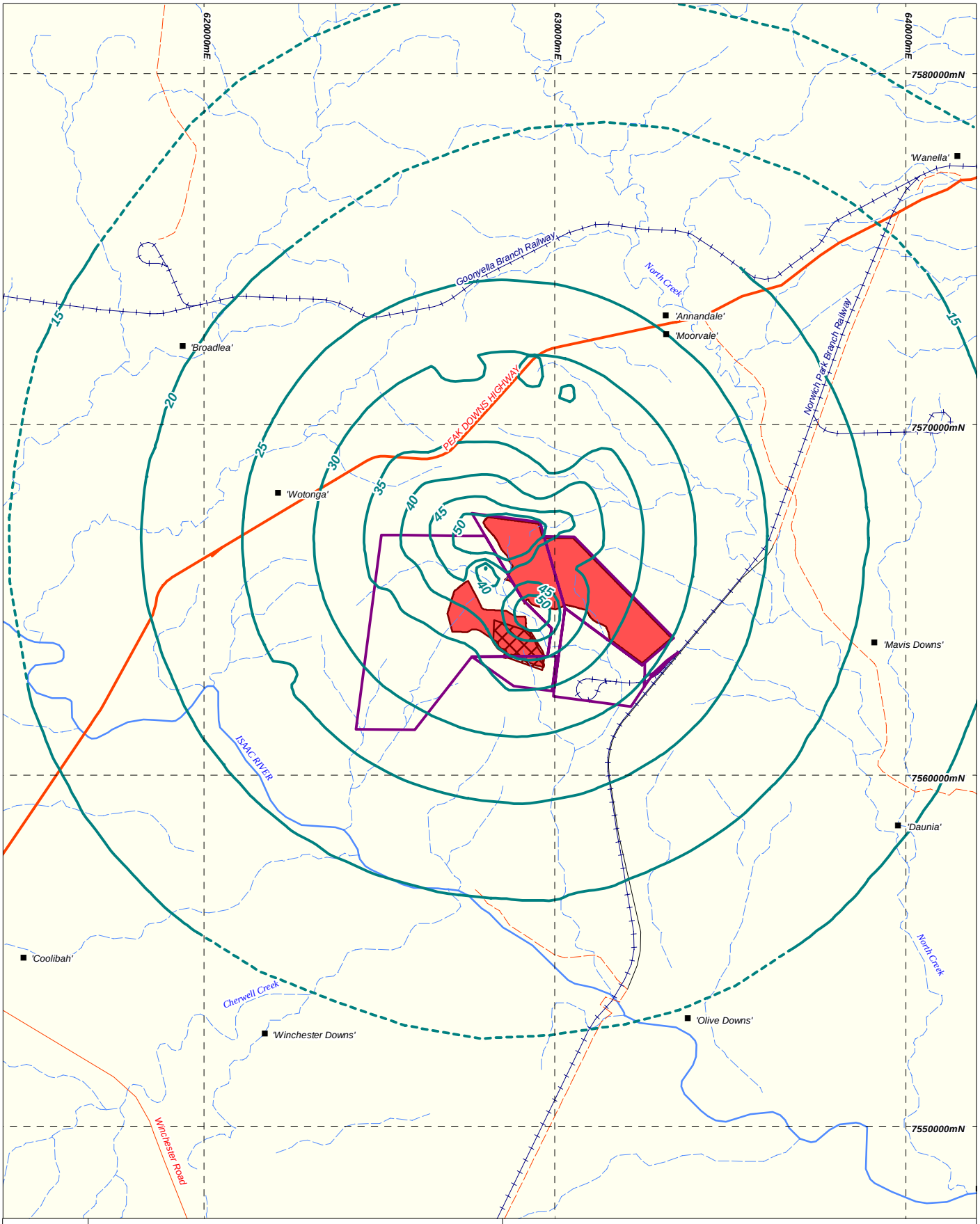

LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd
Millennium Expansion Project

Case 1 Night Meteorology

0 3 6
Kilometres
Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-4

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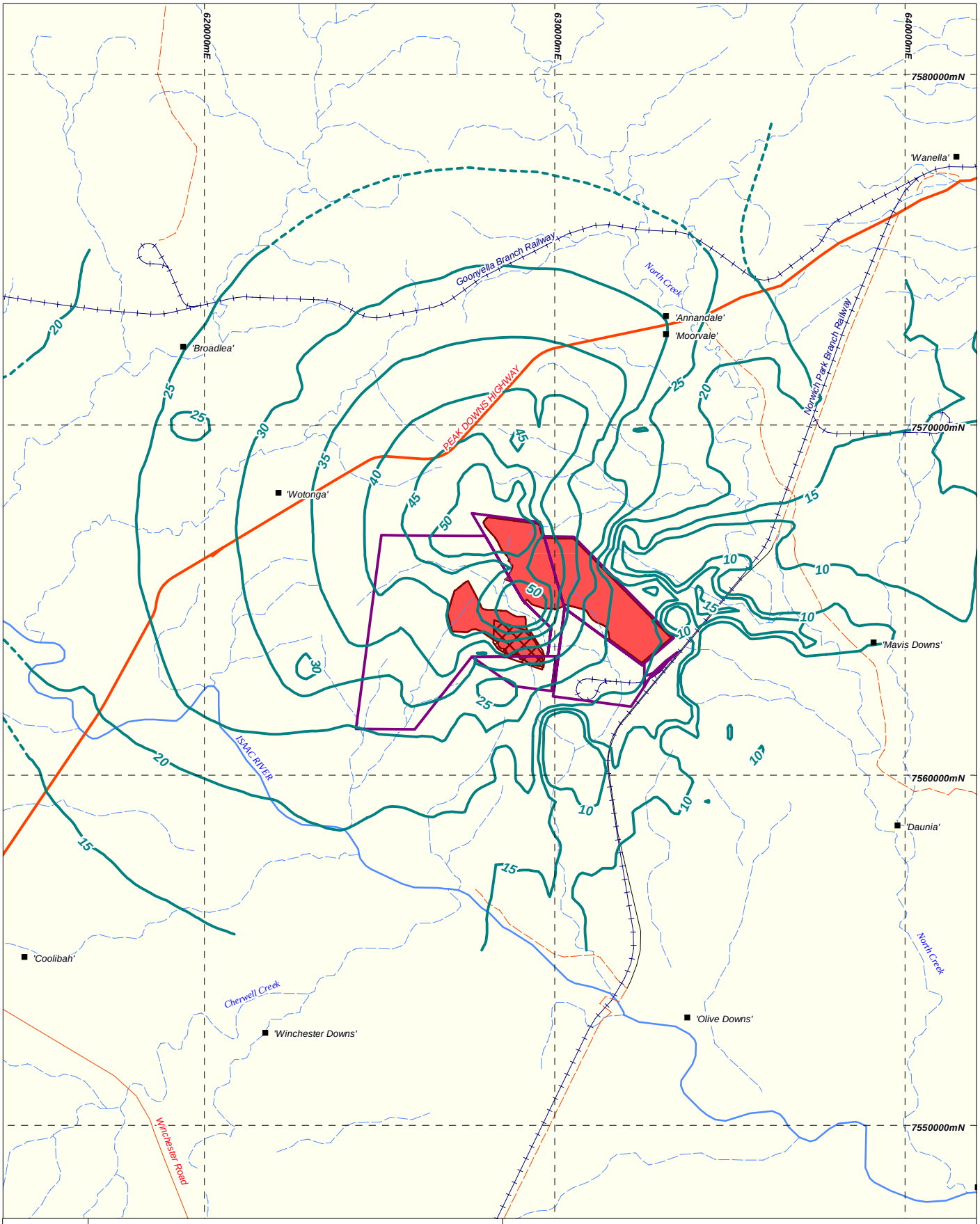

LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Case 1 Night with Wind Meteorology

0 3 6

Kilometres

Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-5

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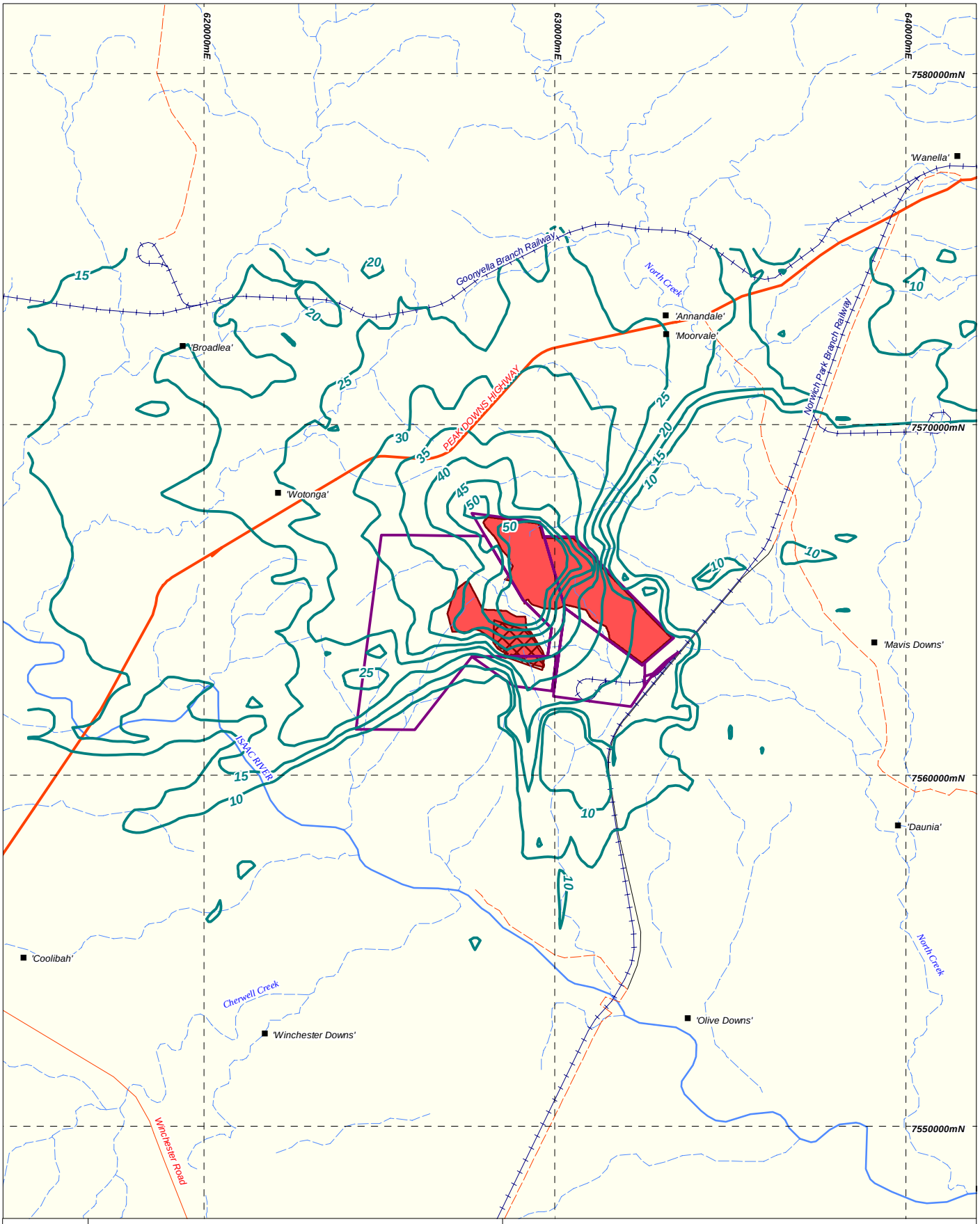

LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Case 2 Day Meteorology

0 3 6

Kilometres

Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-6

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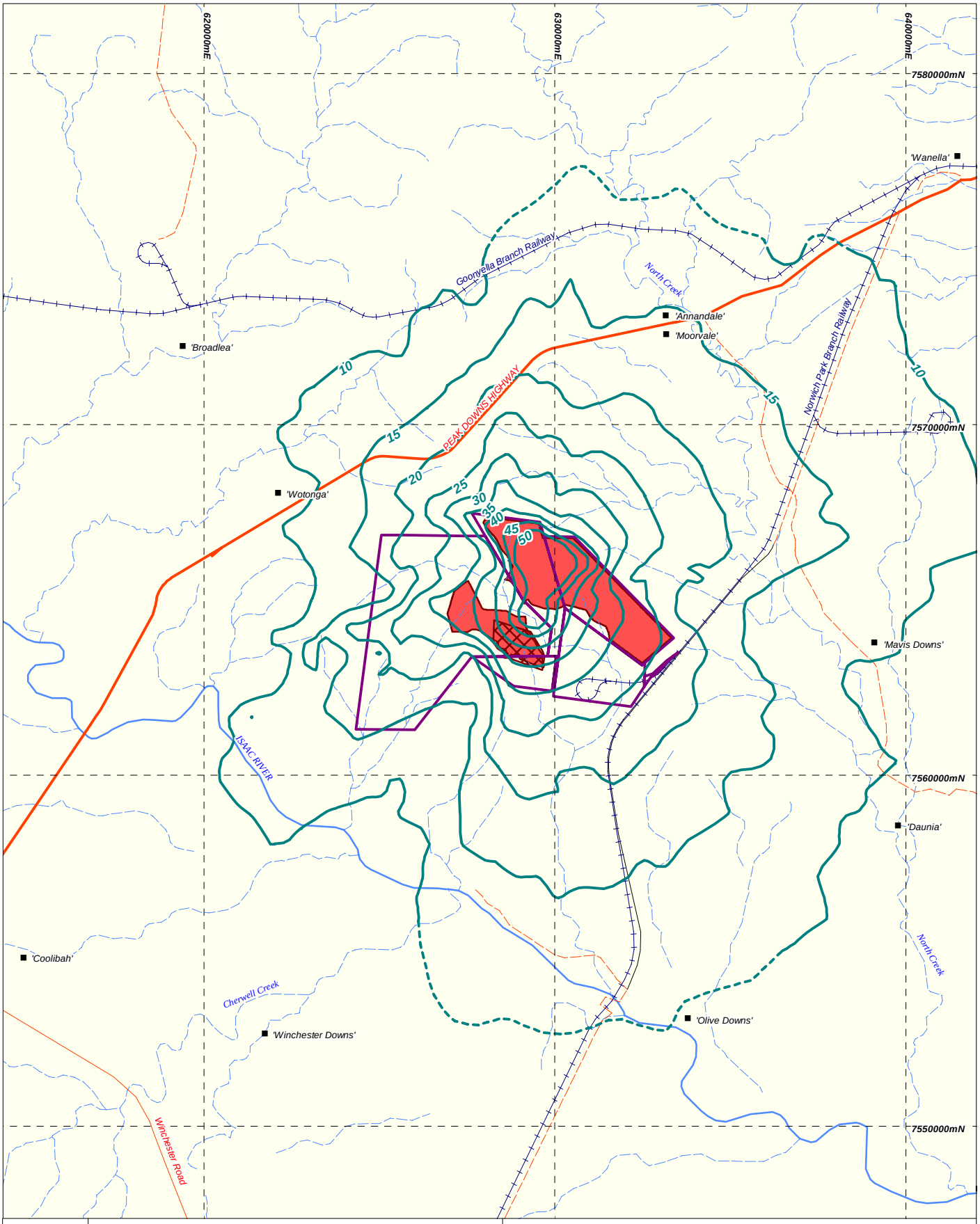


LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd
Millennium Expansion Project

Case 2 Evening Meteorology

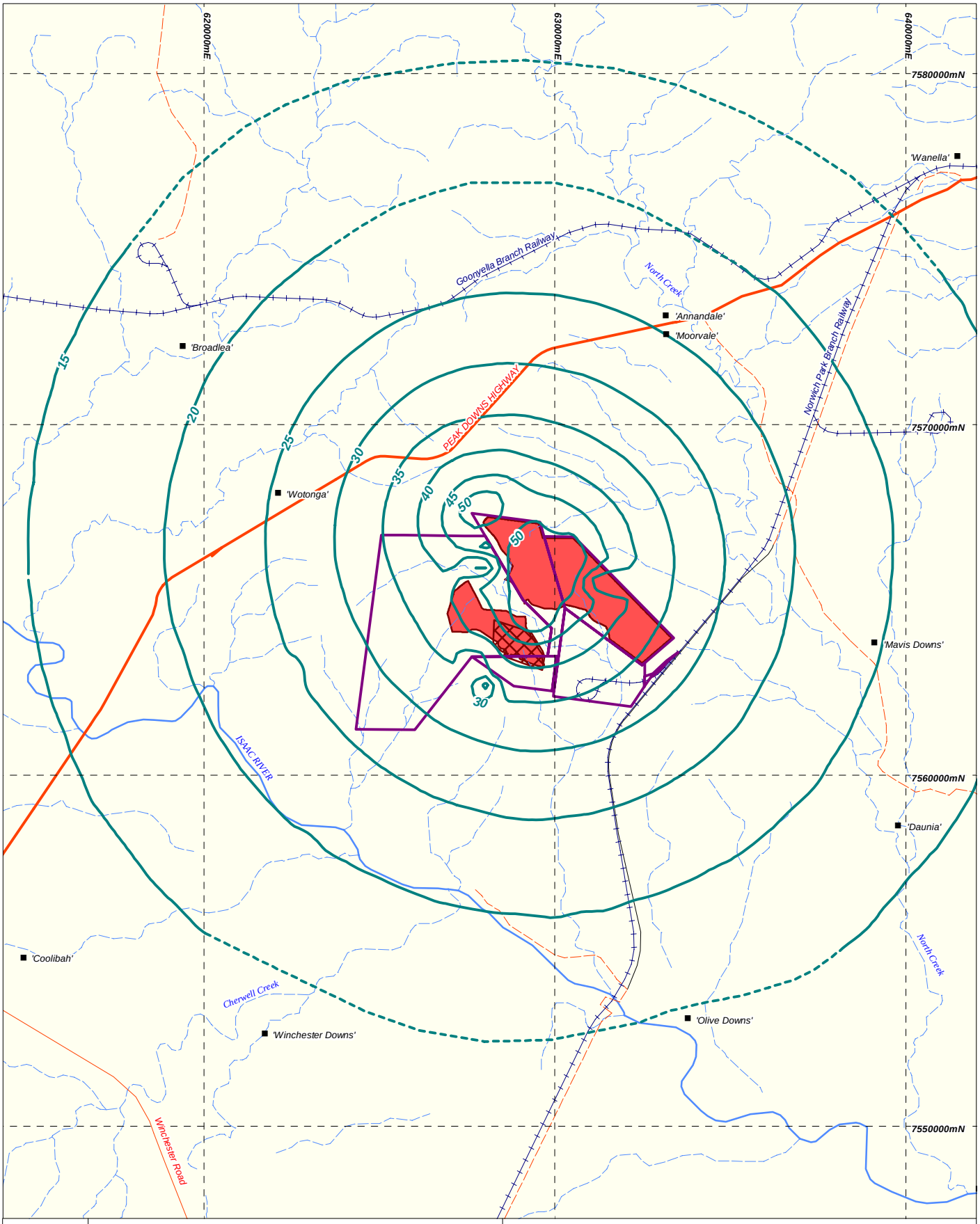
0 3 6
Kilometres
Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-7

S:\Projects\PE001 Millennium Coal EIS_MapInfo\Workspaces\PE001_M249A.wor



LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)
- Estimated continuation contour

MET SERVE

No Window

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Case 2 Night Meteorology

0 3 6

Kilometres

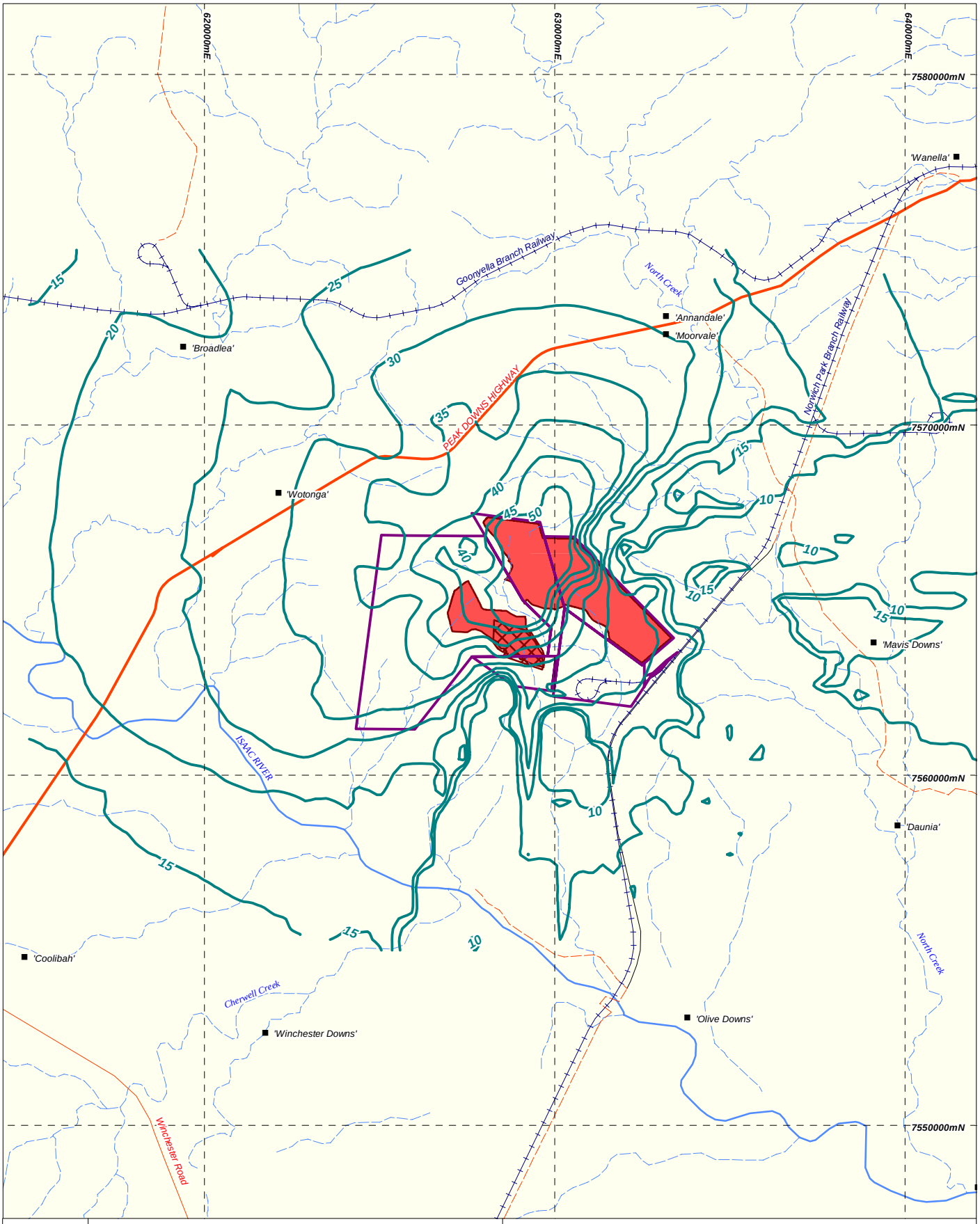
Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-8

S:\Projects\PE001 Millennium Coal EIS_MapInfo\Workspaces\PE001_M250A.wor



LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Case 2 Night with Wind Meteorology

0 3 6

Kilometres

Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-9

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Table 12-7 Night-time Low Frequency Noise Levels for Both Mining Phases

Homestead	Low Frequency Noise Level $L_{Aeq(1\ hour)}$ [dB(Lin)]	
	Out-of-Pit Waste Rock Emplacement	In-Pit Waste Rock Emplacement
Goal	50	50
Winchester Downs	32	30
Wotonga	43	43
Broadlea	41	37
Annandale	42	42
Moorvale	42	42

12.6 POTENTIAL IMPACTS AND MITIGATION MEASURES

12.6.1 Noise Impacts

12.6.1.1 Mining

The effect of the south-easterly wind can be seen in the contours of the figures, as the noise contours do not extend far in the south-east direction compared to the north-west, meaning receptors in the north-west have the highest potential of noise impacts from the MEP. The night case, essentially an inversion case, has contours extending a similar amount in all directions.

The modelled noise levels from the MEP readily comply with the acoustic quality objectives during the day, evening and night at all noise sensitive receptors. This indicates that the health and well-being of all residents living near the MEP are unlikely to be adversely affected. Modelled noise levels from the MEP are predicted to maintain a suitable acoustic environment for individuals to sleep, study or learn, be involved in recreation, including relaxation and conversation and preserve the qualities of the acoustic environment that are conducive to protecting the amenity of the community. There will be negligible noise impacts on terrestrial animals and avifauna, including migratory species.

Furthermore, the predicted noise levels are below the background creep noise goal. It is therefore expected that the predicted noise levels from the MEP will not intrude into the receiving environment.

The low frequency noise level predictions at the residences readily comply with the low frequency noise level limit.

12.6.1.2 Railway

Based on the increase in railway traffic identified in **Chapter 8-Transport**, the noise from the rail spur is expected to increase by 0.2 dB(A), and on the rail loop to increase by less than 1.0 dB(A). Both of these are well below the goal of a maximum 3 dB(A) increase. It should also be noted that on the main railway line, to the east of Coppabella, the increase in noise is likely to be less than 0.2 dB(A) and will be virtually undetectable.

As there are no noise sensitive receptors close to either the railway spur or rail loop, the minor increase in railway noise is unlikely to have any impact to the surrounding area.

12.6.1.3 Road

Based on the increase in road traffic identified in **Chapter 8 - Transport,** there will be less than 2% increase in traffic on the Peak Downs Highway. Given that no new types of transport equipment or machinery will be utilised for the MEP, this will result in an increase in road traffic noise of much less than 1 dB(A), being almost imperceptible.

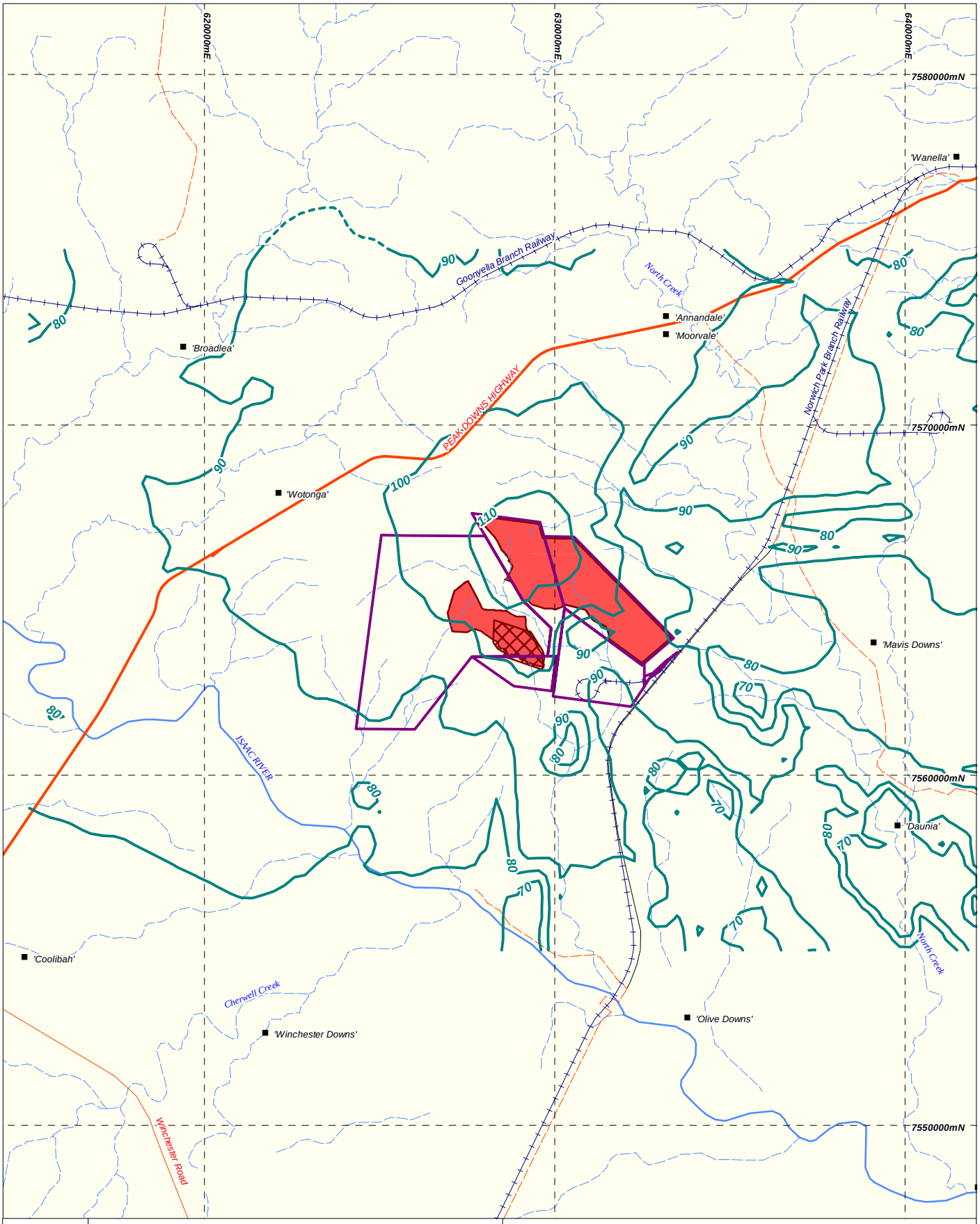
Noise from road traffic is not expected to adversely impact any noise sensitive receptor.

12.6.2 Blasting impacts

The blasting contours for a Maximum Instantaneous Charge (MIC) of 500 kg are shown in **Figure 12-10** and **Figure 12-11,** for blast over pressure and vibrations respectively. For a MIC of 500 kg, the blast overpressure is calculated to be 90 dB(A) Lin peak at Moorvale and Annandale Homesteads, well below the goal of a 115 dB(A) Lin peak.

Blasting has been ongoing at the existing Millennium Mine since commencement in 2005, with no concerns or complaints being raised in this time. There is considerable information on the existing blasting procedures that will be transferred to the MEP, to ensure the blasting noise and vibration goals are readily met, without compromising production.

Blasting contour vibration levels are expected to be well below the goal levels at all sensitive receptors for a MIC of 500 kg.



LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Noise concentration contour in dB(A)

MET SERVE

Peabody

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Blast Overpressure Noise Contours

0 3 6

Kilometres

Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-10

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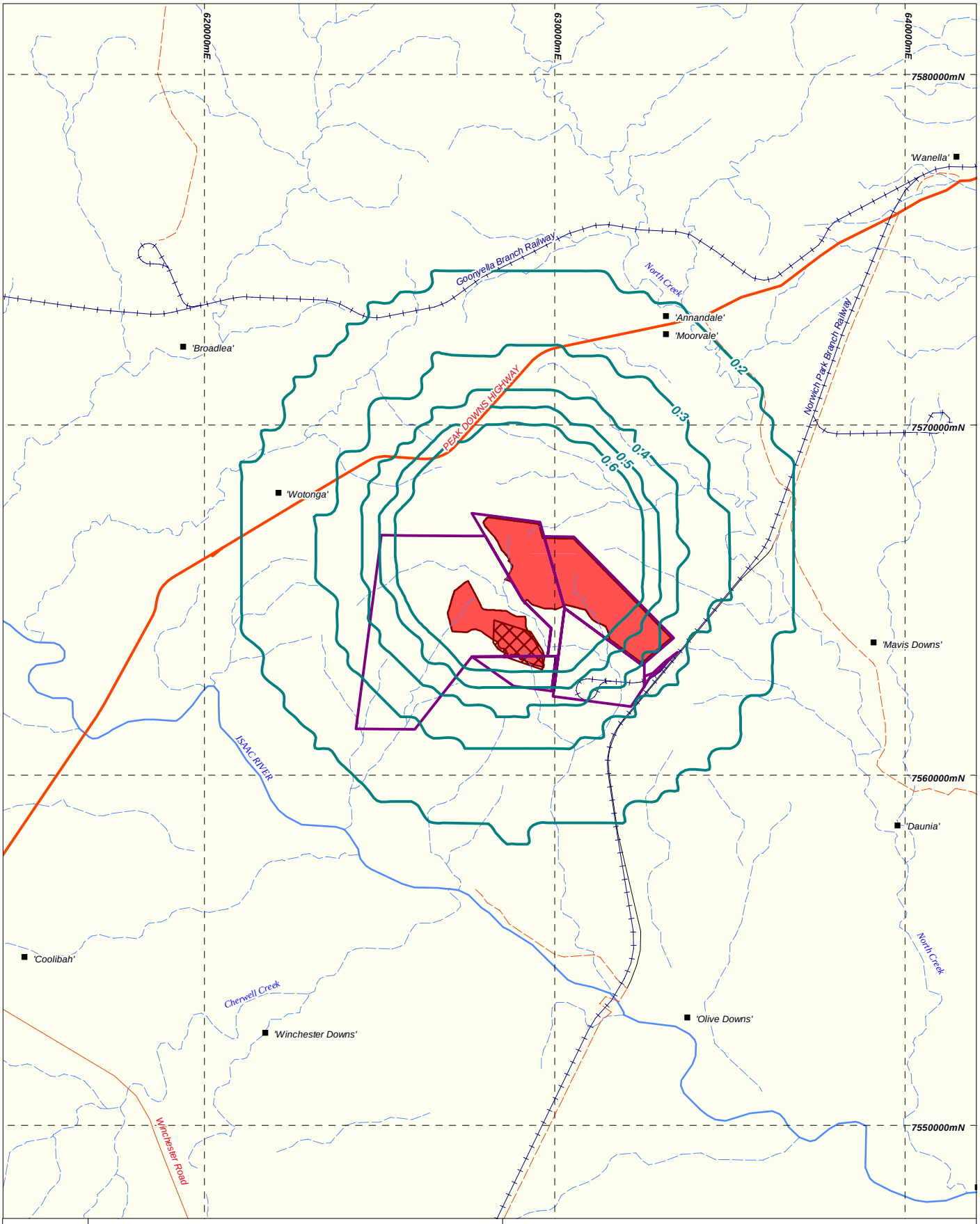

MET SERVE

Peabody

LEGEND

- Principal road
- Road (sealed)
- Road (unsealed)
- Railway
- River
- Watercourse
- Peabody tenement
- Existing Millennium Pit
- Proposed MEP mine
- Vibration contour in mm/s

Data Source:
Infrastructure, Tenement - Minserve. Topography (250k) - Geoscience Australia.
Air Quality - Noise Mapping Australia.

Peabody Energy Australia Pty Ltd

Millennium Expansion Project

Blast Vibration Contours

0 3 6

Kilometres

Scale: 1:150,000 (A4)

18/10/2010

Datum: GDA94
Projection: MGA55

FIGURE 12-11

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12.6.3 Cumulative Impacts

The localised cumulative noise impacts were considered through monitoring the existing noise conditions for the operating Millennium, Carborough Downs and Poitrel Mines, and then modelling the potential increase to overall noise from the MEP.

Based on the modelling undertaken, cumulative noise levels at neighbouring properties are expected to be within day time and night time criteria.

Queensland Rail, as operator of the Goonyella System, is responsible for the management of rail-related noise and has developed a *Code of Practice for Railway Noise Management* (Queensland Rail, 2007) to guide operations, complaint resolution, monitoring, and land use planning.

Noise generated at the Hay Point and Dalrymple Bay Coal Terminals is managed through the Port of Hay Point Environmental Management Plan (Queensland Ports Corporation, 2002), which includes operational controls and extensive environmental monitoring.

12.6.4 Mitigation Measures

Mitigation of blast vibration at nearby sensitive receptors is achieved by utilising the minimum amount of explosive required for each blast, calculated and undertaken by qualified personnel. In additional, blasts are only undertaken during the hours of 10am–5pm, which is recognised as the least sensitive time for nearby homesteads.

No specific noise mitigation measures are proposed for the MEP, however the site will maintain a complaints register. Any legitimate noise or vibration complaint will be investigated and have appropriate mitigation measures instigated, as required. This has also been the case with the existing Millennium Mine, and no complaints regarding noise have been received during current operations.

The eNHealth Council report '*The health effects of environmental noise – other than hearing loss.*' (2004) provides a review of the health effects, other than hearing loss, of environmental noise and reviews measures aimed at the management of environmental noise. The issues contained in the eNHealth (2004) document are addressed in the *EPP Noise*. The eNHealth (2004) document addresses annoyance and quality of life, sleep disturbance, performance and learning with school children, cardio vascular disease, mental health and neuro-physiological stress.

The goals adopted in this report are based on the *EPP Noise* and comply with all aspects of the eNHealth (2004) document. The assessment of future noise levels from the MEP has addressed health and wellbeing, sleep disturbance, low frequency noise and nuisance in accordance with the *EPP Noise* and by inference the enHealth (2004) guidelines.

12.7 REFERENCES

enHealth Council 2004, The health effects of environmental noise – other than hearing loss, Department of Health and Ageing, Commonwealth Government, Canberra.

Noise Mapping Australia 2010, Millennium Mine Expansion Noise and Vibration Assessment.

Queensland Ports Corporation 2002, Port of Hay Point Environment Management Plan.

Queensland Rail 2007, Code of Practice – Railway Noise Management.