Appendix G
Noise impact assessment

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Hunter Valley Operations Continuation Project

Amendment Noise Impact Assessment

Prepared for HV Operations Pty Ltd

July 2025

Hunter Valley Operations Continuation Project

Amendment Noise Impact Assessment

HV Operations Pty Ltd

H190408 RP18

July 2025

Version	Date	Prepared by	Reviewed by	Comments
1	26/05/2025	Robert Kirwan	Ryan Bruniges	Draft
2	31/07/2025	Robert Kirwan	James Wearne	Final

Approved by

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31 July 2025

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1 Introduction

1.1 Background

Hunter Valley Operations (HVO) is a well-established multi-pit open cut coal mining complex, comprising two mine sites separated by the Hunter River, HVO North and HVO South. HVO is approximately 24 kilometres (km) north-west of Singleton in the Hunter Valley of New South Wales (NSW) (refer to Figure 1.1). While the two mine sites are approved under separate development consents issued under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), they operate as one complex with fully integrated environmental management systems.

HVO North operates under Development Consent DA 450-10-2003 issued by the then NSW Minister for Infrastructure and Planning in 2004, which allows extraction of up to 22 million tonnes per annum (Mtpa) of run of-mine (ROM) coal until 31 December 2026. HVO North comprises the approved mining areas of West Pit, Mitchell Pit, Carrington Pit and North Pit, as well as the Hunter Valley (HV) and Howick Coal Preparation Plants (CPP) and the Howick and HVO North mine infrastructure areas (MIA). The Newdell Load Point (LP) and Hunter Valley (HVLP) train loading facilities are also at HVO North.

HVO South operates under Project Approval (PA) 06_0261 issued by the then NSW Minister for Planning in 2009 and comprises the approved mining areas of Riverview Pit, Cheshunt Pit, Riverview South East Extension and South Lemington Pits 1 and 2, as well as the MIA, and the Lemington CPP (LCPP) and rail loop (approved but not constructed). PA 06_0261 allows extraction of up to 20 Mtpa of ROM coal until 24 March 2030.

The key components and approved disturbance areas associated with the HVO Complex are illustrated in Figure 1.2.

Significant coal resources remain across the HVO Complex beyond what is currently approved for extraction under the existing development consents. HVO is therefore seeking approval for the HVO Continuation Project (the Project) from the NSW Minister for Planning and Public Spaces, or delegate, under the provisions of Part 4 of EP&A Act. The Project broadly comprises the continuation of mining at HVO North and HVO South, beyond the current approved mining completion dates of 2026 and 2030 respectively. The Project will seek to maintain separate development consents for HVO North and South, as is currently the case.

Given that the two mine sites operate as one complex, one environmental impact statement (EIS, EMM 2022a) was prepared to support the two State Significant Development (SSD) applications for the Project, being:

- SSD-11826681 – HVO North Open Cut Coal Continuation Project
- SSD-11826621 – HVO South Open Cut Coal Continuation Project.

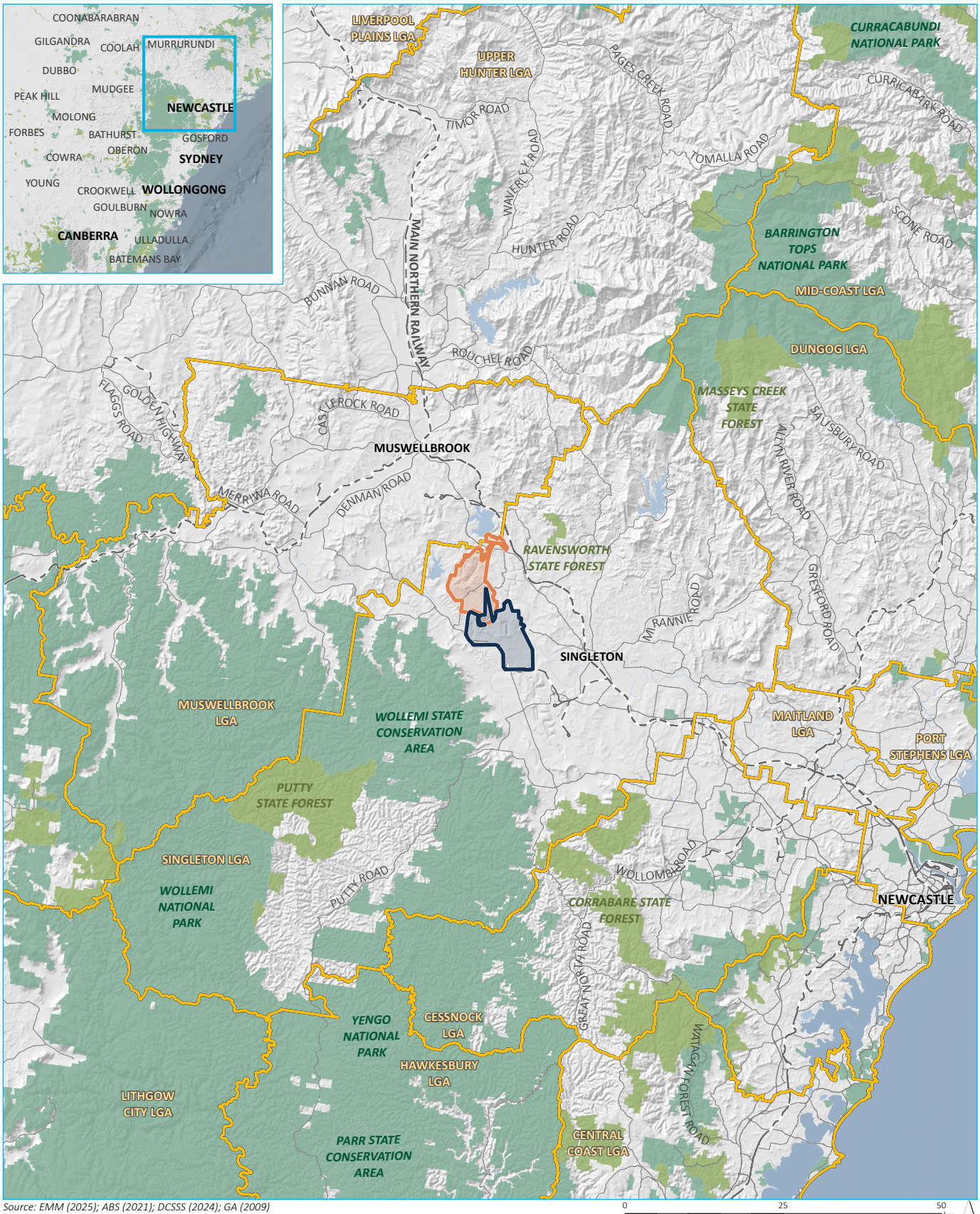
The EIS was subsequently placed on public exhibition from Monday 30 January 2023 through to Monday 27 February 2023. During the public exhibition of the EIS, a total of 1,060 submissions were received by the NSW Department of Planning, Housing and Infrastructure (DPHI) from individuals, organisations, public authorities, councils, and government agencies for the two development applications.

To respond to matters raised in submissions on the Project during the public exhibition period, a Submissions Report (EMM 2023a) was prepared, along with an Amendment Report (EMM 2023b) outlining proposed amendments to the HVO North Project.

During the subsequent assessment of the Project by the NSW Department of Planning, Housing and Infrastructure (DPHI), a number of requests for information (RFI) were issued to HVO, who provided responses as required. In response to an RFI received 5 July 2024, HVO completed a detailed review of the Project and is subsequently seeking to amend the SSD applications in the following ways:

- Reduce the project mine plan to avoid coal extraction within gas Domain 1 at HVO North and reduce the total ROM coal to be extracted by the amended Project by approximately 220 Mt.

- Maintain the current approved maximum annual ROM coal production from HVO North of 22 Mtpa but reduce the proposed maximum annual production limit at HVO South from 18 Mtpa to 13 Mtpa.
- Propose a maximum annual production limit for the HVO Complex of 26 Mtpa ROM, compared to the current approved maximum annual production of 42 Mtpa.
- Reduce the proposed life of mining operations at HVO North by five years, from the end of 2050 to the end of 2045.
- Reduce the proposed life of mining operations at HVO South by three years from the end of 2045 to the end of 2042.
- Expand the HVO North ROM coal stockpile to improve coal management.
- Remove approval for the construction and operation of the Lemington Coal Preparation Plant (LCPP) and associated rail facilities, which is currently approved, but not constructed, under the HVO South Project Approval.
- Temporary transport of product coal by truck from the Howick Coal Preparation Plant (CPP) to the Liddell stockpile for transport to market via the Liddell coal handling and train loading facilities during upgrades of the Newdell Load Point (LP).
- Establishment of a levee (Mitchell East Levee) to provide flood protection for the final void in Mitchell Pit.



Source: EMM (2025); ABS (2021); DCSSS (2024); GA (2009)

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KEY

- Existing HVO North development consent boundary (DA 450-10-2003)
- Existing HVO South project approval boundary (PA 06_0261)

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Local government area

INSET KEY

- NPWS reserve
- State forest

Regional locality

HVO Continuation Project - Amendment
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Figure 1.1

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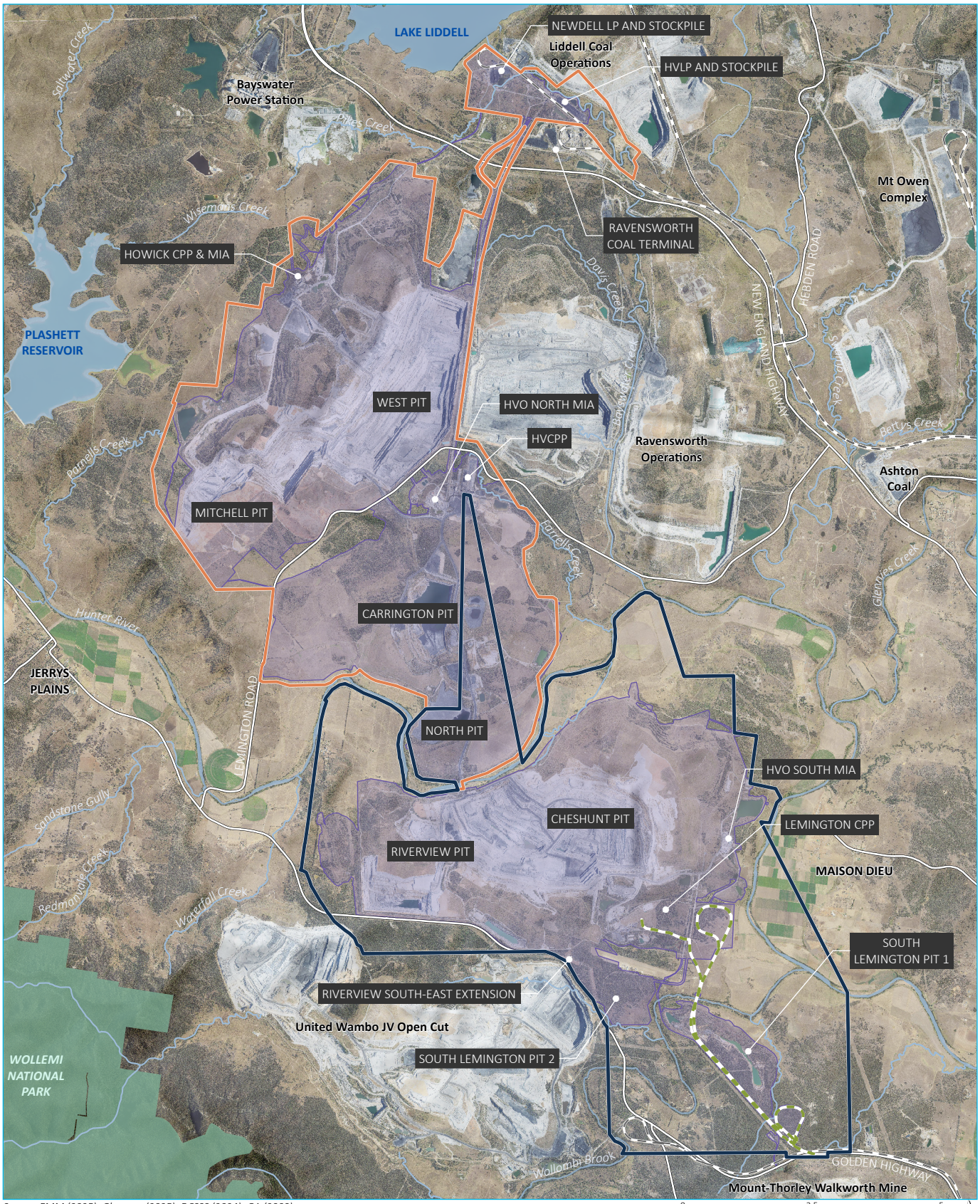

Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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KEY

- Existing HVO North development consent boundary (DA 450-10-2003)
- Existing HVO South project approval boundary (PA 06_0261)
- Existing and approved disturbance area
- South Lemington Rail Loop and haul route (approved, not yet constructed)

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Existing and approved operations

HVO Continuation Project - Amendment
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Figure 1.2

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1.2 The Amended Project

As noted in Section 1.1, the Project broadly comprises the continuation of mining at HVO North and HVO South, beyond the current approved mining completion dates of 2026 and 2030, respectively. The key components of the proposed amended HVO North Continuation Project and HVO South Continuation Project for which approval is now sought are illustrated on Figure 1.3 and summarised in the sections below.

1.2.1 HVO North

The key Project elements at HVO North for which approval is sought include those activities required to carry out open cut coal mining and processing and include:

- changes to the HVO North development consent boundary, as illustrated in Figure 1.3
- continuation of mining operations at HVO North from 1 January 2027 until 31 December 2045
- production of up to 22 Mtpa with no separation of extraction limits between West Pit and Carrington Pit
- infrastructure upgrades, as listed below:
    - realignment of Lemington Road and construction of a new bridge over the Hunter River
    - relocation of the HVO North site access road off the existing Lemington Road
    - increase in the capacity of Parnells Dam from approximately 1 gigalitre (GL) to approximately 4 GL
    - realignment of transmission and telecommunication lines that are currently within the proposed mining area
    - upgrades to the HVO North MIA
    - expansion of the HVO North ROM coal stockpile to improve coal management
    - maintenance and ancillary activities as required to facilitate operations, including the replacement of plant and equipment, where required
    - construction of access roads to facilitate service provider access
    - use of demountable/temporary buildings and other ancillary temporary facilities to enable construction activities and mining operations, as required
    - access road establishment to an existing mine-owned property east of realigned Lemington Road
- transport product coal by truck or overland conveyor from all CPPs to loading points (HVLP and Newdell LP).
- receipt of ROM coal from HVO South via internal haul roads for processing at all CPP facilities approved for HVO North
- management of tailings in accordance with a Tailings Management Strategy

- upgrade of product coal infrastructure as follows:
    - establishment of a new Newdell product stockpile and upgrade of the existing Newdell train loading facility or an extension of the product coal stockpile footprint at the HVLP to increase the total stockpile capacity of the load point
    - construction of a haul road to enable ROM coal to be transported to the neighbouring Ravensworth Operations ROM pad via haul truck for processing, from where product coal is then transferred to the Ravensworth Coal Terminal for transport to market
    - ability to temporarily transport product coal by truck from the Howick CPP to the Liddell stockpile for transport to market via the Liddell coal handling and train loading facilities during upgrades of the Newdell LP
- implementation of a revised water management system including construction of levees, clean water diversions and the Carrington West Wing low permeability barrier wall
- establishment of a levee (Mitchell East Levee) to provide flood protection for the final void in Mitchell Pit
- continued employment of up to 1,500 full time equivalents (FTE) across the HVO complex.

Other than as modified above, all activities that are currently approved under the existing HVO North development consent are intended to continue. Key aspects and outcomes of the approved development at HVO North (under DA 450-10-2003 as modified) that will remain the same under the Project include:

- the maximum allowable annual ROM coal extraction and processing rate of 22 Mtpa
- receipt of ROM coal from HVO South via internal haul road for processing at all CPP facilities approved for HVO North
- approved heights of overburden emplacement areas
- continued avoidance of the Aboriginal heritage site known as CM-CD1
- operating hours, annual workforce numbers and associated operational traffic generation.

1.2.2 HVO South

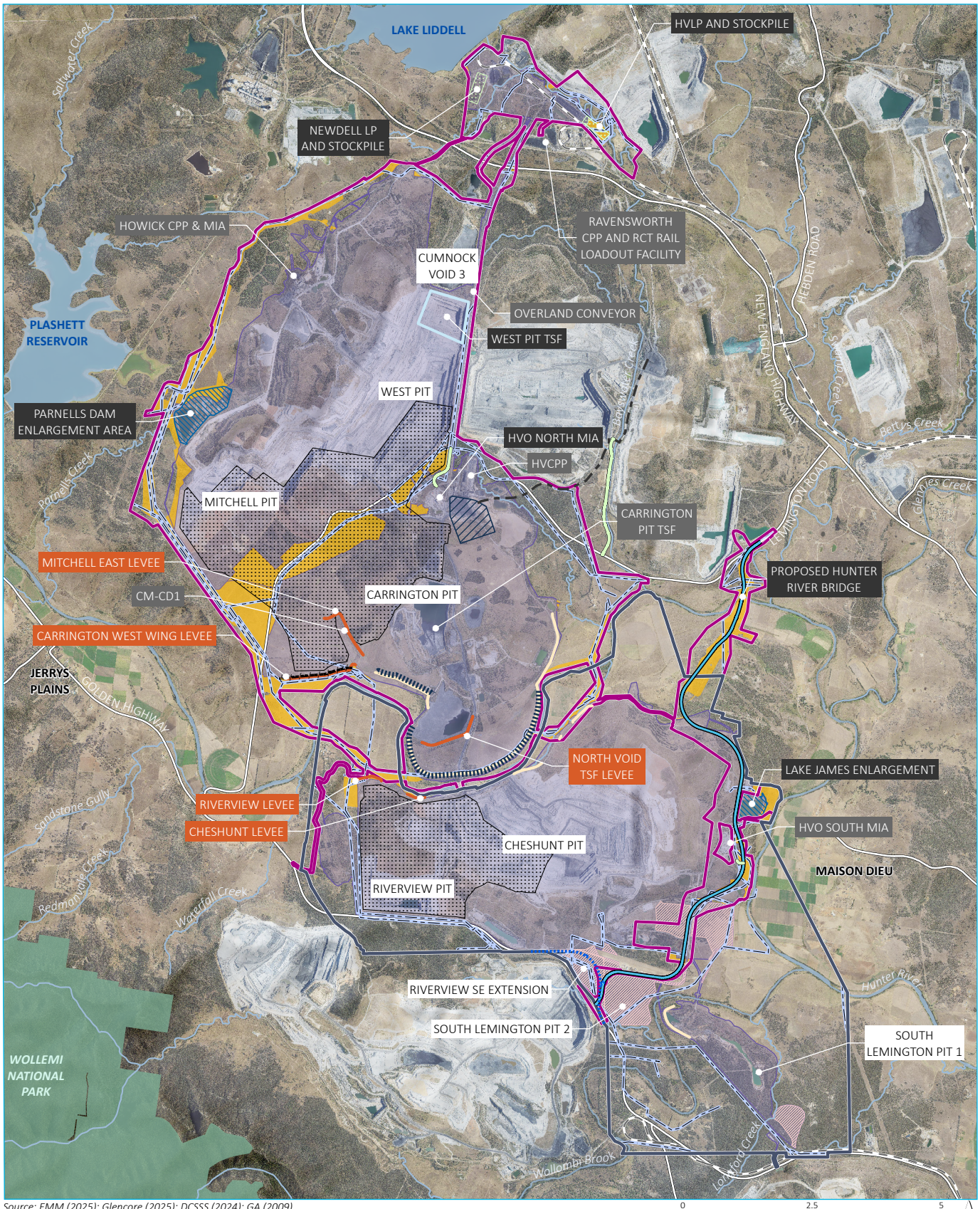
The key Project elements at HVO South for which approval is sought include those activities required to carry out open cut coal mining and processing and include:

- changes to the HVO South development consent boundary, as illustrated in Figure 1.3
- continuation of mining operations at HVO South from 24 March 2030 until 31 December 2042
- a reduction in the approved maximum extraction rate from 20 Mtpa to 13 Mtpa
- removal of coal extraction from the mine plan for the Riverview South East Extension (RSEE), and South Lemington Pit 1 and 2 (SLP 1 and 2)
- infrastructure upgrades including:
    - relocation of some 11 kV and 66 kV Ausgrid transmission lines

  - realignment of internal transmission lines to support mining activities
  - HVO South access road relocation to join the realigned Lemington Road
  - access roads to facilitate service provider access
  - use of demountable/temporary buildings and other ancillary temporary facilities including laydown areas to enable construction activities and mining operations, as required
  - removal of the approval for the construction and operation of the LCPP and associated rail facilities
  - removal of the construction and operation of the approved conveyor from HVO South to the HVCPP at HVO North (the conveyor has not been constructed)
- continuation of integrated water management with HVO North and water transfers with other mining operations (where permitted under the development consents that apply to those other mining operations)
- construction of the Cheshunt and Riverview flood protection levees
- enlargement of Lake James from approximately 0.7 GL to 1.9 GL
- continued employment of up to 1,500 FTE across the HVO complex.

Other than as modified above, all activities that are currently approved under the existing HVO South development consent are intended to continue. Key aspects of the currently approved development at HVO South (under PA 06_0261 as modified) that will remain the same for the Project include:

- no change to the receipt of HVO South coal at all HVO North CPPs via internal haul road for processing
- no change to operating hours
- no change in annual workforce numbers or associated operational traffic generation
- no increase to approved heights of overburden emplacement areas.



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Existing and approved disturbance area
- Additional disturbance area
- Previous approved area not retained
- Existing low permeability barrier wall
- Existing levee

Proposed HVO continuation project element

- Approved barrier wall (not yet constructed)
- Alternative Golden Highway alignment
- Lemington Road realignment
- Levee
- Mine access road
- Proposed haul route to Ravensworth Operations
- Transmission line
- Dam enlargement
- Mining area
- Product stockpile
- ROM coal stockpile enlargement area
- West Pit TSF

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Label format

- Existing item
- Levee
- Project related item

HVO Complex conceptual layout

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Figure 1.3

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1.3 Assessment terminology and abbreviations

Some definitions of acoustic terminology which may be used in this document are as follows:

- **L_A** – the A-weighted root mean squared (RMS) noise level at any instant.
- **L_{A1}** – the noise level which is exceeded for 1 per cent (%) of the time.
- **$L_{A1,1minute}$** – corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms, this represents the maximum measured level, and is often used to assess sleep disturbance.
- **L_{A10}** – the noise level which is exceeded for 10% of the time, which is approximately the average of the maximum noise levels.
- **L_{A90}** – the level exceeded for 90% of the time, which is approximately the average of the minimum noise levels. The LA90 level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
- **L_{Aeq}** – the average noise energy during a measurement period.
- **dB(A)** – noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
- **dB(C)** – noise level measurement units are decibels (dB). The "C" weighting scale is used as a measure of human response to high noise levels. It includes more of the low frequency range of sounds. It is often used to assess low frequency noise impact;
- **sound power level (L_W denotes linear, L_{WA} denotes A-weighted)** – 10 times the logarithm of energy radiated from a source (as noise) divided by a reference power, the reference power being 1 picowatt.
- **sound pressure level (Lp)** – fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals.
- **Hertz (Hz)** – cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together.
- **Assessment Background Level (ABL)** – the [1]0th percentile background noise level for a single period (day, evening or night) of a 24-hour monitoring period.
- **Rating Background Level (RBL)** – the background noise level for a period (day, evening or night) determined from ABL data.
- **Project Noise Trigger Level (PNTL)** - ; these are the benchmark levels above which noise management measures are required to be considered per the NSW Noise Policy for Industry.
- **Achievable Noise Level (ANL)** – the limits determined when PNTL are not met after consideration of all feasible and reasonable mitigation measures.
- **Noise Assessment Group (NAG)** – groups or areas of receptors, where each group is typically assessed against a singular criterion.

1.4 Purpose of the report

1.4.1 Purpose

The purpose of this Noise Impact Assessment (NIA) is to inform the amendment report prepared by EMM to support two separate development applications under Division 4.1 of Part 4 of the EP&A Act for the Project.

1.4.2 Assessment requirements

This NIA has been prepared in accordance with requirements of the then NSW Department of Planning and Environment (DPE) (now DPHI). These were set out in the Secretary's Environmental Assessment Requirements (SEARs) for the Project, issued on 11 March 2021. Table 1.1 lists individual requirements relevant to this NIA and where they are addressed in this NIA.

Table 1.1 Noise related SEARs

Requirements	Section addressed
Noise and Blasting, including: • a detailed assessment of the likely construction, operational and off- site transport noise impacts of the development in accordance with the Interim Construction Noise Guideline, NSW Noise Policy for Industry and the NSW Road Noise Policy respectively, and having regard to the Voluntary Land Acquisition and Mitigation Policy;	Section 4
• cumulative – including a detailed assessment of the cumulative impacts of the development, in combination with other existing and approved mining projects in the locality, with a particular focus on air quality, noise, traffic and social impacts, as well as impacts on water resources.	Section 4.8

To inform the preparation of the SEARs, DPE invited other government agencies to recommend matters to be addressed in the EIS. The NSW Environment Protection Authority (EPA) raised matters relevant to the NIA. The matters raised are listed in Table 1.2 and have been taken into account in preparing this assessment, as indicated in the table. In addition to these requirements, this NIA has also taken into account feedback received from the EPA in matters raised relating to the original development application and associated NIA submitted as part of the EIS (EMM 2022).

Table 1.2 NIA related EPA recommendations

Requirements	Section addressed
• identify the existing noise environment (including any relevant noise assessment groupings) and identify applicable noise goals in line with relevant guidance/standards;	Section 3
• identify potential noise and vibration sources and impacts during both construction and operational stages and identify best practice mitigation measures (pollution control) and strategies to be incorporated for both stages to minimise noise and vibration emissions/impacts (with proposed timing), including validation monitoring, in line with relevant guidance/standards;	Potential sources, impacts and best practice measures in Section 4 Monitoring and management in Section 6
• propose representative noise monitoring locations for determining compliance with applicable noise goals and where relevant noise goals would be set as representative limits	Section 5

Notes: 1. Blasting is not included within the scope of the NIA.

1.4.3 Noise impact assessment objectives

The primary objectives of this amendment NIA are to:

- assess potential noise impacts associated with the Project, including operational noise, construction noise, modifying factor adjustments and sleep disturbance
- determine suitable criteria for each element of potential noise impact in accordance with relevant NSW guidelines and policies. This was completed in the EIS NIA and all determined criteria is unchanged for this amendment NIA
- identify and assess all reasonable and feasible noise mitigation controls and management strategies
- propose any necessary noise monitoring and management strategies.

Not included in this amendment NIA are the following:

- Assessment of road traffic noise. No change from the EIS in annual workforce numbers or associated traffic generation with the Project is proposed. As such, there is no change from the road traffic noise assessment completed for the EIS NIA and therefore there is no further consideration of road traffic noise within this amendment NIA.
- Assessment of rail noise. The Project proposes to continue to transport coal from the site via rail to the Port of Newcastle, to deliver coal to export customers. The amended Project does not propose any changes to the demand on the rail network or the Newcastle Port beyond the original Project as presented in the EIS (EMM 2022a). Coal will be transported in accordance with existing agreements with rail providers and the Newcastle Port. As such, there is no further consideration of this within this amendment NIA.

2 Methodology

This section provides an overview of the methodology used to predict noise emissions from the Project, including how the effect of noise enhancing meteorological conditions are accounted for.

2.1 Overview

While HVO North and HVO South are approved under separate development consents (DA 450-10-2003 and PA 06_0261, respectively), they operate as one complex with fully integrated environmental management systems.

The Project seeks to maintain separate development consents for HVO North and HVO South, as is currently the case, and therefore two separate SSD applications have been submitted, as required under the EP&A Act. HVO North and HVO South have accordingly been assessed as separate entities in this NIA, as required for the separate development applications, as well as presenting the combined impacts of the complex in the cumulative assessment of this NIA in Section 4.8.

In recognition of the fact that the two sites operate as a complex, only one set of noise criteria has been proposed in this NIA, that will apply to the whole complex. This is in recognition of the complexity that would arise (as noted by the EPA in their submission on the Submissions Report prepared for the Project) if separate criteria were to be issued for HVO North and HVO South in terms of demonstrating compliance. The single set of proposed criteria is presented in Section 5. The proposed criteria for the complex are based on operational shutdown requirements that are reasonable for the Project to remain viable. HVO advised that the frequency of operational shutdown requirements required to meet the proposed criteria can be accommodated by HVO North and HVO South.

In relation to the Environment Protection Licence (EPL), this approach is also consistent with existing operations, with one EPL currently applying to the complex. It is proposed that this continues for the Project.

2.2 Policy and guidelines

NSW technical policy and guidelines relevant to the NIA include:

- *Noise Policy for Industry* (NPfI) (EPA 2017)
- *Interim Construction Noise Guideline* (ICNG) (DECCW 2009)
- *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP) (NSW Government 2018).

In accordance with section 2.2 of the NPfI, all model predictions in this NIA are rounded to the nearest integer.

2.3 Regulator consultation and EIS response to submissions

Consultation with the EPA and DPHI was undertaken at times during the EIS assessment process and helped determine whether the assessment methodology and pathway were satisfactory or required further consideration.

In their response on the Submissions Report (Hunter Valley Operations Continuation Project Submissions Report, EMM, November 2023) prepared for the Project, which responded to initial matters raised by the EPA on the EIS NIA and original development application, the EPA accepted:

- the rating background noise levels (RBL) and project noise trigger levels (PNTL) presented are reasonable
- the use of the 'upper 10th percentile' prediction method (described as cumulative distribution or 90th percentile results in this NIA) is reasonably representative of the NPfI noise enhancing meteorological conditions

- the proponent has identified all feasible and reasonable noise mitigation measures for the Project. The assessments outline an extensive and iterative process for consideration and adoption of all feasible and reasonable noise mitigation measures.

This amendment NIA follows the same methodology and pathway as the EIS NIA, with the aforementioned aspects unchanged.

The following have also been considered in this NIA based on EPA's advice on the Submissions Report:

- Construction activities be restricted to ICNG standard hours unless they can be managed to satisfy operational mining noise limits.
- A Construction Noise Management Plan be required to manage construction activities using feasible and reasonable noise mitigation measures.
- Modification to the ANLs and proposed operational noise criteria consistent with the noise conditions proposed by the EPA.

2.4 Operational noise

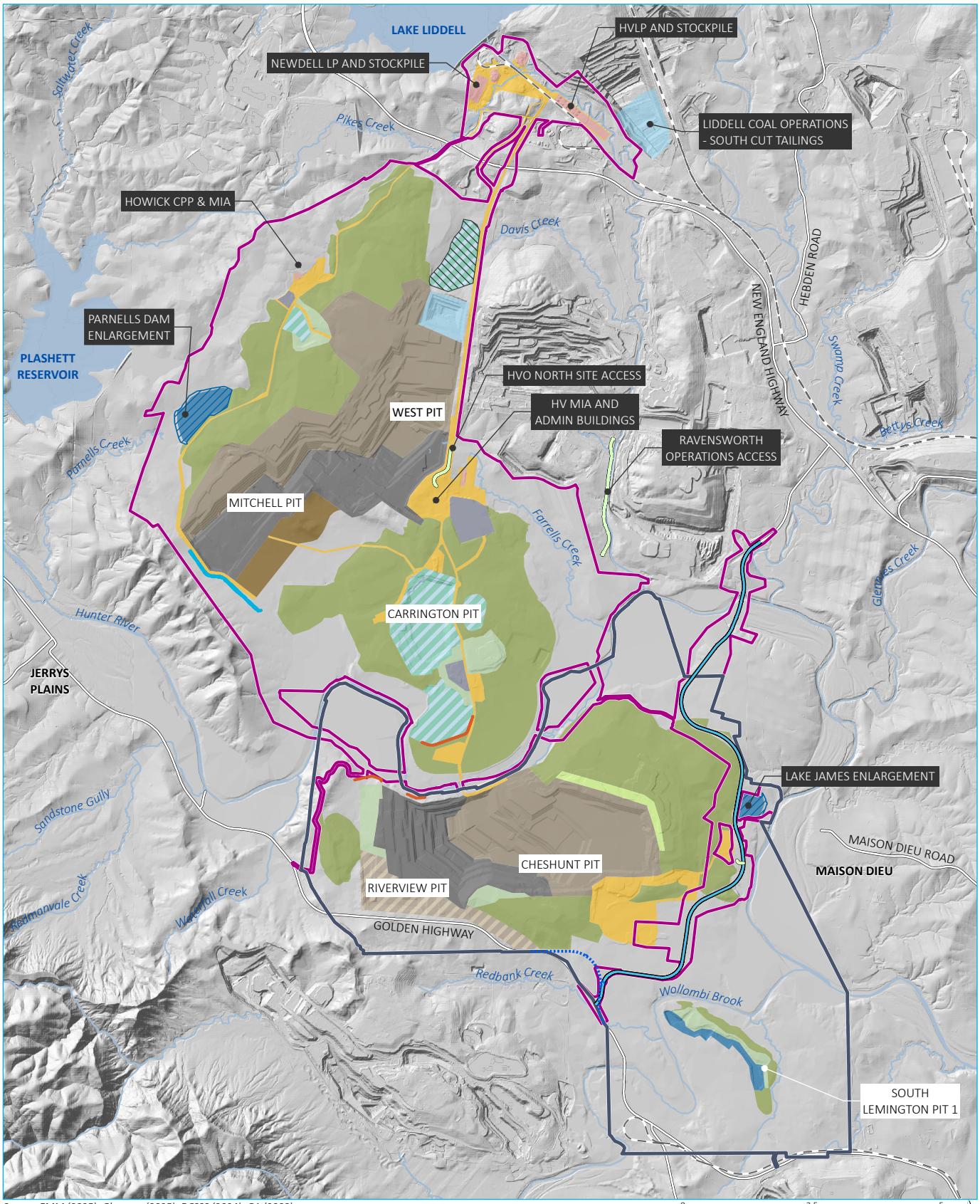
The operational noise assessment in this NIA is generally in accordance with the guidelines outlined in the NPfI. An exception is the cumulative distribution of results methodology, which was employed in lieu of the 'noise enhancing weather conditions' method outlined in the NPfI. The cumulative distribution method allows assessment of impact for a far more comprehensive set of meteorological conditions as discussed in Section 4.1, and as noted above has been accepted by the EPA as an appropriate methodology.

Five indicative operational scenarios were modelled representing stages in progression of mining operations over the proposed life of mine, with emphasis on targeting the highest noise impact, including periods when operations will be closest to identified private residential receptors and maximum extraction periods.

Each stage modelled is a representative typical worst case operating configuration for that period of operations. The stages nominally relate to Year 3, Year 6, Year 8, Year 12 and Year 15 of the amended project. Year 3 is anticipated to be approximately 2029, subject to date of approval. Operational intrusive, cumulative, and potential sleep disturbance impact associated with each of these stages is assessed including modifying factor adjustments, if applicable. Further detail regarding the operating scenarios is provided in Section 4.2.2

An assessment area was defined that encompasses all known private residential receptors that may be noise impacted by the Project.

Figure 2.1 to Figure 2.5 present conceptual mine plans for each of the five stages assessed.



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Alternative Golden Highway alignment
- Lemington Road realignment
- Mine access road

Water infrastructure

- Clean water drain
- Levee
- Cumnock Void 3 (managed by Ravensworth Operations)
- Dam enlargement

Year 3 indicative mine plan

- Active emplacement area
- Inactive emplacement area
- Active mining area
- Active tailings emplacement area
- Inactive tailings emplacement/capping in progress
- Infrastructure/access
- Preparation area
- Product coal stockpile
- ROM coal stockpile
- Rehabilitation
- Shaping for final landform
- Temporary stabilisation
- Water storage

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

Conceptual mine plan- year 3

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Figure 2.1

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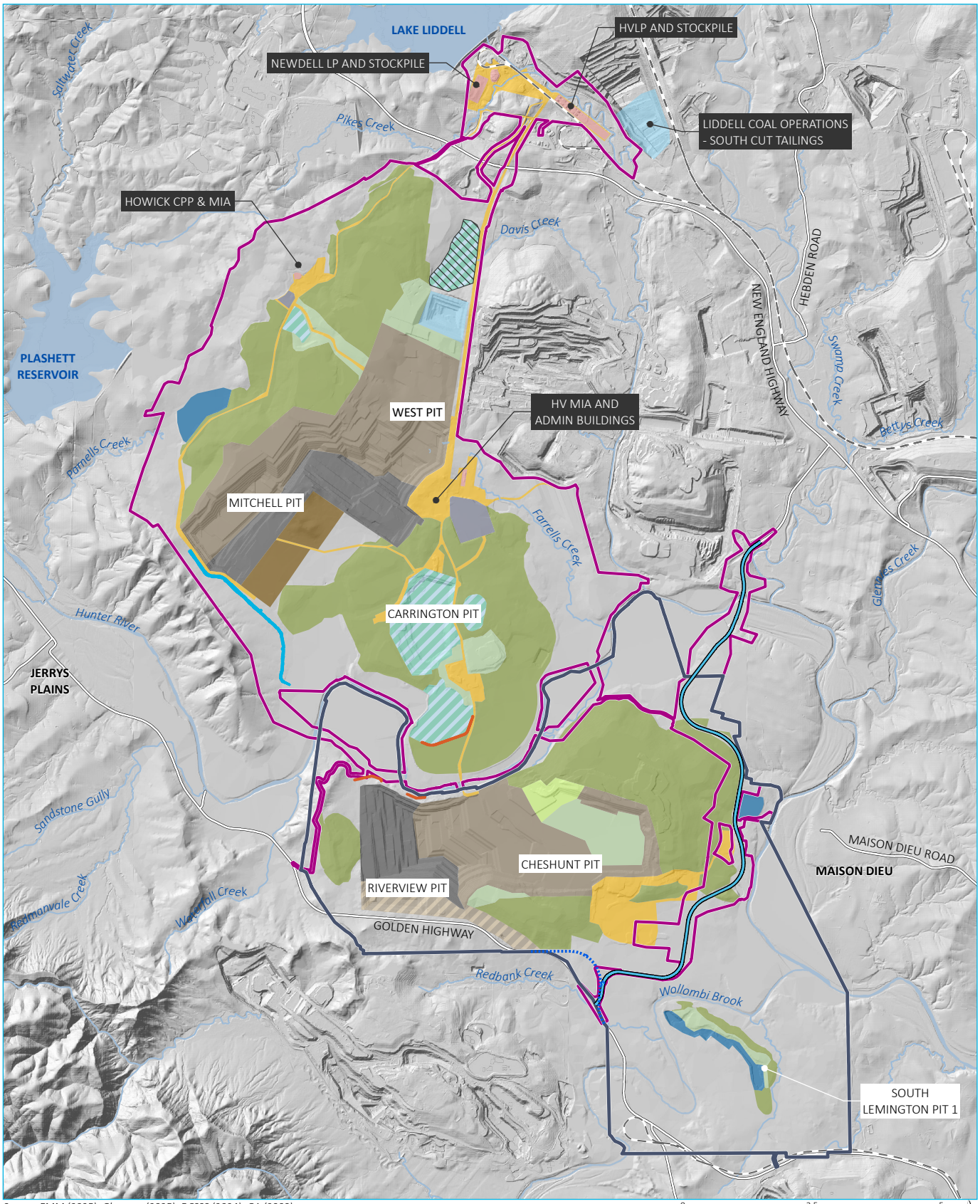

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Alternative Golden Highway alignment
- Lemington Road realignment

Water infrastructure

- Clean water drain
- Levee
- Cumnock Void 3 (managed by Ravensworth Operations)

Year 6 indicative mine plan

- Active emplacement area
- Inactive emplacement area
- Active mining area
- Active tailings emplacement area
- Inactive tailings emplacement/capping in progress
- Infrastructure/access
- Preparation area
- Product coal stockpile
- ROM coal stockpile
- Rehabilitation
- Shaping for final landform
- Temporary stabilisation
- Water storage

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

Conceptual mine plan- year 6

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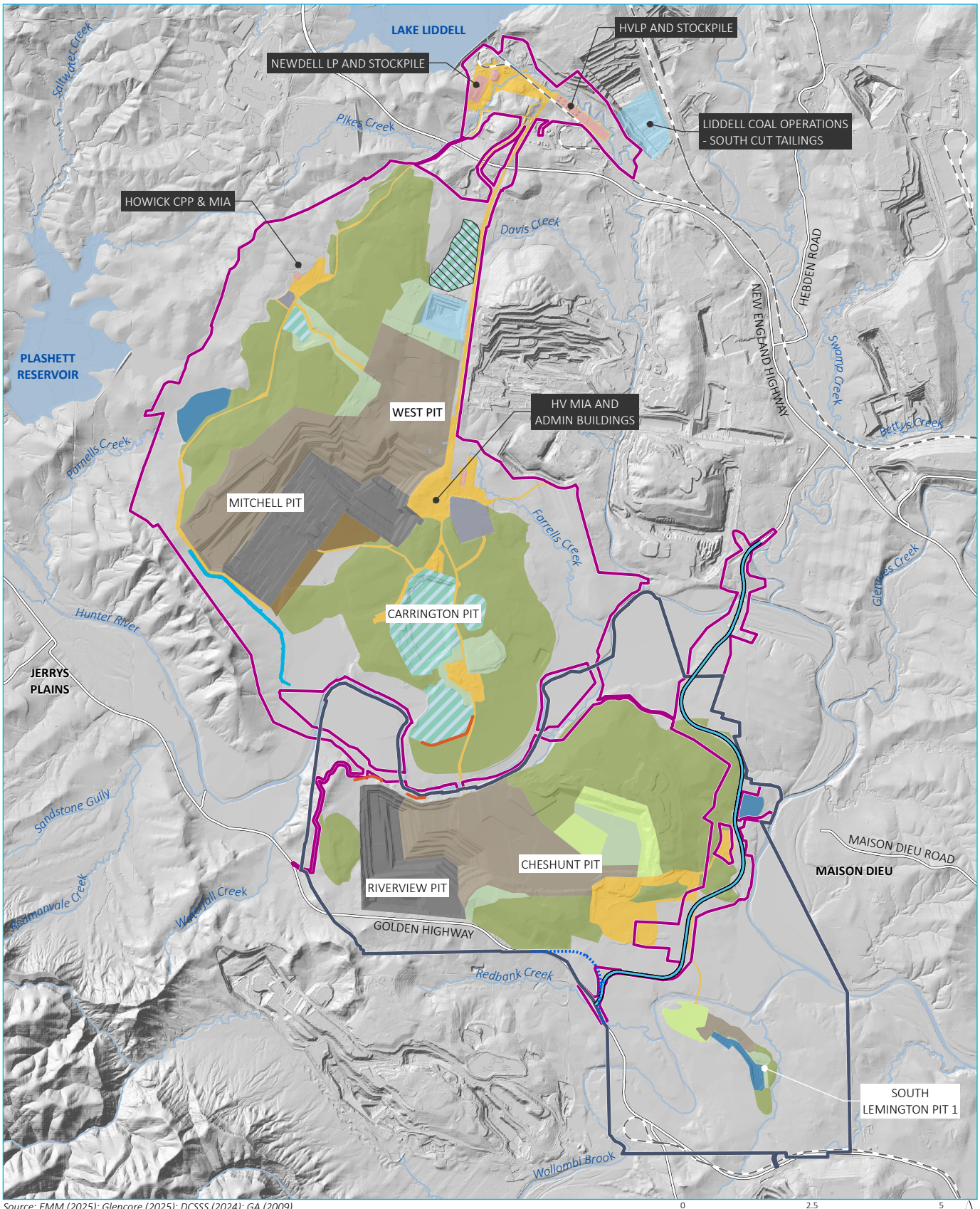

Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Alternative Golden Highway alignment
- Lemington Road realignment

Water infrastructure

- Clean water drain
- Levee
- Cumnock Void 3 (managed by Ravensworth Operations)

Year 8 indicative mine plan

- Active emplacement area
- Active mining area
- Active tailings emplacement area
- Inactive tailings emplacement/capping in progress
- Infrastructure/access
- Preparation area
- Product coal stockpile
- ROM coal stockpile
- Rehabilitation
- Shaping for final landform
- Temporary stabilisation
- Water storage

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

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Conceptual mine plan- year 8

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Figure 2.3

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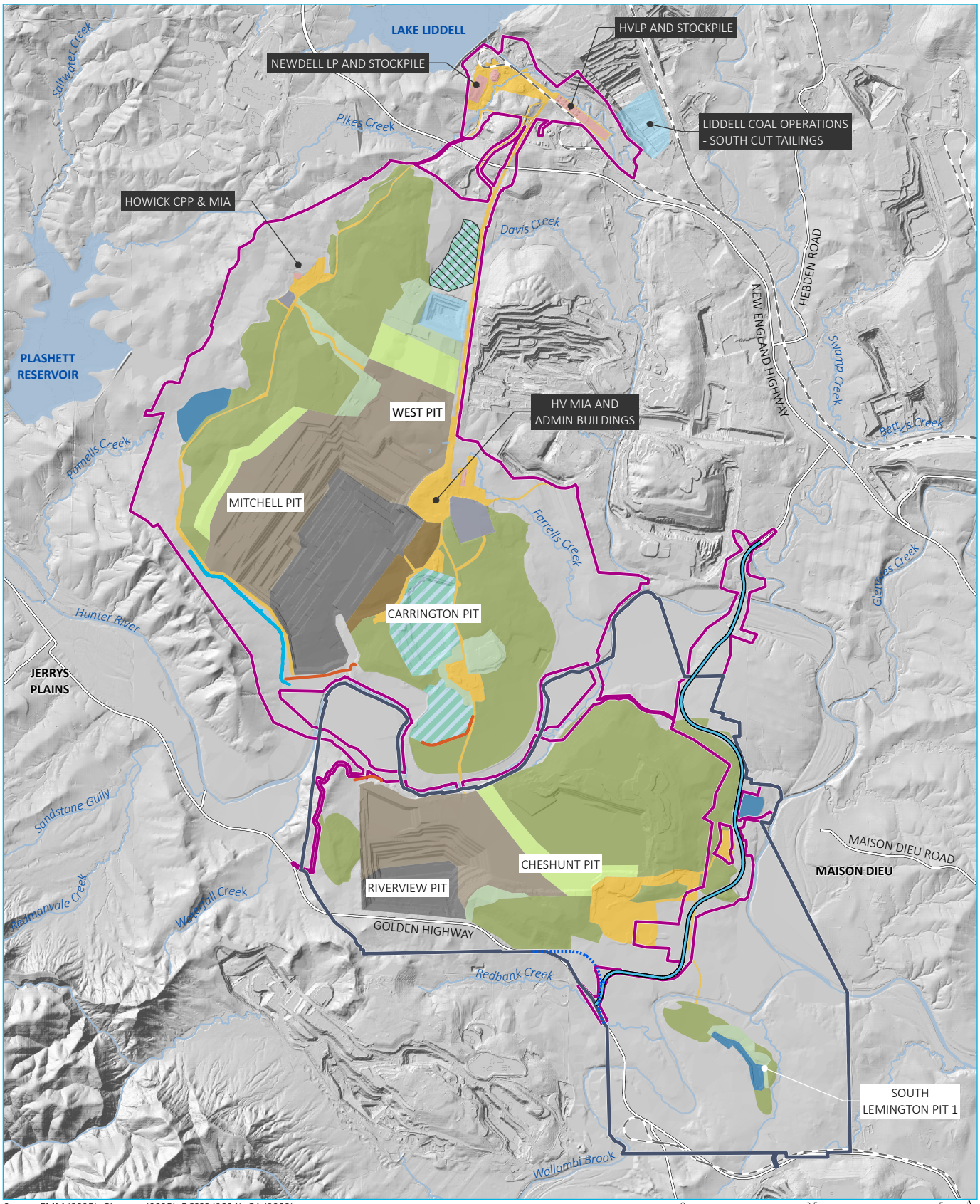

Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Alternative Golden Highway alignment
- Lemington Road realignment

Water infrastructure

- Clean water drain
- Levee
- Cumnock Void 3 (managed by Ravensworth Operations)

Year 12 indicative mine plan

- Active emplacement area
- Active mining area
- Active tailings emplacement area
- Inactive tailings emplacement/capping in progress
- Infrastructure/access
- Preparation area
- Product coal stockpile
- ROM coal stockpile
- Rehabilitation
- Shaping for final landform
- Temporary stabilisation
- Water storage

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

Conceptual mine plan- year 12

HVO Continuation Project - Amendment
Noise Impact Assessment
Figure 2.4

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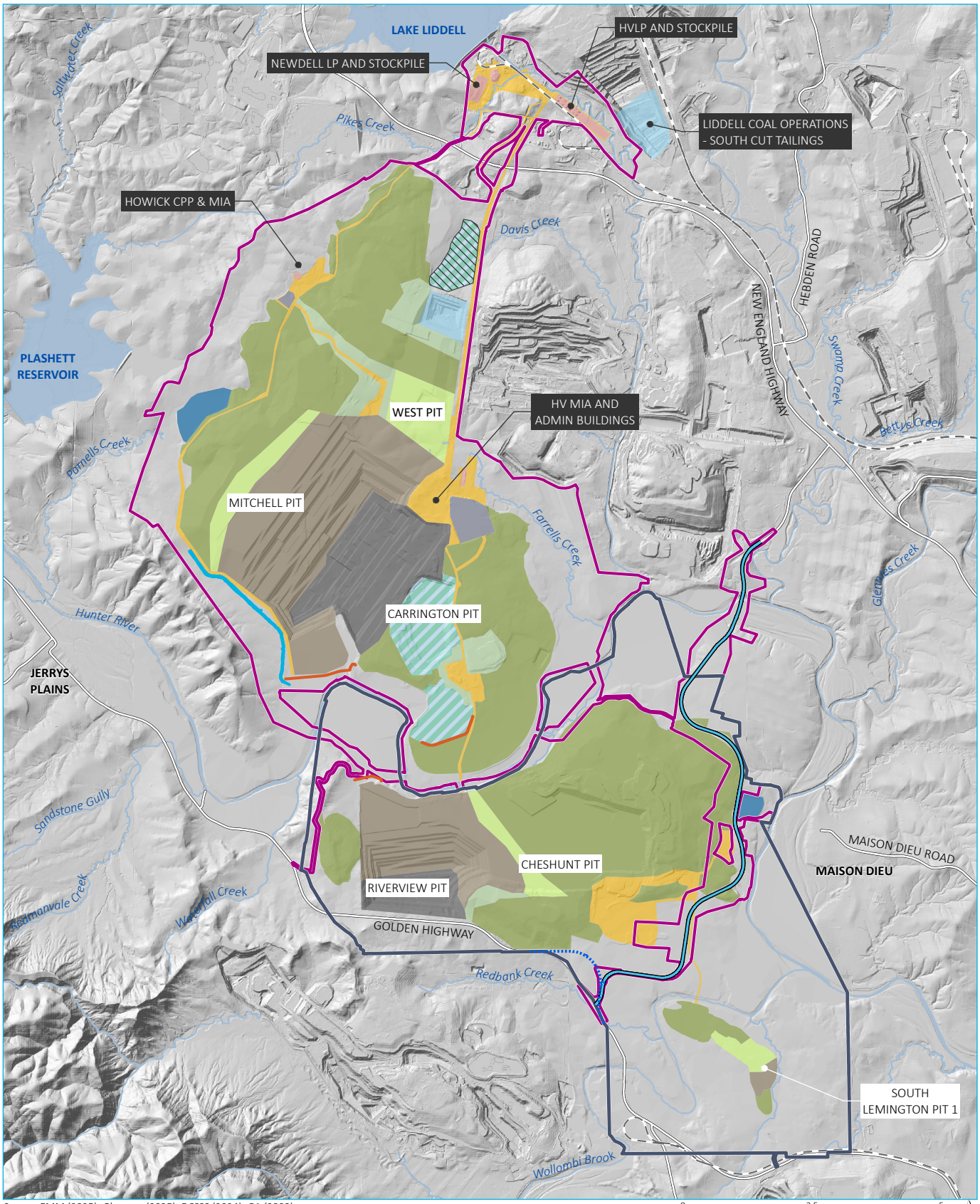

Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Alternative Golden Highway alignment
- Lemington Road realignment

Water infrastructure

- Clean water drain
- Levee
- Cumnock Void 3 (managed by Ravensworth Operations)

Year 15 indicative mine plan

- Active emplacement area
- Active mining area
- Active tailings emplacement area
- Inactive tailings emplacement/capping in progress
- Infrastructure/access
- Product coal stockpile
- ROM coal stockpile
- Rehabilitation
- Shaping for final landform
- Temporary stabilisation
- Water storage

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

Conceptual mine plan- year 15

HVO Continuation Project - Amendment
Noise Impact Assessment
Figure 2.5

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2.5 Construction noise

Construction noise in NSW is typically regulated in accordance with the ICNG. However, the ICNG states it is not applicable to construction associated with mining and quarrying activities, which it states should be assessed in accordance with the NSW Industrial Noise Policy (INP). However, the INP and more recent NPfI specifically exclude construction noise. Due to the lack of clear guidance in NSW guidelines as to how construction noise for mining should be assessed, it has become common practice for this to be assessed in accordance with the ICNG. Furthermore, the SEARs for this project specifically reference the ICNG as being applicable for assessment of construction noise. Therefore, assessment of construction noise impact has been conducted generally in accordance with the ICNG.

The EPA has prepared a Draft Construction Noise Guideline (DCNG), which at the time of writing is currently under review following a period of public consultation. Appendix A of the DCNG specifically addresses assessment of construction noise from mining and other extractive industries. While not yet a current guideline, the general approach for considering construction tasks associated with mining operations described in Appendix A of the DCNG has been adopted as it represents best practice and is consistent with recent contemporary NIA approaches. Activities that comprise the initial construction phase of the Project that are both temporary and facilitate mine operations are assessed as construction tasks and are evaluated against construction noise management levels presented in the ICNG. Longer term activities such as establishing internal haul roads are considered part of the ongoing operation of the mine rather than construction tasks and are therefore assessed against operational noise criteria.

Table 2.1 lists primary construction tasks proposed for the Project and the mine they are associated with (i.e., HVO North or HVO South).

Table 2.1 Proposed construction activities

HVO North	HVO South
Lemington Road realignment	Lake James enlargement
Transmission line relocations	Cheshunt flood protection levee
Parnells Dam enlargement	Riverview flood protection levee
West Pit TSF	Additional mine water/sediment dams
HVO North site access	Pumping infrastructure
Haul road to Ravensworth Operations	
Diversion drains	
Tailings pipelines and pumps	
Additional mine water/sediment dams	
HV MIA, admin building etc	
Newdell LP upgrade	
HVLP product stockpile extension	
Pumping infrastructure	
Carrington West Wing levee	

Notes: 1. Blue highlight indicates construction activities quantitatively assessed.

Each of the activities listed in Table 2.1 are both temporary and necessary to facilitate mine operations and meet the description of 'defined activities' that may be assessed as construction noise per Appendix A of the Draft Construction Noise Guideline. Of these, tasks highlighted blue have the greatest potential to cause construction noise impact and have therefore been quantitatively assessed. The remaining tasks occur well within the Project boundaries, have relatively low noise emissions and/or are at sufficient distance from private residential receptors that noise emissions would be relatively inconsequential and lower than predicted for the modelled activities.

Worst case construction scenarios were assessed and a construction noise impact assessment, prepared in accordance with the ICNG, is provided in Section 4.5 of this NIA.

2.6 Noise modelling methodology

Construction and operational noise levels were predicted using RTA Technology's Environmental Noise Model (ENM), a computer based environmental noise model. ENM is approved by the DPHI and EPA as suitable for prediction of industrial noise involving large propagation distances and is currently the industry standard for NIA of this nature. The model considers geometric spreading, atmospheric absorption, and barrier and ground attenuation. ENM Terrain Category 2, representing a rural land environment, was adopted for model input.

Potential impacts were evaluated using the cumulative distribution of results methodology. This method determines a noise level that is likely to be exceeded 10% of the time in each of the four seasons. A range of results is calculated for a comprehensive set of meteorological conditions, and frequency of occurrence of each of these meteorological conditions is determined from historical meteorological data. The cumulative distribution of these results is analysed to establish a single value for comparison with the limiting criterion. It is considered appropriate to use the 90th percentile result (10% of results are higher than this number) to represent intrusive noise impact. Results provided are 90th percentile L_{Aeq} values; that is, a range of L_{Aeq} results (260 meteorological conditions) have been calculated for each receptor, and the 90th percentile L_{Aeq} has been determined based on the percentage distribution of meteorological conditions. Attachment E lists the 260 meteorological conditions included in this assessment.

Shorter duration weather conditions that increase noise may be an insignificant percentage of time if the assessment is based on annual distribution of meteorological conditions. Therefore, results are determined for each season and the worst-case season result is adopted as the predicted level; the worst-case season may not be the same for each receptor or receptor area.

This methodology requires more calculation than would a procedure involving a smaller set of prevailing meteorological parameters (ie NPfI noise enhancing conditions) but represents best available technology and is, in our opinion, one of the most comprehensive methods available to estimate the range of likely noise levels for a receptor. The NPfI procedures only require assessment of potentially enhancing meteorological conditions if they occur more than 30% of a time period (day, evening and night) in any season. This could mean conditions that enhance noise and result in unacceptably high levels, and which may occur for significant periods of time (right up to 30%), are not assessed.

On the other hand, the cumulative distribution method results in a level being calculated for all possible meteorological conditions. The range of wind speed, wind direction and stability class combinations is actually infinite in the real world. For the purpose of modelling, this has been broken down into 260 conditions, which can be considered to be a comprehensive analysis. Using historical meteorological data, the percentage of time each condition may occur per period and season is known. For any mining scenario modelled it is then possible to determine the likely percentage occurrence of any noise level. Further, the likely percentage of time a criterion might be exceeded can also be estimated.

2.7 Mine plan development

Modelling for the EIS NIA commenced as part of the initial constraints analysis phase of the Project. Noise modelling assisted HVO in the planning and development of EIS Project mine plans to ensure that noise impacts were considered and minimised as far as practicable.

For this amendment NIA, new mine plans and noise models have been developed, drawing on insights gained from the original EIS modelling and the extensive previous analysis. This amendment NIA reflects updated project information and design considerations, and like the EIS modelling, required multiple model iterations, analysis of alternative haulage routes, key contributing equipment, and areas of higher and lower noise impact. Noise controls and management strategies remain generally consistent with those identified in the EIS NIA and were included in the development of the amended project mine plan and modelling process. Further detail regarding reasonable and feasible mitigation controls is included in Section 4.2.4 of this NIA.

2.8 Noise contours

Noise contours were produced over the assessment area to provide a visual representation of the model results. It should be noted that noise contours are based on interpolation of results determined for individual points, and as such are indicative, and are included for presentation purposes only.

3 Criteria

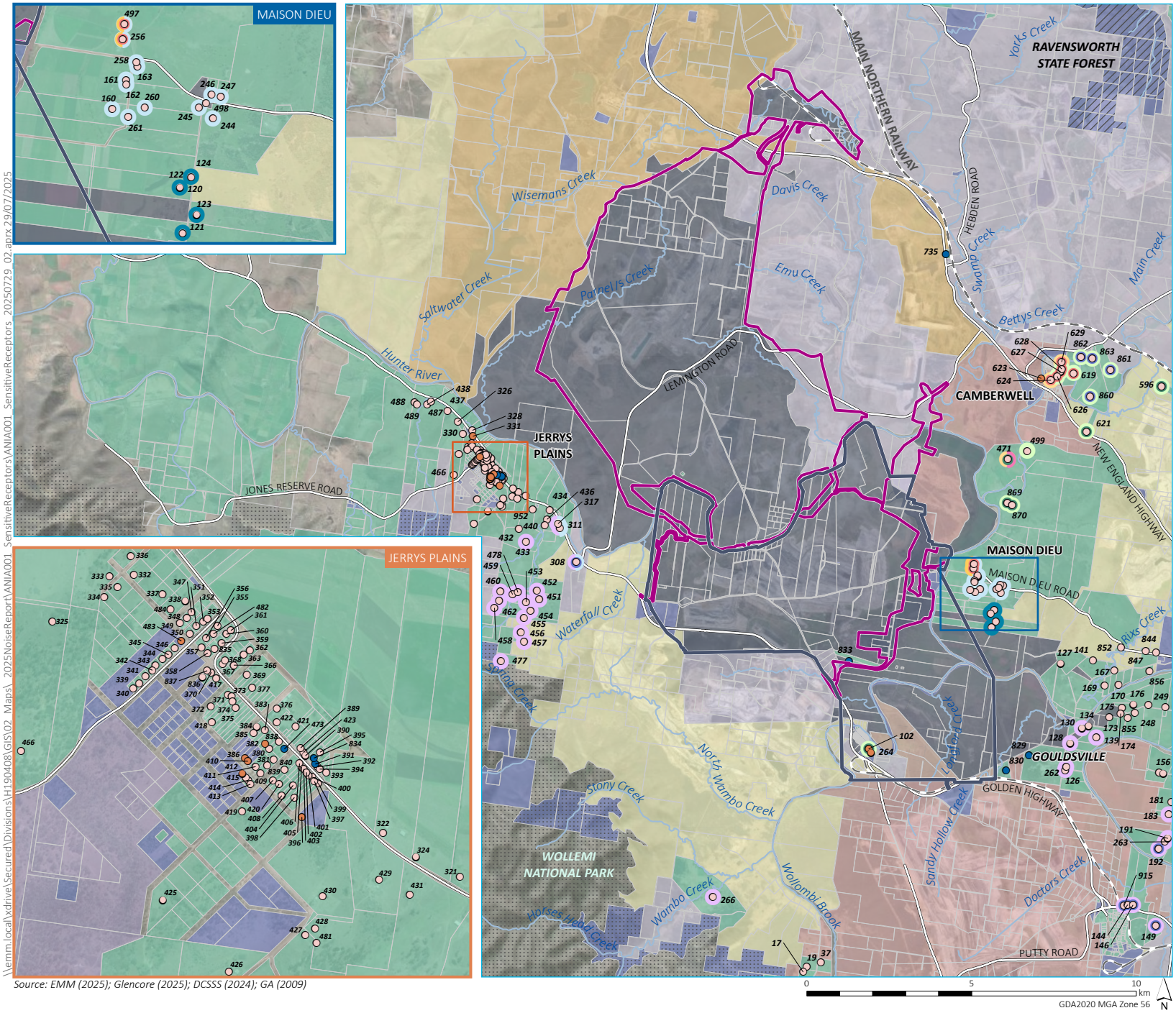
3.1 Existing acoustic environment

3.1.1 Overview

HVO is within a well-established coal mining and power generation region in the Hunter Valley. The general area surrounding the HVO Complex is comprised of various operating open cut and underground coal mining operations. Existing open cut pits, mine-related infrastructure and rehabilitated former mining areas are to the north, south-east and south-west of the HVO Complex.

Surrounding mines include Ravensworth Operations Project, Ashton Coal Project, United Wambo Open Cut Coal Mine Project, Wambo Underground Mine, Mount Thorley Continuation Project and Warkworth Continuation Project. Bayswater and Liddell power stations are to the north-west. Major roads near HVO include the New England Highway and the Golden Highway located immediately to the east and west of the Project, respectively. Other land uses in the area include agriculture, mine-owned buffer land, biodiversity offsets, Crown land, national park, and rural residential areas. Grazing and cropping land are to the north-east of HVO South and west of HVO North. Mount Thorley and Warkworth mines northern and southern biodiversity offset areas are immediately to the east and south of HVO South and to the east and west of HVO North are the Ravensworth Operations and HVO Wandewoi biodiversity offset areas, respectively. The Wollemi National Park is approximately 5 km south-west of the HVO Complex. There are limited private residences in close proximity to the Project, with the closest residences at Maison Dieu to the east, Long Point/Gouldsville to the south-east, Camberwell to the north-east and Jerrys Plains to the west.

The nearest private sensitive receptors are shown in Figure 3.1.



KEY

Amended proposed HVO North development consent boundary

Proposed HVO South development consent boundary

Receptor location

- Private - residential
- Private - non residential
- Community Infrastructure
- Subject to existing acquisition rights - Other mine - AQ
- Subject to existing acquisition rights - Other mine - Noise
- Subject to existing acquisition rights - Other mine - AQ & Noise
- Subject to existing mitigation rights - HVO - AQ
- Subject to existing mitigation rights - HVO - Noise & AQ
- Subject to existing mitigation rights - HVO - Noise
- Subject to existing mitigation rights - Other mine - Noise & AQ
- Subject to existing mitigation rights - Other Mine - AQ
- Subject to existing mitigation rights - Other mine - Noise

Land ownership

- HVO JV land
- Other mine owned - Glencore land
- Other mine owned - Yancoal
- Other mine owned
- AGL Macquarie
- Private
- Public/Crown

Existing environment

- Cadastral boundary
- Rail line
- Major road
- Named watercourse
- NPWS reserve
- State forest

Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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Sensitive receptors

HVO Continuation Project - Amendment
Noise Impact Assessment
Figure 3.1

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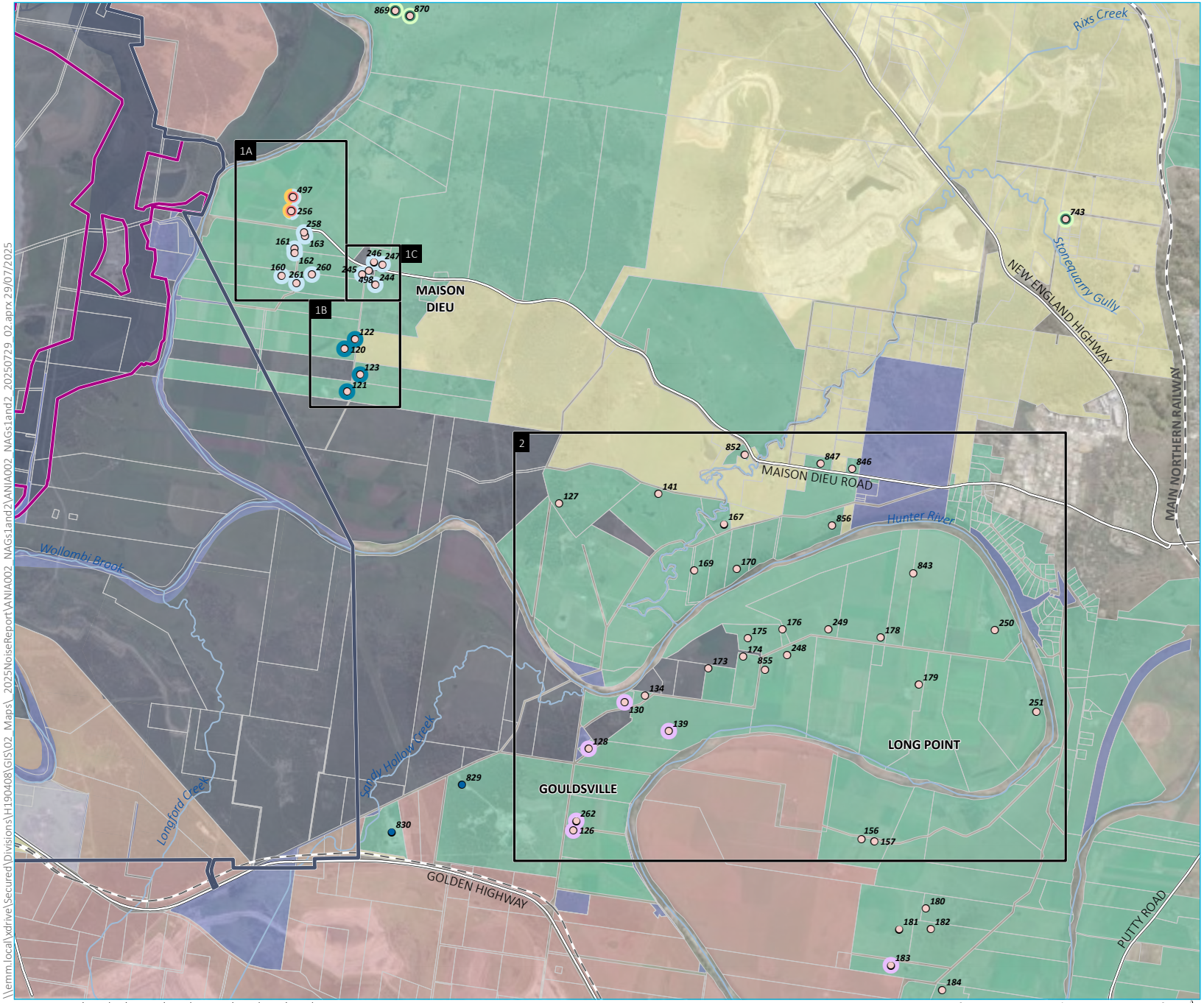
3.2 Land ownership and receptors

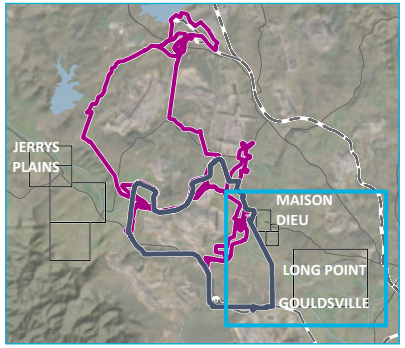
Eight noise assessment groups (NAGs) were established for the Project in the EIS NIA, and remain for this NIA of the amended project. The primary objective of NAGs is to classify receptors into groups, where each group can be represented by a single background noise level and, hence, assessed against a singular criterion. NAG identifiers and their localities are detailed in Table 3.1 and shown in Figure 3.2 and Figure 3.3.

Table 3.1 Noise assessment groups

NAG	Locality
1A	Shearers Lane and northern receptors in Maison Dieu area
1B	Knodlers Lane and southern receptors in Maison Dieu area
1C	North western receptors in Maison Dieu area
2	Long Point
3	Jerrys Plains South / Moses Crossing
4	Redmanvale Road
5A	Jerrys Plains Village
5B	Jerrys Plains West

All known private residential receptors that may be impacted by noise from the Project were assessed. Non-residential privately owned receptors such as schools, recreational sites, churches, industrial and commercial receptors were also assessed against appropriate amenity noise levels from Table 2.2 of the NPfI. Details of all assessed receptors are included in Attachment F. In accordance with the NPfI, this assessment considers only privately-owned residences; mine owned receptors have not been considered as assessment locations.





KEY

Amended proposed HVO North development consent boundary
Proposed HVO South development consent boundary
Noise assessment group

Receptor location
- Private- residential
- Private- non residential
- Subject to existing acquisition rights- Other mine- AQ
- Subject to existing acquisition rights- Other mine- AQ & Noise
- Subject to existing mitigation rights- HVO- Noise & AQ
- Subject to existing mitigation rights- HVO- Noise
- Subject to existing mitigation rights- Other mine- Noise & AQ
- Subject to existing mitigation rights- Other mine- AQ
- Subject to existing mitigation rights- Other mine- Noise

Land ownership
- HVO JV land
- Other mine owned- Glencore land
- Other mine owned- Yancoal
- Other mine owned
- AGL Macquarie
- Private
- Public/Crown

Existing environment
- Cadastral boundary
- Rail line
- Major road
- Named watercourse

NAGs 1A, 1B, 1C and 2

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 3.2

Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

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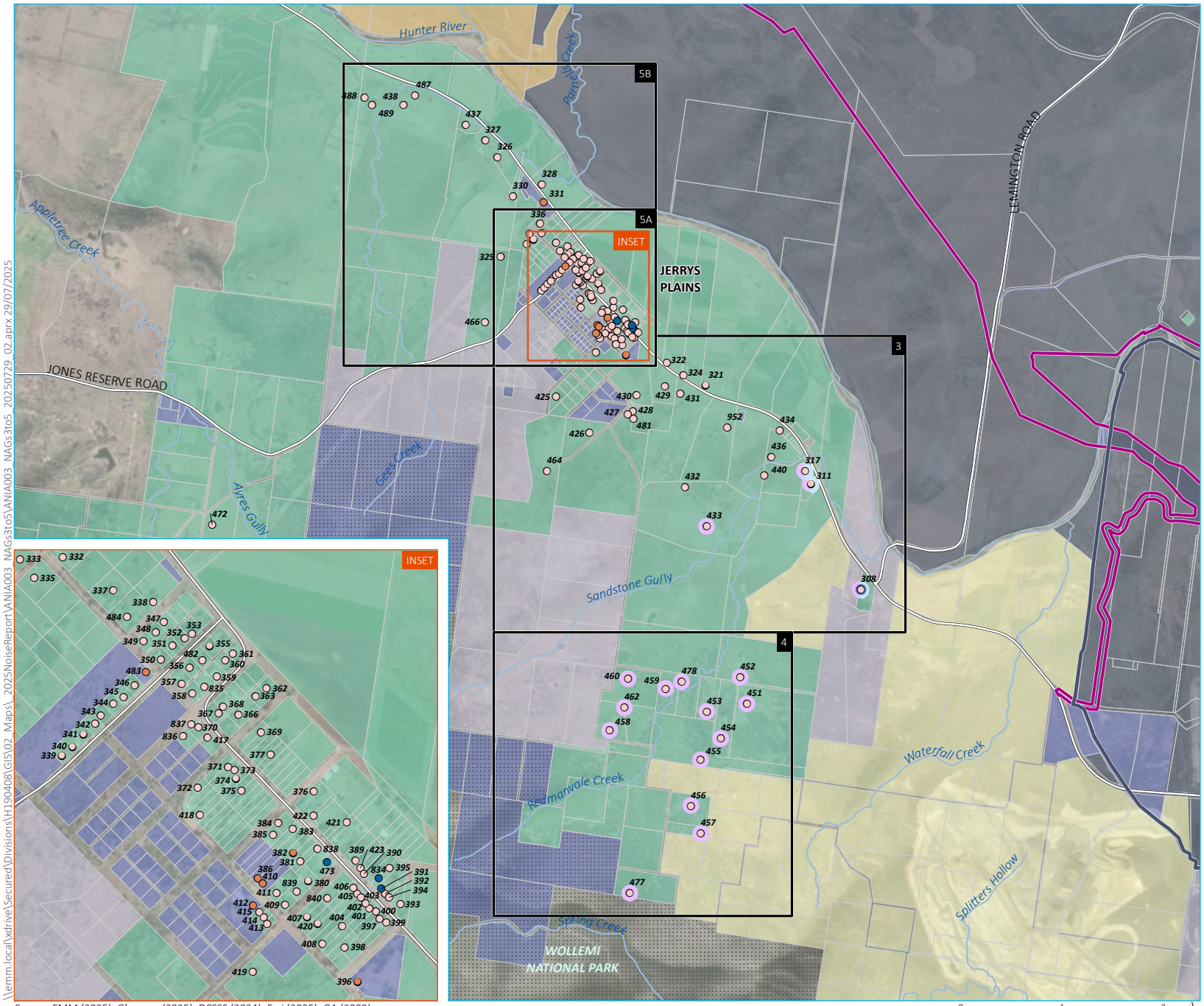

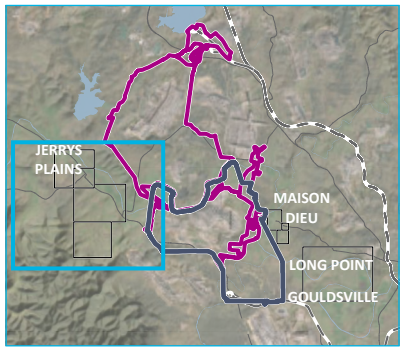

KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Noise assessment group

Receptor location

- Private- residential
- Private- non residential
- Community Infrastructure
- Subject to existing acquisition rights- Other mine- Noise
- Subject to existing mitigation rights- HVO- Noise
- Subject to existing mitigation rights- Other mine- Noise

Land ownership

- HVO JV land
- Other mine owned- Glencore land
- Other mine owned- Yancoal
- Other mine owned
- AGL Macquarie
- Private
- Public/Crown

Existing environment

- Cadastral boundary
- Rail line
- Major road
- Named watercourse
- NPWS reserve

NAGs 3, 4, 5A and 5B

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 3.3

creating opportunities

Source: EMM (2025); Glencore (2025); DCSSS (2024); Esri (2025); GA (2009)

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3.3 Existing project approvals

3.3.1 Development consents

Noise impacts around HVO are addressed in the two most recent development consents detailed below in Table 3.2. It is noted that this assessment is the first time HVO has been required to be assessed under the NPfI.

Table 3.2 Applicable consents for HVO

Report descriptor	Development consent/Project approval	Applicable pits
HVO North	Development Consent 450-10-2003 (as modified)	West Pit, Mitchell Pits, Carrington Pit and North Pit
HVO South	Project Approval 06_0261 (as modified)	Cheshunt Pit, Riverview pits, Riverview South East Extension, South Lemington Pits 1 and 2

3.3.2 Environment Protection Licence

HVO holds EPL No. 640 issued by the EPA. Noise requirements are detailed in L5 of the licence.

3.3.3 Current approved operational noise criteria

Table 3.3 provides a summary of the noise limits under the current HVO development consent/project approval and EPL for the key receptor areas around the HVO Complex. Many private residential receptors are not listed in the current consents, so tabulated criteria are based on the receptors that are listed, which are generally representative of neighbouring receptors. A range is provided where criteria are variable within a NAG which is because in some cases consent and EPL limits are different for the same receptor or, consent limits vary across the NAG. Limits also vary between HVO North and South consents. The EPL includes inconsistent criteria for some receptors, only those in the first eight rows of the table in licence condition L5.1 have been considered. The higher criterion listed is usually representative of the most affected receptors within the NAG.

Table 3.3 Current consent and EPL operational noise criteria – $L_{Aeq,15minute}$ dB

NAG	Locality	Lowest criterion			Highest criterion		
		Day	Evening	Night	Day	Evening	Night
1A	Shearers Lane and Northern receptors in Maison Dieu area	41	41	41	41	41	41
1B	Knodlers Lane and Southern receptors in Maison Dieu area	40	40	40	40	40	40
1C	North western receptors in Maison Dieu area	39	39	39	39	39	39
2	Long Point	35	35	35	37	37	37
3	Jerrys Plains South / Moses Crossing	35	35	35	40	40	40
4	Redmanvale Road	35	35	35	35	35	35
5A	Jerrys Plains Village	40	40	40	40	40	40
5B	Jerrys Plains West	35	35	35	40	40	40

3.3.4 Compliance history

Compliance monitoring for HVO has comprised of routine monthly surveys. An assessment of recent monitoring data from 2016 up to and including 2024 demonstrates that operations have predominately been compliant with noise criteria. Non-compliant measurements account for a small percentage of the monitoring dataset. These are shown in Table 3.4 and Table 3.5.

Table 3.6 and Table 3.7 also show no sustained exceedances. There have been no measured noise non-compliances in 2025 to 1 May and the last $L_{Aeq,15minute}$ non-compliance was in May 2019.

Table 3.4 Summary of noise measurements for HVO North (2016–2024)

Total measurements ($L_{Aeq,15minute}$)	1,028
Total measurements ($L_{A1,1minute}$)	1,021
Total number of non-compliances ($L_{Aeq,15minute}$)	4
Total number of non-compliances ($L_{A1,1minute}$)	Nil
Percentage of non-compliant measurements ($L_{Aeq,15minute}$)	0.4%
Percentage of non-compliant measurements ($L_{A1,1minute}$)	0.0%

Table 3.5 Summary of noise measurements for HVO South (2016–2024)

Total measurements ($L_{Aeq,15minute}$)	966
Total measurements ($L_{A1,1minute}$)	981
Total number of non-compliances ($L_{Aeq,15minute}$)	4
Total number of non-compliances ($L_{A1,1minute}$)	5
Percentage of non-compliant measurements ($L_{Aeq,15minute}$)	0.4%
Percentage of non-compliant measurements ($L_{A1,1minute}$)	0.5%

Table 3.6 Yearly breakdown of noise measurements for HVO North

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total measurements ($L_{Aeq,15minute}$)	109	110	107	110	119	120	136	109	108
Total measurements ($L_{A1,1minute}$)	109	110	108	110	111	120	136	109	108
Total number of non-compliances ($L_{Aeq,15minute}$)	1	0	3	0	0	0	0	0	0
Total number of non-compliances ($L_{A1,1minute}$)	0	0	0	0	0	0	0	0	0
Percentage of non-compliant measurements ($L_{Aeq,15minute}$)	0.9%	0%	2.8%	0%	0%	0%	0%	0%	0%
Percentage of non-compliant measurements ($L_{A1,1minute}$)	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 3.7 Yearly breakdown of noise measurements for HVO South

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total measurements ($L_{Aeq,15minute}$)	109	100	108	101	99	109	124	108	108
Total measurements ($L_{A1,1minute}$)	109	110	108	106	99	109	124	108	108
Total number of non-compliances ($L_{Aeq,15minut}$)	2	1	0	1	0	0	0	0	0
Total number of non-compliances ($L_{A1,1minute}$)	4	0	1	0	0	0	0	0	0
Percentage of non-compliant measurements ($L_{Aeq,15minute}$)	1.8%	1%	0%	0.9%	0%	0%	0%	0%	0%
Percentage of non-compliant measurements ($L_{A1,1minute}$)	3.6%	0%	0.9%	0%	0%	0%	0%	0%	0%

3.4 Operational noise assessment levels

Section 2 of the NPfI outlines the procedure to determine Project Noise Trigger Levels (PNTL) relevant to a particular industrial development and applying it to existing noise-sensitive receivers. If it is predicted that the development is likely to cause PNTL to be exceeded at existing private residential receptors, reasonable and feasible noise controls and/or management measures should be considered to reduce predicted noise as far as practicable.

The NPfI states:

> The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.
>
> The project noise trigger level, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a proposal or site. **It is the combination of these elements that is designed to ensure that acceptable noise outcomes are determined by decision makers.**

The NPfI also states:

> Where a project noise trigger level is exceeded, assess the feasible and reasonable mitigation measured that could be implemented to reduce noise down towards the relevant project noise trigger level. If it is reasonable to achieve these levels, the proponent should do so. If not, then achievable noise levels should be identified. It is not mandatory to achieve the trigger levels but the assessment should provide justification if they cannot be met. An assessment of the acceptability of residual impacts should also be provided.

The key point in these extracts is that PNTL are not mandatory but are intended to be an initial screening trigger to determine if further noise controls and/or management measures need to be considered. Once all reasonable and feasible mitigation controls are determined and implemented/applied, an assessment of the significance of residual noise impacts can be made in accordance with Section 4 of the NPfI.

The PNTL is the lower (that is, the more stringent) value of the project intrusiveness noise level and project amenity noise level.

Project intrusiveness noise levels aim to protect against significant changes in noise levels relative to existing background levels. Project amenity noise levels seek to protect against cumulative noise impacts from industry and maintain amenity for particular land uses. Applying the most stringent requirement as the PNTL ensures that both intrusive noise is limited, and amenity is protected in such a way that no single industry can unacceptably change the noise level of an area.

3.4.1 Project intrusiveness noise levels

The intrusiveness noise level is expressed as:

$L_{Aeq,15minute}$ = Rating Background Level + 5 dB

Where:

- $L_{Aeq,15minute}$ represents the equivalent continuous (energy average) A-weighted sound pressure level of the source over 15 minutes
- RBL represents the background level to be used for assessment purposes.

Intrusive noise levels are only applied to residential receptors (residences). For other receptor categories, recommended amenity noise levels apply.

3.4.2 Recommended amenity noise levels

Table 2.2 of the NPfI provides recommended amenity noise levels for various land uses. Where the existing noise level from industrial sources approaches the recommended amenity noise level, noise from new sources must be limited to protect the amenity of the area. Recommended amenity noise levels are intended to protect community against noise impacts such as speech interference, annoyance, and some sleep disturbance. Ambient noise levels within an area from all industrial noise sources combined should remain below recommended amenity noise levels where feasible and reasonable.

Table 2.3 of the NPfI provides guidance on assigning residential receptor noise categories. Private residential receptors in the assessment area are categorised rural residential in accordance with Table 2.3, the relevant section of which is reproduced below.

Receiver category	Typical planning zoning – standard instrument*	Typical existing background noise levels	Description
Rural residential	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime RBL <40 dB(A) Evening RBL <35 dB(A) Night RBL <30 dB(A)	**Rural** – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented in column 3 due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.

The assessment area includes several non-residential receptors. Recommended amenity noise levels for relevant receptor categories in this NIA are listed in Table 3.8.

Table 3.8 Recommended amenity noise levels – $L_{Aeq,period}$ dB

Receptor category	Day	Evening	Night
Private residential (external)	50	45	40
School classroom (internal, when in use)	35	NA	NA
School classroom (external, when in use) [1]	45	NA	NA
Passive recreation area (external)	50	50	50
Active recreation area (external)	55	55	55
Commercial premises (when in use)	65	65	65
Industrial premises (when in use)	70	70	70
Place of worship (internal)	40	40	40
Place of worship (external) [1]	50	50	50

Notes: 1. 10 dB adjustment applied to obtain equivalent external amenity noise level.

An adjustment of 10 dB has been applied to internal amenity noise levels for schools and places of worship to obtain an equivalent external value. This adjustment is consistent with standard practice, and in keeping with Section 2.6 of the NPfI that recommends that in cases where gaining internal access for monitoring is difficult, then external noise levels 10 dB above the internal levels apply.

3.4.3 Project amenity noise levels

Recommended amenity noise levels represent the objective for total industrial noise at a receptor location. The NPfI also defines a project amenity noise level, which represents the objective for noise from a single industrial development at a receptor location. As stated in the NPfI the project amenity noise level is determined as follows:

Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)

The NPfI provides exceptions for when the project amenity noise level does not apply, which are:

1. in areas with high traffic noise levels
2. in proposed developments in major industrial clusters
3. where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level
4. where cumulative industrial noise is not a necessary consideration because no other industries are present in the area, or likely to be introduced into the area in the future.

These exceptions are not applicable to the Project. Project amenity noise levels are determined in Section 3.4.5 of this NIA.

3.4.4 $L_{Aeq,period}$ to $L_{Aeq,15minute}$ adjustment

Intrusiveness and amenity noise levels each use the L_{Aeq} descriptor; however, intrusiveness noise levels are averaged over a 15-minute duration whilst amenity noise levels are averaged over an assessment period (day, evening or night). The NPfI provides a method to standardise the time periods, which involves applying an adjustment factor of plus 3 dB to $L_{Aeq,period}$ noise levels to obtain equivalent $L_{Aeq,15minute}$ noise levels. Conversely, an adjustment factor of minus 3 dB can be applied to an $L_{Aeq,15minute}$ noise level to obtain an equivalent $L_{Aeq,period}$ noise level.

3.4.5 Project noise trigger levels

For the EIS NIA, background noise surveys were conducted to determine Rating Background levels (RBL) in receptor areas around the HVO Complex. PNTL were determined from RBL and they are unchanged in this amendment NIA.

Table 3.9 provides calculated PNTL for each NAG determined in accordance with the NPfI for private residential receptors. Where private residential receptors fall outside of the identified NAGs, the NPfI default minimum RBLs have been adopted and result in PNTL of $L_{Aeq,15minute}$ 40/35/35 dB for the day/evening/night periods, respectively.

It should be noted that PNTL are used in this assessment as a benchmark level above which noise management measures are required to be considered (in accordance with the NPfI) and to evaluate the significance of residual noise impacts.

Table 3.9 Project noise triggers levels – private residential receptors

NAG	PNTL ($L_{Aeq,15minute}$)		
	Day	Evening	Night
1A	40	36	36
1B	40	36	36
1C	40	36	36
2	40	35	35
3	41	41	38
4	40	35	35
5A	41	38	37
5B	40	35	35

3.4.6 Achievable noise levels

PNTL were established for each NAG in accordance with the NPfI to set a benchmark for assessing the need to consider noise mitigation. Initial modelling showed noise emissions levels from the Project were above these at various noise-sensitive receptors surrounding the Project, indicating that operational constraints would be required to reduce noise. Given the preceding, an assessment of feasible and reasonable noise mitigation strategies was completed.

Mine plan iterations and equipment sound power level analysis formed the basis of the mitigation assessment, with model iterations completed to reduce predicted noise impact. HVO has made a commitment to best-in-class 400 t and 600 t excavator sound power levels and targeted other key equipment sound power levels during the analysis. All reasonable and feasible mitigation measures detailed in Section 4.2.4 were implemented to reduce noise towards the PNTL, and noise impacts were re-evaluated before further mitigation measures (equipment shutdowns) were then considered. After considering and modelling all these measures, it was determined that PNTL could not be reasonably or feasibly met for all receptors.

Given the above, achievable noise levels (ANL) were developed for the Project.

3.5 Voluntary Land Acquisition and Mitigation Policy

In September 2018, the NSW government published the *Voluntary Land Acquisition and Mitigation Policy (the VLAMP) for State Significant Mining, Petroleum and Extractive Industry Developments* (NSW Government 2018). This document describes the NSW Government's policy for voluntary mitigation and land acquisition to address noise impacts from state significant mining, petroleum, and extractive industry developments.

3.5.1 Mitigation and acquisition criteria

The VLAMP provides the following guidance on the applicability of noise mitigation and acquisition criteria:

> A consent authority can apply voluntary mitigation and voluntary land acquisition rights to reduce:
>
> - operational noise impacts of a development on privately owned land; and
> - rail noise impacts of a development on privately owned land near a non-network rail line (private rail line), that is on, or exclusively servicing an industrial site (see Appendix 3 of the RING);

But not:

- construction noise impacts, as these impacts are shorter term and can be controlled;
- noise impacts on the public road or rail network; or
- modifications of existing developments with legacy noise issues, where the modification would have beneficial or negligible noise impacts.

3.5.2 Voluntary mitigation rights

The VLAMP states:

> A consent authority should only apply voluntary mitigation rights where, even with the implementation of best practice management at the mine site:
>
> - the noise generated by the development would meet the requirements in Table 1 (see following page), such that the impacts would be characterised as marginal, moderate or significant, at any residence on privately owned land; or
> - the development would increase the total industrial noise level at any residence on privately owned land by more than 1 dB(A) and noise levels at the residence are already above the recommended amenity noise levels in Table 2.2 of the Noise Policy for Industry; or
> - the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended acceptable levels in Table 6 of Appendix 3 of the RING by greater than or equal to 3 dB(A) at any residence on privately owned land.

All noise levels must be calculated in accordance with the NPfI or RING (as applicable).

3.5.3 Voluntary acquisition rights

The VLAMP states:

> A consent authority should only apply voluntary land acquisition rights where, even with the implementation of best practice management:
>
> - the noise generated by the development would be characterised as significant, according to Table 1 (see following page), at any residence on privately owned land; or
> - the noise generated by the development would contribute to exceedances of the acceptable noise levels plus 5 dB in Table 2.2 of the NPfI on more than 25% of any privately-owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls [1]; or
> - the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended maximum criteria in Table 6 of Appendix 3 of the RING at any residence on privately owned land.
>
> All noise levels must be calculated in accordance with the NPfI or RING (as applicable).

Table 1 of the VLAMP outlines a procedure for characterising noise impact and provides examples of potential receptor-based treatments that could be used to mitigate residual noise impact; this table is reproduced below.

When assessing the difference between predicted noise levels and PNTL, the VLAMP uses the categories 0 to 2 dB, 3 to 5 dB, and >5 dB.

[1] *Voluntary land acquisition rights should not be applied to address noise levels on vacant land other than to vacant land specifically meeting these criteria.*

Table 1 – Characterisation of noise impacts and potential treatments[16]

If the predicted noise level minus the project noise trigger level[17] is:	And the total cumulative industrial noise level is:	Characterisation of impacts:	Potential treatment:
All time periods 0-2dB(A)	Not applicable	Impacts are considered to be **negligible**	The exceedances would not be discernable by the average listener and therefore would not warrant receiver based treatments or controls
All time periods 3-5dB(A)	• ≤ recommended amenity noise level in Table 2.2 of the NPfI; or • > recommended amenity noise level in Table 2.2 of the NPfI, but the increase in total cumulative industrial noise level resulting from the development is ≤1dB	Impacts are considered to be **marginal**	Provide mechanical ventilation / comfort condition systems to enable windows to be closed without compromising internal air quality / amenity.
All time periods 3-5dB(A)	> recommended amenity noise level in Table 2.2 of the NPfI, and the increase in total cumulative industrial noise level resulting from the development is >1dB	Impacts are considered to be **moderate**	As for marginal impacts but also upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Day and evening >5dB(A)	≤ recommended amenity noise levels in Table 2.2 of the NPfI	Impacts are considered to be **moderate**	As for marginal impacts but also upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Day and evening >5dB(A)	> recommended amenity noise levels in Table 2.2 of the NPfI	Impacts are considered to be **significant**	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions above.
Night >5dB(A)	Not applicable	Impacts are considered to be **significant**	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions above.

[16] Adapted from the *Noise Policy for Industry* (NPfI) (EPA 2017).

[17] See section 2.1 of the NPfI for an explanation of project noise trigger levels.

3.6 Residual noise impacts

Residual noise impacts occur when achievable noise levels predicted for a private residential receptor are greater than PNTL, and all feasible and reasonable noise mitigation measures have been considered (including consideration of all source mitigation and noise pathway mitigation). The significance of any residual impact can be used to assess the need for receptor-based treatment options. In extreme cases, significant levels of residual noise impact may result in voluntary acquisition status.

Both the NPfI and VLAMP provide guidance on procedures for determining the significance of residual noise impacts. When assessing total cumulative industrial noise level against recommended amenity noise levels, "< recommended amenity noise level" used in the NPfI is taken as "less than or equal to recommended amenity noise level", which is consistent with Table 1 of the VLAMP.

As noted in Section 3.5, the method of assessing residual noise impact differs between the NPfI and the VLAMP. Assessment of residual noise impact is included in Section 4.3.4 of this NIA and includes both methods.

3.6.1 NPfI Significance of residual noise impacts

Section 4 of the NPfI provides guidance for determining the significance of residual noise impacts. Table 4.1 of the NPfI outlines a procedure for allocating residual noise impact significance levels for each receptor on a case-by-case basis. Table 4.2 of the NPfI then provides examples of receptor-based treatments that could be used to mitigate residual noise impact. These tables are reproduced below.

Table 4.1: Significance of residual noise impacts.

If the predicted noise level minus the project noise trigger level is:	And the total cumulative industrial noise level is:	Then the significance of residual noise level is:
≤ 2 dB(A)	Not applicable	Negligible
≥ 3 but ≤ 5 dB(A)	< recommended amenity noise level or > recommended amenity noise level, but the increase in total cumulative industrial noise level resulting from the development is less than or equal to 1dB	Marginal
≥ 3 but ≤ 5 dB(A)	> recommended amenity noise level and the increase in total cumulative industrial noise level resulting from the development is more than 1 dB	Moderate
> 5 dB(A)	≤ recommended amenity noise level	Moderate
> 5 dB(A)	> recommended amenity noise level	Significant

Note: This approach is designed for new and substantially-modified developments and should be applied with caution to assessments of existing operations.

Table 4.2: Examples of receiver-based treatments to mitigate residual noise impacts.

Significance of residual noise level	Example of potential treatment
Negligible	The exceedances would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls.
Marginal	Provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity.
Moderate	As for 'marginal', but also upgraded façade elements, such as windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Significant	May include suitable commercial agreements where considered feasible and reasonable.

3.6.2 VLAMP significance of residual noise impact

The VLAMP method of determining the significance of residual noise impacts is outlined in Section 3.5.3 of this NIA. Table 1 of the VLAMP, reproduced in that section, summarises the assessment method which is generally consistent with the NPfI methodology.

3.7 Construction noise criteria

Construction noise management levels, sourced from the ICNG and determined in the EIS NIA, are presented in Table 3.10. In certain circumstances, it can be difficult to differentiate between operational and construction noise sources. Construction noise predictions have therefore been combined with operational noise predictions for the nearest assessed stage of mining to obtain a cumulative level for assessment purposes.

The 'noise affected' levels for construction work prescribed in the ICNG are:

- $L_{Aeq,15minute}$ equal to background plus 10 dB during standard construction hours
- $L_{Aeq,15minute}$ equal to background plus 5 dB for work outside the standard construction hours.

The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq,15minute}$ is greater than the noise affected level, the proponent should:

- apply all feasible and reasonable work practices to meet the noise affected level
- also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

The ICNG also indicates a 'highly noise affected' level of $L_{Aeq,15minute}$ 75 dB. The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:

- times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences
- if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Construction noise management levels presented in Table 3.10 apply to private residential receptors for the Project during standard construction hours. Out of hours construction activities would need to comply with approved operational noise limits.

As approval for the various construction tasks is being sought under separate consents, construction tasks associated with each site (i.e. both HVO North and HVO South) are assessed separately against the management levels listed in Table 3.10.

Table 3.10 Standard construction hours noise management levels, private residential receptors – $L_{Aeq,15minute}$ dB

NAG	Area	Noise affected	Highly noise affected
1A	Shearers Lane and northern receptors in Maison Dieu area	45	75
1B	Knodlers Lane and southern receptors in Maison Dieu area	45	75
1C	North western receptors in Maison Dieu area	45	75
2	Long Point	45	75
3	Jerrys Plains South/Moses Crossing	46	75
4	Redmanvale Road	45	75
5A	Jerrys Plains Village	46	75
5B	Jerrys Plains West	45	75

The guideline specifies standard construction hours as:

- Monday to Friday, 7.00 am to 6.00 pm
- Saturday, 8:00 am to 1:00 pm
- no construction work on Sunday and public holidays.

HVO proposes to undertake construction noise generating activities primarily during standard construction hours. Outside of these times, HVO is committed to managing noise such that the cumulative impact from the mining operations and construction activities do not exceed the operational noise limits. This will allow construction tasks to be undertaken as required but will restrict cumulative operational and construction noise to approved operational noise limits. Many construction activities will occur well within the project boundaries and/or at sufficient distance from private residential locations that noise emission would be relatively inconsequential. These activities present minimal risk of increasing operational noise levels and should therefore be able to be conducted at any time.

Construction noise impact is assessed in Section 4.5 of this NIA.

3.7.1 Other land uses

The ICNG provides construction noise criteria for non-residential receptor categories such as schools, places of worship, community centres, recreation areas, and commercial/industrial premises. Construction noise management levels for such land uses are listed in Table 3.11. These management levels apply when properties are in use.

Table 3.11 Noise management levels, non-private residential receptors – $L_{Aeq,15minute}$ dB

Receptor category	Management level
Classrooms at schools and other educational institutions (internal)	45
Classrooms at schools and other educational institutions (external) [1]	55
Place of worship (internal)	45
Place of worship (external) [1]	55
Active recreation area (external)	65
Passive recreation area (external)	60
Community centres (external) [2]	60
Industrial premises (external)	75
Offices, retail outlets (external)	70

Notes: 1. 10 dB adjustment applied to obtain equivalent external amenity noise level.
2. Passive recreation area level adopted, which is consistent with the recommended 'maximum' internal levels in AS2107 for leisure centres and club buildings.

An adjustment of 10 dB has been applied to internal amenity noise levels where relevant to obtain an equivalent external value. This adjustment is consistent with standard practice, and in keeping with Section 2.6 of the NPfI that recommends that in cases where gaining internal access for monitoring is difficult, then external noise levels 10 dB above the internal levels apply.

3.8 Maximum noise level assessment

Section 2.5 of the NPfI includes a guideline for assessing maximum noise level events that have potential to cause sleep disturbance. According to the NPfI, where the subject development/premises night-time noise levels at a residential location exceed the following trigger levels, a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq,15minute}$ 40 dB or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- $L_{AF,max}$ 52 dB or the prevailing RBL plus 15 dB, whichever is the greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night-time period.

Assessment of sleep disturbance is included in Section 4.6 of this NIA.

3.9 Cumulative noise criteria

Recommended amenity noise levels listed in Table 2.2 of the NPfI and Table 3.8 of this NIA have been used to assess cumulative noise.

Assessment of cumulative noise is included in Section 4.8 of this NIA.

3.10 Corrections for annoying noise characteristics (modifying factors)

Fact Sheet C of the NPfI outlines procedures for assessing modifying correction factors. These correction factors, also referred to as modifying factor penalties, are applied to predicted/measured noise levels at the receptor before comparison with relevant noise trigger levels/criteria, to account for the additional annoyance caused by these noise characteristics.

Modifying factors, as they are applicable to industrial noise, are described in more detail below.

3.10.1 Tonality and intermittent noise

As defined in the NPfI:

> Tonal noise contains a prominent frequency and is characterised by a definite pitch.
>
> Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.

Open cut mines are not generally tonal or intermittent in nature as per the intent of the NPfI. A review of recent HVO compliance monitoring data from 2016 onwards shows that neither tonal nor intermittent modifying factors have been historically applied. No further assessment of these characteristics has been made. It is reasonable to expect that if the mine continues operations as before (regarding noise emissions) then the absence of tonal and intermittent noise characteristics will similarly continue.

3.10.2 Low frequency noise

As defined in the NPfI:

> Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.

The NPfI contains the current method of assessing low frequency noise, which is a 2-step process as detailed below:

> Measure/assess source contribution C- and A-weighted Leq,T levels over the same time period.
> Correction to be applied where the C minus A level is 15 dB or more and:
>
> - where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period; and
> - where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2 dB(A) positive adjustment applies for the daytime period.

Table C2 and associated notes from the NPfI is reproduced below:

Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Notes:

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.
- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

Low frequency noise is assessed in this NIA through comparison of one-third octave model predictions against NPfI low frequency noise thresholds. Further detail is provided in Section 4.7 of this NIA.

4 Noise impact assessment

4.1 Best Management Practice

Noise management at HVO uses Best Management Practice (BMP) consistent with contemporary industry standards. Procedures for management and monitoring are outlined in the existing Noise Management Plan (NMP).

BMP currently implemented at HVO include:

- real-time noise monitoring locations used for noise management
- proactive operational planning based on predicted meteorological conditions
- a tiered alarming system that incorporates real-time monitoring and meteorological data is used to notify site personnel when elevated noise levels occur off site. The NMP includes a detailed procedure outlining management protocols in response to noise trigger levels
- monthly attended noise monitoring is used to assess compliance against impact assessment criteria. Monitoring is conducted at eight locations representing potentially affected privately owned residences and the Hunter Valley Gliders Club
- sound power testing is completed on one third of the attenuated fleet annually to ensure equipment noise levels are consistent with modelled levels
- noise management awareness is provided to all personnel as part of the induction process
- a detailed management procedure is in place to ensure any community complaints are recorded, investigated and communicated appropriately.

4.2 Noise model parameters

4.2.1 Meteorology

Under various wind and temperature gradient conditions, noise may be increased or decreased compared with still-isothermal conditions – that is, no wind or temperature gradient (also referred to as neutral atmospheric conditions). Atmospheric conditions that most affect noise propagation are temperature and wind velocity gradients. They can both enhance or reduce noise propagation from source to receptor due to refraction of sound propagating through the atmosphere, brought about by a change in sound speed with height.

Noise levels are increased when the wind blows from source to receptor or under temperature inversion conditions (both of which are sometimes referred to as ‘adverse weather conditions’), and decreased when the wind blows from receptor to the source or under temperature lapse conditions.

One complete year of meteorological data (2017) from the HVO Corporate automatic weather station (AWS) was analysed to determine the frequency of occurrence of each of the modelled meteorological conditions, by season and time period. The HVO Corporate AWS is located within the HVO North project area, and data recorded at this AWS are considered representative of weather conditions in the region. Multiple years of data were considered, and 2017 was selected as the most representative of long-term regional weather trends and had a very high level of completeness. 2017 was used for the EIS NIA and for consistency has been used in this amendment NIA.

Sigma-theta data was analysed, in accordance with procedures in Section D1.4 of the NPfI, to determine the appropriate stability class and associated vertical temperature gradient for each weather record. A vertical temperature gradient of 4 degrees C per 100 m was adopted for atmospheric stability class F to capture predictions for the upper end of the range specified in Table D2 of the NPfI.

Attachment E lists the 260 meteorological conditions included in the assessment.

4.2.2 Mining scenarios

Five operational stages have been modelled, indicatively representing Year 3, Year 6, Year 8, Year 12 and Year 15 of the amended Project; these nominally correspond to years 2029, 2032, 2034, 2038 and 2041. These modelled stages are different from the EIS modelled stages to reflect the new mine plans developed for the amendment and a reduction in the proposed life of mining operations at both HVO North and HVO South. Factors that may contribute to changes in predicted noise impacts associated with the amended project when compared to the original application include revised fleet sizes and equipment types, altered pit progression and scheduling due to lower annual ROM production rates, and shifts in the location and timing of active dig and dump operations.

Numerous refinements of each stage were made to determine the most efficient mine layout whilst minimising noise emissions. Further details of proposed noise mitigation measures are provided in Section 4.2.4 of this NIA.

Haul road alignments were optimised to provide topographical shielding and to avoid haulage of coal and overburden in exposed areas as far as practicable. Those modelled are indicative to allow for assessment; road alignments may vary, as is usual, for actual mining operations.

All known major noise sources were included in model scenarios. Plant (other than locomotives which were modelled as idling on the rail loop) was modelled at maximum sound power, and on the assumption that all plant operates continuously and simultaneously. In reality, this rarely occurs and as such, modelled results are considered conservative. Modelled plant quantities represent in-service levels and include an allowance for availability and utilisation.

Table 4.1 and Table 4.2 list representative typical plant quantities included in each model stage for HVO North and HVO South respectively. These are indicative quantities to allow for assessment. Actual quantities will be determined by production requirements and may increase or decrease relative to those assessed. Operations should be monitored and modified as required to ensure the site operates within approved limits. Table 4.3 lists CPP plant included in all model stages.

Figure B.1 to Figure B.5 in Attachment B show modelled plant locations and mine plan topography.

Table 4.1 HVO North open cut plant items included in models

Equipment category	Quantities				
Representative type	**Year 3**	**Year 6**	**Year 8**	**Year 12**	**Year 15**
Excavators and loaders					
P&H 4100	-	-	1	1	1
Liebherr R9800	2	2	2	2	2
Hitachi EX5600	4	4	6	8	8
Hitachi EX3600	3	4	4	4	4
LeTourneau 1850	1	1	1	1	1
Haul trucks					
Komatsu 830E	33	39	49	54	52

Equipment category	Quantities				
Representative type	**Year 3**	**Year 6**	**Year 8**	**Year 12**	**Year 15**
Komatsu 930E	17	15	23	28	28
Dozers					
Caterpillar D10	5	5	7	7	7
Caterpillar D11	15	15	21	24	24
Komatsu WD900	4	4	6	7	6
Drills					
Drill 70klb	5	6	6	6	7
Drill 50klb	1	1	1	1	2
Drill coal	-	-	-	1	-
Water trucks					
Caterpillar 785 water cart	3	3	4	4	4
Caterpillar 789 water cart	3	4	5	5	5
Graders					
Caterpillar 16M grader	5	5	7	8	7
Caterpillar 24M grader	2	2	2	4	4
Service trucks					
Caterpillar 773 service truck	3	4	5	5	5

Notes: 1. Table shows representative typical plant that may operate at any point in time within the mine to allow for assessment.

Table 4.2 HVO South open cut plant items included in models

Equipment category	Quantities				
Representative type	**Year 3**	**Year 6**	**Year 8**	**Year 12**	**Year 15**
Excavators and loaders					
P&H 4100	2	2	1	-	-
Hitachi EX5600	4	4	4	1	2
Hitachi EX3600	3	2	2	1	1
LeTourneau 1850	1	1	1	1	1
Haul trucks					
Komatsu 830E	32	30	23	12	15
Komatsu 930E	19	21	10	-	-
Dozers					
Caterpillar D10	5	5	3	2	2

Equipment category	Quantities				
Representative type	**Year 3**	**Year 6**	**Year 8**	**Year 12**	**Year 15**
Caterpillar D11	16	16	10	5	5
Komatsu WD900	4	4	2	1	1
Drills					
Drill 70klb	3	3	3	2	1
Drill 50klb	1	1	1	1	-
Drill coal	1	1	1	-	1
Water trucks					
Caterpillar 785 water cart	3	3	2	1	2
Caterpillar 789 water cart	4	3	2	1	1
Graders					
Caterpillar 16M grader	5	5	3	2	3
Caterpillar 24M grader	3	3	3	1	1
Service trucks					
Caterpillar 773 service truck	4	3	3	2	2
Water pumps					
Water pumps	2	2	2	2	2

Notes: 1. Table shows representative typical plant that may operate at any point in time within the mine to allow for assessment.

Table 4.3 CPP plant items included in models

	Quantities		
Description	**HVLP and Newdell LP**	**HV CPP**	**Howick CPP**
Coal Processing Plant (CPP)	-	1	1
Stockpile/ROM dozers	3	-	-
Le Tourneau L1850	-	1	-
Komatsu WA900	-	-	3
Haulage trucks (B-double)	-	-	7
Reject Komatsu 830E	-	2	-
Stockpile Komatsu 830E	-	2	-
Train wagon loading	2	-	-
Locomotives on rail loop (idle)	2	-	-
Locomotives on rail spur	-	-	-
ROM bin	1	1	1

	Quantities		
Description	**HVLP and Newdell LP**	**HV CPP**	**Howick CPP**
ROM crusher	-	1	1
Secondary sizing station	-	1	1
Stacker	1	1	2
Reclaimer	2[3]	1	-
Rail load out bin	2	-	-
Conveyors	15	16	8
Conveyor drives [2]	8	9	6
Feeder	-	1	1
Transfer station	5	3	2

Notes: 1. Conveyor drives located in close proximity to major noise sources such as crushing plant omitted, as contribution insignificant.
2. HVLP only.
3. Table shows representative typical plant that may operate at any point in time to allow for assessment.

4.2.3 Plant sound power

All acoustically significant noise sources on site are included in the models. Regular sound power testing of mining equipment is undertaken at HVO. Sound power levels used in modelling, provided in Table 4.4, have been based on measured in-service levels of plant operating at HVO where possible. Mining equipment and associated sound power levels presented in Table 4.4 are representative of a typical mining fleet to be used for the Project for the purposes of noise impact modelling. These sound power levels represent current or anticipated fleet average levels. It is normal for equipment within an equipment category to vary, with some equipment having sound power either higher or lower than the fleet average. HVO intends to review available mining equipment and technology, as required, throughout the life of the Project and may update or replace the mining equipment from time to time, whilst managing noise impacts to within relevant noise limits.

Dozers operating in exposed locations, such as overburden emplacement areas, should be restricted to 1st gear during periods of adverse meteorological conditions; however, this restriction would not be required during all weather conditions, and this management control should be implemented as required to assist with managing noise impacts to within relevant noise limits.

Haul truck sound powers were incorporated into haul route strings created for the length of each route. This method distributes the acoustic energy of vehicles along the length of each route. Routes comprise a string of segments of fixed length, each segment having a sound power determined by:

- sound power for type of trucks on route. Trucks travelling down ramps greater than 5% grade were allocated a sound power reduced by 2 dB
- number of each truck type on route in a 15-minute period, based on the load capacity of the loading unit
- speed of loaded truck on segment grade toward dump/ROM
- speed of empty truck on segment grade from dump/ROM.

Truck speeds are relative to grade in the direction of travel and were allocated in accordance with truck speed data collected from mine sites in the Hunter Valley. Speed determines the duration required to traverse each segment, an important variable when calculating L_{Aeq} for a specific time period. Graders, water carts and service trucks were allocated sound power levels in a similar manner. Haul truck, watercart and service truck sound power levels shown in Table 4.4 are uphill loaded, full power levels.

Train sound power levels were incorporated by creating strings of points representing the section of track the train would traverse in a 15-minute period.

Table 4.4 Sound power data

Equipment category	Representative Sound Power, $L_{eq,15minute}$	
	Linear (dB)	A-weighted (dB(A))
Excavators and loaders		
P&H 4100	124	116
Hitachi EX5600	125	117
600t Excavator (Best In Class)	122	117
Hitachi EX3600	122	117
Liebherr R9800	123	114
LeTourneau L1850	123	117
Haul trucks		
Komatsu 830E – full attenuation	124	116
Komatsu 930E – full attenuation	123	115
Dozers		
Caterpillar D10 (1st gear forward, 1st gear reverse composite)	121	116
Caterpillar D10 (1st gear forward, 2nd gear reverse composite)	123	120
Caterpillar D11 (1st gear forward, 1st gear reverse composite)	121	116
Caterpillar D11 (1st gear forward, 2nd gear reverse composite)	123	120
Wheel Dozer	119	110
Drills		
Drill 70 klb	121	113
Drill 50 klb	121	113
Drill Coal	121	113
Water trucks		
Caterpillar 785	125	119
Caterpillar 789	123	117
Graders		
Caterpillar 16M	115	108

Equipment category	Representative Sound Power, $L_{eq,15minute}$	
	Linear (dB)	A-weighted (dB(A))
Caterpillar 24M	119	112
Service trucks		
Caterpillar 773	122	117
CPP and stockpile mobile equipment		
LeTourneau L1850	123	117
Komatsu WA900	123	118
Howick haulage trucks (B-double)	114	109
CPP fixed plant		
HV Coal Processing Plant	134	117
Howick Coal Processing Plant	130	116
HV and Howick ROM crusher/breaker	128	111
HV and Howick secondary sizing station	126	114
HV and Howick ROM bin (with hood)	121	114
HVO and Howick Stacker	112	105
HVLP stockpile reclaimer	118	115
Other Reclaimers	118	113
Feeders	115-118	105-112
Yard Conveyors (per 100 m)	97-105	91-98
Overland Conveyor (per 100 m)	111	97
Small conv. Drives (< 250 kW)	103	96
Medium conv. Drives (250-600 kW)	105	99
Large conv. Drives (> 600 kW)	117	108
Stockpile dozers	121	116
Train wagon loading	113	110
Newdell LP and HVLP train load out bin	116	115
Train load out transfer and conveyor drives	120	114
Locomotives on rail loop (idle)	121	105
Water pumps	98	93

Notes: 1. Table shows representative typical sound powers to allow for assessment.

4.2.4 Feasible and reasonable noise controls

Section 3.4 and Fact Sheet F of the NPfI provide guidance on feasible and reasonable noise mitigation controls.

'Feasible' and 'reasonable' mitigation is defined in the NPfI as follows.

> A feasible mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. It may also include options such as amending operational practices (for example, changing a noisy operation to a less-sensitive period or location) to achieve noise reduction.
>
> Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure.

The following factors should be considered in deciding whether an option is reasonable:

1. Noise impacts
2. Noise mitigation benefits
3. Cost effectiveness of noise mitigation
4. Community views.

Further details are included in Fact Sheet F of the NPfI.

Table 4.5 lists possible mitigation options, whether these are feasible and/or reasonable, and provides justification as to why each option was adopted or not. Controls implemented in this NIA are a mix of controls already included in the existing NMP, and others developed during this assessment.

It is EMM's opinion that all feasible and reasonable noise controls have been investigated and, where applicable, included in the assessment. HVO's commitments regarding noise control and management are included in Section 6.1 of this NIA.

Table 4.5 Feasible and reasonable noise mitigation options

Mitigation option	Feasible mitigation test	Reasonable mitigation test	Justification for adopting or disregarding this option
Mitigation at the source			
Best Available Technology Economically Achievable (BATEA) equipment	yes	yes	HVO currently operates a combined attenuated and unattenuated mining fleet and is progressively attenuating the remaining fleet of large mining equipment. BATEA sound power has been adopted where reasonable and feasible in this NIA for significant noise generating mobile equipment.
Immediate replacement of all unattenuated equipment with BATEA equipment	yes	no	It would not be reasonable for HVO to immediately replace serviceable unattenuated equipment in good working order with BATEA equipment.
Best Management Practice (BMP)	yes	yes	HVO currently implements BMP, which is described in Section 4.1 of this NIA. BMP will continue to be applied to the Project, and is applied where relevant in this NIA.
Restrict activity to day and evening only	yes	no	Restricting operations to the day and evening would render the Project unviable.

Mitigation option	Feasible mitigation test	Reasonable mitigation test	Justification for adopting or disregarding this option
Dozers restricted to 1st gear	yes	yes	Restricting dozers to 1st gear operation during enhancing weather conditions is feasible and reasonable. This control was applied to the modelling assessment.
Restrict operation of rehabilitation dozers	yes	yes	Restricting operation of rehabilitation dozers during enhancing weather conditions is feasible and reasonable. This control was applied to the modelling assessment.
Restrict operation of drills in exposed locations	yes	yes	Restricting operation of exposed drills during enhancing weather conditions is feasible and reasonable. This control was applied to the modelling assessment.
Mitigation in the transmission path to the receptor			
Roadside bunds	yes	Constructing roadside bunds on strategic long term haul roads is reasonable. The cost of constructing bunds on short term haul roads is prohibitive.	An 8 m high roadside bund is to be constructed on the exposed side of the haul road from the Mitchell Pit towards the Howick CPP for approximately 900 m. Other roads are designed to utilise shielding from natural topography within the mining areas.
Low level dumps	yes	yes	Emplacement areas at varying elevations were considered to evaluate benefit of dumping of overburden in more shielded locations.
Alternative haulage routes	yes	yes	Where reasonable and feasible, alternative haul routes and roads will be utilised during enhancing weather conditions. This control was applied to the modelling assessment.
Relocation of attenuated equipment to high impact areas	yes	yes	Identification of high and low impact areas will determine if allocation of attenuated equipment is required. This may be required during periods of enhancing weather conditions.
Fixed infrastructure located in protected area	yes	yes	The HV CPP and Howick CPP fixed infrastructure is located in suitably protected areas with a buffer distance of approximately 8,000 and 5,000 metres respectively to the nearest receptors.
Mitigation at the receptor			
Mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity	yes	yes	This level of mitigation is feasible and reasonable for receptors predicted to have 'marginal' residual noise impact in accordance with NPfI definitions.
Upgrading façade elements, such as windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels	yes	yes	This level of mitigation is feasible and reasonable for receptors predicted to have 'moderate' and 'significant' residual noise impact in accordance with NPfI definitions.

Mitigation option	Feasible mitigation test	Reasonable mitigation test	Justification for adopting or disregarding this option
Voluntary acquisition	yes	yes	Voluntary acquisition rights is feasible and reasonable for receptors predicted to have 'significant' residual noise impact in accordance with NPfI and VLAMP definitions.

4.3 Operational noise assessment

4.3.1 Best achievable noise levels

Once all reasonable and feasible options in Table 4.5 were incorporated to site models, results were still higher than PNTL for many receptors, indicating additional mitigation measures would be required by the amended Project to further reduce noise. The only remaining option at this point is shutdown of operations during enhancing meteorological conditions.

A key benefit of cumulative distribution method modelling is that knowing the frequency occurrence of each modelled meteorological condition quantifies the frequency occurrence of each predicted result. From this, the percentage of time the Project would be required to adopt additional mitigation measures such as shutting down mining and ancillary equipment to meet PNTL can be calculated. Operational shutdown requirements to meet PNTL were determined this way; however, were not reasonable for the amended Project to remain viable (this on advice from HVO). This can be seen in Table 4.6 and Table 4.7 where shutdowns of up to 71% and 52% were predicted to be required for HVO North and South respectively to meet the PNTL.

Table 4.6 HVO North – Night Period PNTL and worst-case result for all stages

NAG	PNTL	Base scenario [1]		Mitigation scenario result before shutdowns [2]	
		$L_{Aeq,15\ minute}$ dB	% of time above PNTL	$L_{Aeq,15\ minute}$ dB	% of time above PNTL
1A	36	30	0%	30	0%
1B	36	29	0%	29	0%
1C	36	30	0%	30	0%
2	35	26	0%	26	0%
3	38	44	55%	43	50%
4	35	38	49%	37	40%
5A	37	44	63%	42	59%
5B	35	43	73%	41	71%
Other	35	34	0%	33	0%

Notes: 1. This operational scenario includes plant sound power mitigation, but does not include operational modifications, e.g. utilising alternative haulage routes and operating in more shielded locations.

2. This operational scenario includes plant sound power mitigation and operational modifications.

Table 4.7 HVO South – Night Period PNTL and worst-case result for all stages

NAG	PNTL	Base scenario [1]		Mitigation scenario result before shutdowns [2]	
		$L_{Aeq,15\ minute}$ dB	% of time above PNTL	$L_{Aeq,15\ minute}$ dB	% of time above PNTL
1A	36	41	71%	38	38%
1B	36	41	65%	39	47%
1C	36	38	49%	36	8%
2	35	37	41%	35	25%
3	38	43	64%	41	52%
4	35	36	15%	34	2%
5A	37	37	13%	36	0%
5B	35	34	0%	33	0%
Other	35	36	19%	33	0%

Notes: 1. This operational scenario includes plant sound power mitigation, but does not include operational modifications, e.g. utilising alternative haulage routes and operating in more shielded locations.

2. This operational scenario includes plant sound power mitigation and operational modifications.

In accordance with the NPfI, once all reasonable and feasible mitigation options had been considered, which has been extended to include periods of plant shutdown, reasonable ANL were determined for the amended Project and are detailed in Table 4.8. These ANL are consistent with the EIS NIA (EMM, 2022), except for adjustments to the day period ANL for NAG 1C, 2 and 4 based on the EPA RTS (EMM, 2023) advice where:

- for NAG 1C the daytime ANL is 1 dB lower
- for NAG 2, the daytime ANL is 3 dB lower
- for NAG 4, the daytime ANL is 3 dB lower.

Table 4.8 Achievable noise levels for the Project

NAG	Residential receptor ID	Day	Evening	Night
		$L_{Aeq,15minute}$ dB	$L_{Aeq,15minute}$ dB	$L_{Aeq,15minute}$ dB
1A	160, 161, 162, 163, 256, 258, 260, 261, 497	41	41	41
1B	120, 121, 122, 123	40	40	40
1C	244, 245, 246, 247, 498	39	39	39
2	126, 127, 128, 130, 134, 139, 141, 156, 157, 167, 169, 170, 173, 174, 175, 176, 178, 179, 248, 249, 250, 251, 262, 843, 846, 847, 852, 855, 856	37	35	35
3	308, 311, 317, 321, 322, 324, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 436, 440, 464, 952, 481	41	41	40
4	451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 462, 477, 478	37	37	37

NAG	Residential receptor ID	Day	Evening	Night
		$L_{Aeq,15minute}$ dB	$L_{Aeq,15minute}$ dB	$L_{Aeq,15minute}$ dB
5A	332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353 355, 356, 357, 358, 359, 360, 361, 362, 363, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 380, 381, 383, 384, 385, 389, 390, 392, 393, 394, 395, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 411, 413, 414, 415, 417, 418, 419, 420, 421, 422, 423, 482, 484, 835, 836, 837, 838, 839, 840	40	40	40
5B	326, 328, 330, 437, 438, 466, 487, 488, 489	40	40	40
-	All other privately owned land	40	35	35

Table 4.9 and Table 4.10 present the operational noise predictions against ANL. To comply with ANL the frequency of plant shutdowns required is up to 38% and 30% for HVO North and South, respectively. HVO have advised that the frequency of plant shutdowns required to meet proposed ANL can be accommodated by the Project schedule.

Table 4.9 HVO North – Night Period ANL and worst-case result for all stages

NAG	ANL	Base scenario [1]		Mitigation scenario result before shutdowns [2]	
		$L_{Aeq,15\ minute}$ dB	% of time above ANL	$L_{Aeq,15\ minute}$ dB	% of time above ANL
1A	41	30	0%	30	0%
1B	40	29	0%	29	0%
1C	39	30	0%	30	0%
2	35	26	0%	26	0%
3	40	44	45%	43	38%
4	37	38	29%	37	8%
5A	40	44	53%	42	34%
5B	40	43	55%	41	30%
Other	35	34	0%	33	0%

Notes: 1. This operational scenario includes plant sound power mitigation, but does not include operational modifications, e.g. utilising alternative haulage routes and operating in more shielded locations.

2. This operational scenario includes plant sound power mitigation and operational modifications.

Table 4.10 HVO South – Night Period ANL and worst-case result for all stages

NAG	ANL	Base scenario [1]		Mitigation scenario result before shutdowns [2]	
		$L_{Aeq,15\ minute}$ dB	% of time above ANL	$L_{Aeq,15\ minute}$ dB	% of time above ANL
1A	41	41	10%	38	0%
1B	40	41	15%	39	1%
1C	39	38	3%	36	0%
2	35	37	41%	35	25%
3	40	43	51%	41	30%
4	37	36	1%	34	0%
5A	40	37	0%	36	0%
5B	40	34	0%	33	0%
Other	35	36	19%	33	0%

Notes: 1. This operational scenario includes plant sound power mitigation, but does not include operational modifications, e.g. utilising alternative haulage routes and operating in more shielded locations.

2. This operational scenario includes plant sound power mitigation and operational modifications.

4.3.2 Operational A-weighted predictions

Results presented in this NIA are 90th percentile predictions that meet or are below the ANL for the Project. The residual impact assessment outcomes based on those results are provided Table 4.11 and Table 4.12. In summary:

- 109 private residential receptors have 90th percentile predictions exceeding PNTL for HVO North
- 23 private residential receptors have 90th percentile predictions exceeding PNTL for HVO South.

Table 4.11 and Table 4.12 present worst-case season 90th percentile operational noise predictions for the five modelled stages for HVO North and HVO South respectively. The maximum result for the five stages is also provided for each time period. Results are presented for all receptors (132) with a prediction that exceeds PNTL in any time period.

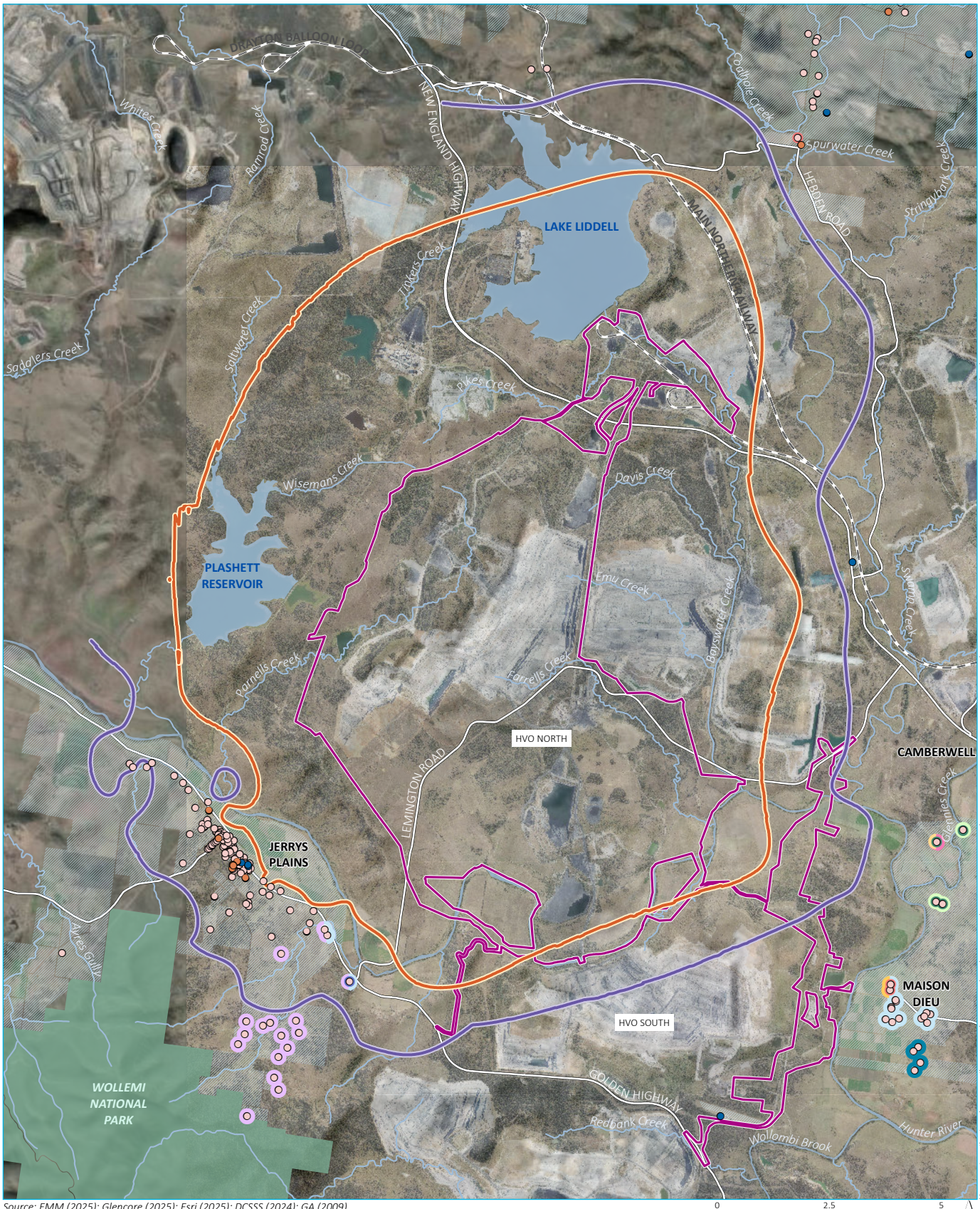
A complete set of 90th percentile predictions for all receptors is presented in Attachment A.

Figure 4.1 and Figure 4.2 illustrate indicative HVO North and HVO South maximum envelope $L_{Aeq,15minute}$ noise contours. These contours represent the maximum envelope predicted for all stages and all time periods. A complete set of noise contour figures for each individual stage is presented in Attachment C.

4.3.3 Prescribed noise limits

It should be noted that the results presented in this NIA do not necessarily match the ANL in all cases. The ANL are levels that HVO is proposing it could meet 100% of the time, as that level of compliance with approved noise criteria is required by regulators in NSW. Results in this NIA represent a typical worst case operating scenario, which shows variations, as expected, in predicted levels across the assessed receptors. Some receptors will require the predicted ANL as noise limits when others do not, as key receptors determine the ANL in each NAG and there is variability across each NAG. However, results for all receptors meet or are below the ANL presented in Section 4.3.2.

Given the preceding, predicted noise levels in Table 4.11 and Table 4.12 should not be prescribed as approved noise limits. The amended Project viability has been determined on the basis of ANL being approved as noise limits.



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Amended proposed HVO North development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North maximum envelope

$L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 4.1

EMM
creating opportunities

\\emm.local\xdrive\Secured\Divisions\H190408\GIS\02_Maps_2025NoiseReport\ANIA005_HVOSMax15minContours\ANIA005_HVOSMax15minContours_20250731_02.aprx 31/07/2025

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Proposed HVO South development consent boundary

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South maximum envelope

$L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 4.2

EMM
creating opportunities

Table 4.11 HVO North operational noise predictions– $L_{Aeq,15minute}$ dB

Receptor ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
311	41	41	38	29	29	37	30	29	**39**	27	26	**39**	31	33	**39**	30	34	**39**	31	34	**39**
317	41	41	38	28	29	37	29	30	**39**	26	26	**39**	30	33	**39**	31	34	**39**	31	34	**39**
321	41	41	38	28	30	38	30	33	**39**	28	32	**40**	34	37	**40**	35	37	**39**	35	37	**40**
322	41	41	38	29	32	38	31	34	**40**	30	35	**40**	36	37	**39**	36	37	**39**	36	37	**40**
324	41	41	38	29	31	38	31	33	**40**	29	33	**40**	35	37	**40**	35	37	**39**	35	37	**40**
326	40	35	35	35	**36**	**38**	37	**36**	**39**	36	**36**	**38**	36	35	**38**	35	34	**37**	37	**36**	**39**
328	40	35	35	36	**37**	**38**	37	**37**	**40**	37	**37**	**39**	36	35	**38**	36	34	**37**	37	**37**	**40**
330	40	35	35	35	**36**	**38**	37	**37**	**39**	36	**36**	**38**	36	35	**38**	35	34	**37**	37	**37**	**39**
332	41	38	37	35	36	**38**	37	37	**39**	36	37	**39**	36	36	**38**	35	35	**38**	37	37	**39**
333	41	38	37	35	36	**38**	36	37	**39**	36	37	**38**	36	36	**38**	35	35	37	36	37	**39**
334	41	38	37	35	36	**38**	36	37	**39**	36	37	**38**	35	36	**38**	35	35	37	36	37	**39**
335	41	38	37	35	36	**38**	36	38	**39**	36	37	**38**	36	36	**38**	35	35	**38**	36	38	**39**
336	41	38	37	35	36	**38**	37	37	**39**	36	37	**39**	36	36	**38**	36	35	**38**	37	37	**39**
337	41	38	37	35	36	**38**	36	37	**39**	36	37	**39**	35	36	**38**	36	35	**38**	36	37	**39**
338	41	38	37	34	36	**38**	36	37	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
339	41	38	37	34	35	37	35	36	**39**	35	37	**38**	35	36	**38**	35	35	37	35	37	**39**
340	41	38	37	34	35	37	35	36	**39**	35	37	**38**	35	37	**38**	35	35	37	35	37	**39**
341	41	38	37	34	35	**38**	35	36	**39**	36	37	**38**	36	37	**38**	35	35	37	36	37	**39**

Receptor ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
342	41	38	37	34	35	**38**	35	37	**39**	36	37	**39**	36	37	**38**	35	35	37	36	37	**39**
343	41	38	37	34	35	**38**	35	37	**39**	36	37	**39**	36	37	**38**	35	35	37	36	37	**39**
344	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**38**	35	35	37	36	37	**39**
345	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**38**	35	36	**38**	36	37	**39**
346	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
347	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
348	41	38	37	34	36	**38**	36	37	**40**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**40**
349	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	35	**38**	36	37	**39**
350	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
351	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
352	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
353	41	38	37	33	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
355	41	38	37	33	36	**39**	35	37	**39**	36	38	**39**	36	37	**39**	36	36	**38**	36	38	**39**
356	41	38	37	33	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
357	41	38	37	33	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
358	41	38	37	33	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
359	41	38	37	33	36	**39**	35	37	**39**	36	38	**39**	36	37	**39**	36	36	**38**	36	38	**39**
360	41	38	37	33	36	**38**	35	37	**39**	36	38	**39**	36	37	**39**	36	36	**38**	36	38	**39**
361	41	38	37	33	36	**39**	35	37	**39**	36	38	**39**	36	37	**39**	36	36	**38**	36	38	**39**
362	41	38	37	32	36	**39**	34	37	**39**	36	38	**39**	36	37	**40**	36	36	**38**	36	38	**40**

Receptor ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
363	41	38	37	32	36	**39**	34	37	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
366	41	38	37	33	36	**39**	35	37	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
367	41	38	37	33	36	**39**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
368	41	38	37	33	36	**39**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
369	41	38	37	32	36	**39**	34	36	**39**	36	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
370	41	38	37	33	36	**38**	35	36	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
371	41	38	37	32	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
372	41	38	37	32	35	**38**	35	36	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
373	41	38	37	32	36	**38**	35	37	**39**	35	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
374	41	38	37	32	36	**38**	34	36	**39**	35	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
375	41	38	37	32	36	**38**	34	36	**39**	35	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
376	41	38	37	31	35	**39**	34	36	**39**	35	37	**39**	36	37	**39**	36	37	**39**	36	37	**39**
377	41	38	37	32	36	**39**	34	37	**39**	35	37	**39**	36	37	**39**	36	36	**38**	36	37	**39**
380	41	38	37	31	34	**39**	34	36	**39**	34	37	**39**	36	37	**39**	35	37	**39**	36	37	**39**
381	41	38	37	31	35	**38**	33	36	**39**	35	37	**39**	36	37	**39**	35	37	**38**	36	37	**39**
383	41	38	37	31	35	**39**	33	36	**39**	35	37	**39**	36	37	**39**	35	37	**38**	36	37	**39**
384	41	38	37	32	35	**39**	34	36	**39**	35	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
385	41	38	37	32	35	**39**	34	36	**39**	35	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
389	41	38	37	30	34	**39**	33	36	**39**	34	37	**40**	36	37	**39**	35	36	**39**	36	37	**40**
390	41	38	37	30	34	**39**	33	36	**39**	34	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**

Receptor ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
392	41	38	37	30	33	**39**	33	36	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
393	41	38	37	29	33	**39**	33	35	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
394	41	38	37	30	33	**39**	33	36	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
395	41	38	37	30	33	**39**	33	36	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
397	41	38	37	30	33	**39**	33	35	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
398	41	38	37	30	33	**38**	33	35	**39**	33	36	**39**	36	37	**39**	35	36	**38**	36	37	**39**
399	41	38	37	29	33	**39**	33	35	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
400	41	38	37	30	33	**39**	33	35	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
401	41	38	37	30	33	**39**	33	35	**39**	33	37	**39**	36	37	**39**	36	37	**39**	36	37	**39**
402	41	38	37	30	34	**39**	33	35	**39**	33	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
403	41	38	37	30	34	**39**	33	36	**39**	34	37	**40**	36	37	**39**	36	37	**39**	36	37	**40**
404	41	38	37	30	34	**38**	33	35	**39**	33	36	**39**	36	37	**39**	35	36	**39**	36	37	**39**
405	41	38	37	30	34	**39**	33	36	**39**	34	37	**40**	36	37	**39**	35	36	**39**	36	37	**40**
406	41	38	37	30	34	**39**	33	36	**39**	34	37	**40**	36	37	**39**	35	36	**39**	36	37	**40**
407	41	38	37	31	34	**38**	33	36	**39**	34	36	**39**	36	37	**39**	35	36	**39**	36	37	**39**
408	41	38	37	30	34	**38**	33	35	**39**	33	36	**39**	36	37	**39**	35	36	**39**	36	37	**39**
409	41	38	37	31	35	**38**	33	36	**39**	34	37	**39**	36	37	**39**	35	37	**38**	36	37	**39**
411	41	38	37	31	35	**38**	33	35	**38**	34	37	**39**	36	37	**38**	35	37	**38**	36	37	**39**
413	41	38	37	31	35	**38**	33	36	**39**	34	36	**39**	36	37	**39**	35	36	**38**	36	37	**39**
414	41	38	37	31	35	**38**	33	35	**38**	34	36	**39**	35	36	**38**	35	36	**38**	35	36	**39**

Receptor ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
415	41	38	37	31	35	**38**	33	35	**38**	34	37	**39**	35	37	**38**	35	36	**38**	35	37	**39**
417	41	38	37	33	36	**38**	35	36	**39**	36	37	**39**	36	37	**38**	35	36	**38**	36	37	**39**
418	41	38	37	32	35	**38**	34	36	**38**	36	37	**39**	36	37	**38**	35	36	**38**	36	37	**39**
419	41	38	37	31	34	**38**	33	35	**38**	34	36	**38**	35	36	**38**	35	36	**38**	35	36	**38**
420	41	38	37	30	34	**38**	33	35	**39**	34	36	**39**	36	37	**39**	35	36	**39**	36	37	**39**
421	41	38	37	31	34	**39**	34	36	**39**	34	37	**40**	36	37	**39**	36	36	**39**	36	37	**40**
422	41	38	37	31	35	**39**	34	36	**39**	35	37	**39**	36	37	**39**	36	37	**39**	36	37	**39**
423	41	38	37	30	34	**39**	33	36	**39**	34	37	**40**	36	37	**39**	35	36	**39**	36	37	**40**
427	41	41	38	31	32	37	31	33	**39**	31	35	38	35	36	38	35	36	38	35	36	**39**
428	41	41	38	31	32	37	31	33	**39**	31	35	38	35	36	38	35	36	38	35	36	**39**
429	41	41	38	30	32	38	31	33	**40**	29	34	**39**	35	37	**39**	35	37	**39**	35	37	**40**
430	41	41	38	30	32	37	31	33	**39**	31	35	**39**	35	36	38	35	36	**39**	35	36	**39**
431	41	41	38	29	31	38	31	33	**39**	29	33	**39**	35	37	**39**	35	37	**39**	35	37	**39**
434	41	41	38	28	28	38	29	32	**39**	28	28	**40**	32	35	**40**	33	36	**40**	33	36	**40**
436	41	41	38	28	28	37	30	31	**39**	28	28	**39**	31	34	**39**	33	35	**40**	33	35	**40**
437	40	35	35	35	35	38	37	**36**	**39**	36	35	**38**	35	34	**37**	35	34	**37**	37	**36**	**39**
440	41	41	38	28	28	37	30	30	**39**	28	27	38	31	34	39	33	35	40	33	35	**40**
466	40	35	35	33	34	36	34	35	**37**	34	35	**37**	34	35	36	34	35	36	34	35	**37**
481	41	41	38	31	32	37	31	33	**39**	31	35	38	34	36	38	35	36	38	35	36	**39**
482	41	38	37	33	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**

Receptor ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
484	41	38	37	34	36	**38**	35	37	**39**	36	37	**39**	36	37	**38**	36	36	**38**	36	37	**39**
487	40	35	35	34	33	**36**	36	35	**38**	35	34	**37**	35	34	**37**	34	33	35	36	35	**38**
488	40	35	35	33	33	**36**	35	35	**37**	34	33	**36**	34	33	**36**	33	32	34	35	35	**37**
489	40	35	35	33	33	**36**	35	34	**37**	34	33	**36**	33	32	35	32	31	33	35	34	**37**
835	41	38	37	33	36	**38**	35	37	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
836	41	38	37	33	36	**38**	35	36	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
837	41	38	37	33	36	**38**	35	36	**39**	36	37	**39**	36	37	**39**	35	36	**38**	36	37	**39**
838	41	38	37	31	34	**39**	33	36	**39**	34	37	**39**	36	37	**39**	35	37	**39**	36	37	**39**
839	41	38	37	31	35	**38**	33	36	**39**	34	37	**39**	36	37	**39**	35	37	**38**	36	37	**39**
840	41	38	37	30	34	**39**	33	35	**39**	34	37	**39**	36	37	**39**	35	36	**39**	36	37	**39**
952	41	41	38	28	28	**38**	30	32	**39**	30	30	**39**	33	36	**40**	34	37	**40**	34	37	**40**

Notes: 1. Values in bold type exceed PNTL.

Table 4.12 HVO South operational noise predictions– $L_{Aeq,15minute}$ dB

Receptor ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
120	40	36	36	35	36	**37**	31	32	33	34	35	**38**	30	31	32	27	31	35	35	36	**38**
121	40	36	36	35	36	**37**	31	32	33	35	36	**39**	30	31	32	29	31	**37**	35	36	**39**
122	40	36	36	35	35	**37**	31	32	33	33	34	**37**	29	31	32	27	31	34	35	35	**37**
123	40	36	36	35	36	**37**	31	32	33	34	35	**38**	29	31	32	28	33	36	35	36	**38**
160	40	36	36	36	**37**	**39**	32	33	34	34	35	**38**	31	32	34	31	32	34	36	**37**	**39**
161	40	36	36	36	**37**	**39**	32	33	34	34	34	**37**	31	32	34	30	31	34	36	**37**	**39**
162	40	36	36	36	**37**	**39**	32	33	34	34	35	**37**	31	32	34	30	31	34	36	**37**	**39**
163	40	36	36	35	36	**38**	32	33	34	33	34	36	30	32	33	28	29	31	35	36	**38**
244	40	36	36	34	35	**37**	31	31	32	33	34	36	29	30	31	28	30	33	34	35	**37**
245	40	36	36	34	36	**37**	31	31	33	33	34	36	29	30	32	29	30	33	34	36	**37**
246	40	36	36	34	35	**37**	30	31	32	32	33	35	29	30	31	28	30	33	34	35	**37**
247	40	36	36	34	35	**37**	30	31	32	32	33	35	28	29	31	28	30	33	34	35	**37**
256	40	36	36	36	**37**	**39**	32	33	34	32	34	36	30	32	34	29	30	33	36	**37**	**39**
258	40	36	36	36	**37**	**39**	32	33	34	33	34	36	30	32	33	28	29	32	36	**37**	**39**
260	40	36	36	35	**37**	**38**	32	32	34	34	35	**38**	30	32	33	30	31	34	35	**37**	**38**
261	40	36	36	36	**37**	**39**	32	33	34	34	35	**38**	31	32	34	31	31	34	36	**37**	**39**
308	41	41	38	37	37	**40**	37	36	**39**	38	38	**40**	37	37	**40**	35	35	**39**	38	38	**40**
311	41	41	38	35	36	**39**	36	37	**39**	36	37	38	35	35	**39**	33	34	37	36	37	**39**

Receptor ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
317	41	41	38	35	36	38	36	37	**39**	36	37	38	34	35	**39**	32	34	37	36	37	**39**
434	41	41	38	35	36	**39**	36	37	**39**	35	36	37	34	35	38	31	33	35	36	37	**39**
436	41	41	38	35	36	38	35	36	39	35	36	37	34	35	37	32	33	36	35	36	**39**
497	40	36	36	36	**37**	**39**	32	33	34	32	34	36	30	32	33	29	30	33	36	**37**	**39**
498	40	36	36	34	35	**37**	31	31	32	33	34	36	29	30	32	29	30	33	34	35	**37**

Notes: 1. Values in bold type exceed PNTL.

4.3.4 Residual noise impact assessment

As discussed in Section 4.2.4 all reasonable and feasible mitigation controls are applied to the amended Project. Therefore, any predicted exceedances of PNTL can be considered residual noise impact.

Residual noise impacts were evaluated for the Project with all reasonable and feasible noise control options included. The outcomes were as follows:

- No receptors are predicted to experience a significant residual impact, meaning that voluntary acquisition rights are not triggered at any receptor as a result of the amended Project.
- The residual impact at all receptors is predicted to be either negligible or marginal.
- Thirty receptors (equivalent to 24 landholders) are predicted to experience a marginal impact due to the amended Project, as follows:
    - 22 receptors (equivalent to 19 landholders) are in new areas of marginal impact, being NAGs 5A and 5B in the area of Jerry Plains. Of these, five are 'isolated' and therefore qualify for voluntary noise mitigation rights. These are the same five receptors that qualified for voluntary noise mitigation rights in the EIS NIA. The remaining 17 are within the Jerrys Plains village and therefore do not qualify for mitigation as per Section 4.2 of the NPfI that states that "*Receiver treatment, including the extreme case of voluntary acquisition, is normally only applicable for isolated residences in rural areas.*" There is no one noise source responsible for the marginal impacts in the Jerrys Plains area. Identification of the highest contributing sources was part of the feasible and reasonable noise mitigation assessment of the Project, which was undertaken prior to determining the residual noise impacts. The feasible and reasonable mitigation measures applied to the Project are described in Table 4.5. Further discussion is provided in Section 4.3.6.
    - 8 receptors (equivalent to 5 landholders) (are in areas of existing marginal impact (NAGs 1A and 1B in Maison Dieu), and therefore currently have noise mitigation rights which will continue.

It is noted that there are an additional 12 receptors that hold existing noise mitigation rights under the HVO South project approval, and will be offered to maintain their rights, despite not being required to by the Project (receptors 120, 122, 123, 163, 244, 245, 246, 247, 260, 308, 311, 317).

For receptors listed in Table 4.11 and Table 4.12, residual noise impact significance levels have been determined in accordance with both Section 4 of the NPfI, and the VLAMP (refer to Section 0 for more detail). Assessment outcomes are presented in Table 4.14 and Table 4.15. Each column included in Table 4.14 and Table 4.15 is explained in Table 4.13.

Table 4.13 Explanation of Table 4.14 headings

Column heading	Explanation
Maximum Envelope Prediction	The maximum envelope 90th percentile prediction that meets or is below ANL for all stages and time periods. It is governed by the night period prediction in all cases.
Maximum Exceedance of PNTL	The highest predicted exceedance of PNTL due to the maximum envelope 90th percentile prediction.
Recommended Amenity Level	The night period recommended amenity noise level for a rural area from Table 2.2 of the NPfI.
Total Cumulative Industrial Level	The total cumulative industrial noise level is the maximum $L_{Aeq,period}$ from Section 4.8 of this NIA.

Column heading	Explanation
Cumulative Industrial Level > Recommended Amenity Level Test	“yes” if total cumulative industrial noise level is greater than the recommended amenity noise level, otherwise “no”.
NPfI Residual Noise Significance Level	The residual noise significance level determined in accordance with Table 4.1 of the NPfI.
VLAMP Residual Noise Significance Level	The residual noise significance level determined in accordance with the VLAMP. Where the total cumulative industrial noise level is less than the recommended amenity noise level, and the 90th percentile prediction exceeds PNTL by 3 to 5 dB, the marginal category is deemed to apply.

Table 4.14 HVO North residual noise significance level evaluation

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
328	40	5	40	37	No	Marginal	Marginal
326	39	4	40	37	No	Marginal	Marginal
330	39	4	40	37	No	Marginal	Marginal
437	39	4	40	37	No	Marginal	Marginal
348	40	3	40	37	No	Marginal	Marginal
362	40	3	40	37	No	Marginal	Marginal
389	40	3	40	38	No	Marginal	Marginal
390	40	3	40	38	No	Marginal	Marginal
392	40	3	40	38	No	Marginal	Marginal
393	40	3	40	38	No	Marginal	Marginal
394	40	3	40	38	No	Marginal	Marginal
395	40	3	40	38	No	Marginal	Marginal
397	40	3	40	38	No	Marginal	Marginal
399	40	3	40	37	No	Marginal	Marginal
400	40	3	40	38	No	Marginal	Marginal
402	40	3	40	37	No	Marginal	Marginal
403	40	3	40	38	No	Marginal	Marginal
405	40	3	40	38	No	Marginal	Marginal

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
406	40	3	40	38	No	Marginal	Marginal
421	40	3	40	38	No	Marginal	Marginal
423	40	3	40	38	No	Marginal	Marginal
487	38	3	40	35	No	Marginal	Marginal
321	40	2	40	39	No	Negligible	Negligible
322	40	2	40	39	No	Negligible	Negligible
324	40	2	40	39	No	Negligible	Negligible
332	39	2	40	37	No	Negligible	Negligible
333	39	2	40	37	No	Negligible	Negligible
334	39	2	40	37	No	Negligible	Negligible
335	39	2	40	37	No	Negligible	Negligible
336	39	2	40	37	No	Negligible	Negligible
337	39	2	40	37	No	Negligible	Negligible
338	39	2	40	37	No	Negligible	Negligible
339	39	2	40	36	No	Negligible	Negligible
340	39	2	40	37	No	Negligible	Negligible
341	39	2	40	37	No	Negligible	Negligible
342	39	2	40	37	No	Negligible	Negligible
343	39	2	40	37	No	Negligible	Negligible
344	39	2	40	37	No	Negligible	Negligible

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
345	39	2	40	37	No	Negligible	Negligible
346	39	2	40	37	No	Negligible	Negligible
347	39	2	40	37	No	Negligible	Negligible
349	39	2	40	37	No	Negligible	Negligible
350	39	2	40	37	No	Negligible	Negligible
351	39	2	40	37	No	Negligible	Negligible
352	39	2	40	37	No	Negligible	Negligible
353	39	2	40	37	No	Negligible	Negligible
355	39	2	40	37	No	Negligible	Negligible
356	39	2	40	37	No	Negligible	Negligible
357	39	2	40	37	No	Negligible	Negligible
358	39	2	40	37	No	Negligible	Negligible
359	39	2	40	37	No	Negligible	Negligible
360	39	2	40	37	No	Negligible	Negligible
361	39	2	40	37	No	Negligible	Negligible
363	39	2	40	37	No	Negligible	Negligible
366	39	2	40	37	No	Negligible	Negligible
367	39	2	40	37	No	Negligible	Negligible
368	39	2	40	37	No	Negligible	Negligible
369	39	2	40	37	No	Negligible	Negligible

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
370	39	2	40	37	No	Negligible	Negligible
371	39	2	40	37	No	Negligible	Negligible
372	39	2	40	37	No	Negligible	Negligible
373	39	2	40	37	No	Negligible	Negligible
374	39	2	40	37	No	Negligible	Negligible
375	39	2	40	37	No	Negligible	Negligible
376	39	2	40	38	No	Negligible	Negligible
377	39	2	40	37	No	Negligible	Negligible
380	39	2	40	37	No	Negligible	Negligible
381	39	2	40	37	No	Negligible	Negligible
383	39	2	40	37	No	Negligible	Negligible
384	39	2	40	37	No	Negligible	Negligible
385	39	2	40	37	No	Negligible	Negligible
398	39	2	40	37	No	Negligible	Negligible
401	39	2	40	37	No	Negligible	Negligible
404	39	2	40	37	No	Negligible	Negligible
407	39	2	40	37	No	Negligible	Negligible
408	39	2	40	37	No	Negligible	Negligible
409	39	2	40	37	No	Negligible	Negligible
411	39	2	40	37	No	Negligible	Negligible

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
413	39	2	40	37	No	Negligible	Negligible
414	39	2	40	37	No	Negligible	Negligible
415	39	2	40	37	No	Negligible	Negligible
417	39	2	40	37	No	Negligible	Negligible
418	39	2	40	37	No	Negligible	Negligible
420	39	2	40	37	No	Negligible	Negligible
422	39	2	40	37	No	Negligible	Negligible
429	40	2	40	39	No	Negligible	Negligible
434	40	2	40	40	No	Negligible	Negligible
436	40	2	40	40	No	Negligible	Negligible
440	40	2	40	40	No	Negligible	Negligible
466	37	2	40	35	No	Negligible	Negligible
482	39	2	40	37	No	Negligible	Negligible
484	39	2	40	37	No	Negligible	Negligible
488	37	2	40	34	No	Negligible	Negligible
489	37	2	40	34	No	Negligible	Negligible
835	39	2	40	37	No	Negligible	Negligible
836	39	2	40	37	No	Negligible	Negligible
837	39	2	40	37	No	Negligible	Negligible
838	39	2	40	37	No	Negligible	Negligible

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
839	39	2	40	37	No	Negligible	Negligible
840	39	2	40	37	No	Negligible	Negligible
952	40	2	40	39	No	Negligible	Negligible
311 [1]	39	1	40	40	No	Negligible	Negligible
317 [1]	39	1	40	40	No	Negligible	Negligible
419	38	1	40	37	No	Negligible	Negligible
427	39	1	40	39	No	Negligible	Negligible
428	39	1	40	39	No	Negligible	Negligible
430	39	1	40	39	No	Negligible	Negligible
431	39	1	40	39	No	Negligible	Negligible
481	39	1	40	39	No	Negligible	Negligible

Notes: 1. Receptor currently has voluntary mitigation rights. Mitigation rights are to be retained.

Table 4.15 HVO South residual noise significance level evaluation

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
121 [1]	39	3	40	39	No	Marginal	Marginal
160 [1]	39	3	40	39	No	Marginal	Marginal
161 [1]	39	3	40	39	No	Marginal	Marginal
162 [1]	39	3	40	39	No	Marginal	Marginal
256 [2]	39	3	40	39	No	Marginal	Marginal
258 [1]	39	3	40	39	No	Marginal	Marginal
261 [1]	39	3	40	39	No	Marginal	Marginal
497 [2]	39	3	40	39	No	Marginal	Marginal
120 [1]	38	2	40	39	No	Negligible	Negligible
123 [1]	38	2	40	39	No	Negligible	Negligible
163 [1]	38	2	40	39	No	Negligible	Negligible
260 [1]	38	2	40	39	No	Negligible	Negligible
308 [3]	40	2	40	43	Yes	Negligible	Negligible
122 [1]	37	1	40	38	No	Negligible	Negligible
244 [1]	37	1	40	38	No	Negligible	Negligible
245 [1]	37	1	40	38	No	Negligible	Negligible
246 [1]	37	1	40	38	No	Negligible	Negligible
247 [1]	37	1	40	38	No	Negligible	Negligible
311 [1]	39	1	40	40	No	Negligible	Negligible

Receptor ID	Maximum envelope prediction below ANL $L_{Aeq,15minute}$ dB	Maximum exceedance of PNTL dB(A)	Recommended amenity level $L_{Aeq,period}$ dB	Total cumulative industrial level $L_{Aeq,period}$ dB	Cumulative industrial level > recommended amenity level test	NPfI residual noise significance level	VLAMP residual noise significance level
317 [1]	39	1	40	40	No	Negligible	Negligible
434	39	1	40	40	No	Negligible	Negligible
436	39	1	40	40	No	Negligible	Negligible
498	37	1	40	38	No	Negligible	Negligible

Notes: 1. Receptor currently has voluntary noise mitigation rights under HVO approvals. Mitigation rights are to be retained.

2. Receptor has acquisition on request rights with Ravensworth Operations for air quality and mitigation rights with Ravensworth Operations and HVO South for noise. Mitigation rights are to be retained.

3. Receptor has acquisition on request rights with United Wambo Joint Venture for noise and mitigation rights with United Wambo Joint venture and HVO South for noise. Mitigation rights are to be retained.

A summary of receptors allocated to each residual noise significance category is provided in Table 4.16.

Table 4.16 Residual noise significance summary

Significance category	HVO North receptors	HVO South receptors
Significant	-	-
Moderate	-	-
Marginal	328, 326, 330, 437, 348, 362, 389, 390, 392, 393, 394, 395, 397, 399, 400, 402, 403, 405, 406, 421, 423, 487.	121, 160, 161, 162, 256, 258, 261, 497.
Negligible	321, 322, 324, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 349, 350, 351, 352, 353, 355, 356, 357, 358, 359, 360, 361, 363, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 380, 381, 383, 384, 385, 398, 401, 404, 407, 408, 409, 411, 413, 414, 415, 417, 418, 420, 422, 429, 434, 436, 440, 466, 482, 484, 488, 489, 835, 836, 837, 838, 839, 840, 952, 311, 317, 419, 427, 428, 430, 431, 481	120[1], 123[1], 163[1], 260[1], 308[1], 122[1], 244[1], 245[1], 246[1], 247[1], 311[1], 317[1], 434, 436, 498

Notes: 1. Receptor currently has voluntary noise mitigation rights under HVO approvals. Mitigation rights are to be retained.

Table 4.2 of the NPfI provides examples of receptor-based treatments that could be used to mitigate residual noise impact. That table is reproduced in Section 3.6.1 of this NIA. These treatments are generally consistent with Table 1 of the VLAMP, with the exception that the VLAMP also recommends residence mitigation where the residual impact category is significant.

4.3.5 EIS NIA comparison

A comparison with the residual noise impact outcomes from the EIS NIA is provided in Table 4.17.

Table 4.17 Residual noise impact comparison

Impact	EIS NIA receptor total	Amendment NIA receptor total
Receptors with significant residual impact	Nil	Nil
Receptors with marginal residual impact [1]	27 (equivalent to 19 landholders)	30 (equivalent to 24 landholders)
Receptors in new areas of marginal residual impact [1]	14 (equivalent to 11 landholders)	22 (equivalent to 19 landholders)
Receptors in existing areas of marginal impact	13 (equivalent to 8 landholders)	8 (equivalent to 5 landholders)
Receptors to maintain rights, despite not being required by the Project	7	12

Notes: 1. The EIS NIA noted 28 receptors with marginal residual impact and 15 receptors in new areas of marginal impact, however, one of those receptors (327) has since been demolished. Table 4.17 reflects this change and receptor 327 has not been included in this amendment NIA.

The proposed and limiting night period ANL are consistent between the EIS and the Amendment NIA; however, despite this, there are variations in the predicted residual noise impacts between the two assessments. These differences primarily stem from changes to the mine planning between the EIS and the amendment. The amendment incorporates new mine plans that reflect reduced annual ROM coal production rates, a shortened project life for both HVO North and HVO South, and avoidance of coal extraction in gas domain 1 at HVO North. Factors contributing to the changes in predicted noise impacts include revised fleet sizes and equipment types, altered pit progression and scheduling due to lower annual ROM production rates, the removal of the LCPP and associated rail facilities, and shifts in the location and timing of active dig and dump operations. These amendments have led to increased predicted marginal residual impacts in Jerrys Plains Village (NAG 5A), while reducing predicted impacts in Maison Dieu (NAG 1A, 1B, 1C). It should be noted that the increase in marginal residual impact in Jerrys Plains Village is a result of the revised operations now distributing noise across a different part of the village, where residences are more densely located. Despite this, the predicted noise levels remain within 2 dB across the entire NAG, which is below the threshold for perceptibility and indicates that the change, while reflected in the modelling, is not expected to be noticeable in practice. This is discussed further in Section 4.3.6.

4.3.6 NAG 5A marginal impact discussion

It should be noted that the NPfI specifies that receiver treatment is normally only applicable for isolated residences in rural areas. The VLAMP states the following on the applicability of noise mitigation and acquisition criteria:

> A consent authority can apply voluntary mitigation and voluntary land acquisition rights to reduce:
>
> - operational noise impacts of a development on privately owned land; and
> - rail noise impacts of a development on privately owned land near a non-network rail line (private rail line), that is on, or exclusively servicing an industrial site (see Appendix 3 of the RING);

But not:

- construction noise impacts, as these impacts are shorter term and can be controlled;
- noise impacts on the public road or rail network; or
- modifications of existing developments with legacy noise issues, where the modification would have beneficial or negligible noise impacts.

Although two new SSD consents are being sought, as required, for the Project at both HVO North and HVO South, and not a 'modification' in a planning sense to the existing development consent, the Project is an existing development with a long-standing history of a noise presence in Jerrys Plains Village (the village, NAG 5A), that warrants careful consideration before strictly applying policy ratified well after mining operations, particularly HVO, first commenced in the area. The VLAMP states that rights *can* be applied to reduce operational noise impacts of a development; however, it is important to note that the Project is not proposing to increase noise above the current limits that apply (as set out in the existing HVO North and South development consents or EPL 640).

HVO has exhausted all feasible and reasonable control options to reduce noise towards PNTL (Section 4.2.4). The resulting achievable noise levels, particularly for Jerrys Plains, are consistent with current HVO development consent/Project Approval and EPL limits and should not adversely impact the Jerrys Plains community. Noise levels there should not change as HVO would continue to operate within existing approved limits.

This NIA proposes in Section 5.1 that the $L_{Aeq,15minute}$ 40 dB limit in the village, current in both the HVO North consent DA 450-10-2003 and EPL 640, continues to apply. It is acknowledged that this criterion is higher than the relevant PNTL.

At present there is no requirement for receiver treatment at any residence in the village.

All HVO North predictions in NAG 5A are within a 2 dB range, which is widely accepted as an imperceptible difference in noise level.

Affording mitigation rights for some residences in the village and not others may result in the following:

- This may indicate some (i.e. those offered mitigation rights) will be subjected to perceptibly different noise levels than others, which is not the case.
- It could indicate to the community that noise levels will be increasing above current levels associated with the existing operation (no mitigation rights have previously been applicable), which is not the case.
- It may cause unnecessary social impacts and community frustration because some residents are afforded residential receiver treatments while immediately neighbouring residents are not.

It is therefore proposed that mitigation rights are not applicable to those 17 receptors (348, 362, 389, 390, 392, 393, 394, 395, 397, 399, 400, 402, 403, 405, 406, 421, and 423) in the village where predicted levels are 3 dB higher than PNTL in accordance with the VLAMP exclusions where:

- there are legacy noise issues (the predicted level has been approved and experienced for many years)
- the modification to operations has negligible noise impact (as shown by low noise complaint numbers).

Regarding these exclusions, the VLAMP references “modifications of existing developments”. While a new SSD consent is sought for the Project for both HVO North and HVO South, as noted above, the Project relates to the continuation of an operation that has existed in some capacity since 1949. Mining noise in the village is expected to continue as before and is not new.

HVO are proposing to continue operating within current noise limits at Jerrys Plains. Proposed limits are the same as existing and the community should therefore not experience noise levels above what is currently approved.

4.4 Private land area assessment

As described in Section 3.5 an assessment of operational noise impact over contiguous privately-owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls is required in accordance with the VLAMP. Additional single point predictions were generated over contiguous private lot areas for each of the five modelled stages to determine the maximum extent of noise impact over the life of the Project. Predictions for all privately owned land areas were below the acceptable amenity noise level plus 5 dB (Table 2.2 of the NPfI).

4.5 Construction noise assessment

Construction noise criteria and proposed construction hours are presented in Section 3.7 of this NIA. The following sections describe construction tasks required, scenarios assessed, and impact assessment outcomes.

A worst-case construction scenario has been assessed as follows.

1. Concurrent construction associated with the following activities. Approval for the Lake James enlargement is being sought under the HVO South consent, while the other construction tasks are being sought under the HVO North consent.

    - Lake James enlargement (HVO South)
    - Lemington Road realignment (HVO North)
    - Parnells Dam enlargement (HVO North)
    - Transmission and telecommunication line relocations (HVO North).

4.5.1 Construction scenario

Table 4.18 lists the work areas and construction tasks assessed, including equipment types, quantities, acoustic utilisation rates and sound powers for each task. Note that these parameters are representative of equipment typically used for such tasks; however, alternative or additional equipment may be utilised depending on final construction design.

Table 4.18 Construction scenario details

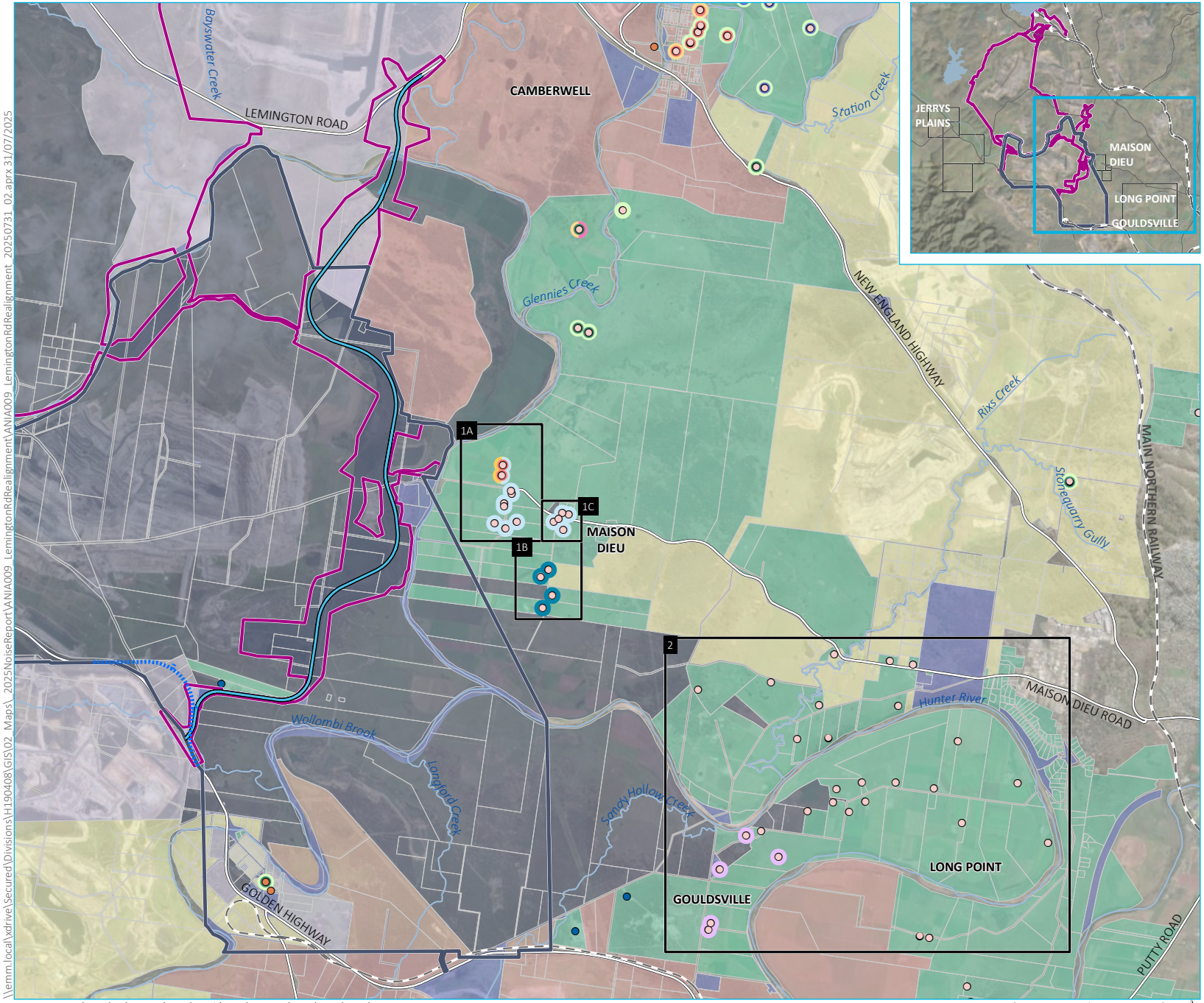
Task	Equipment type	Equipment quantity	Acoustic usage %	Sound power $L_{Aeq,15minute}$ dB
Lemington Road construction				
Establish sub base and base	D8 dozer	2	70	107
	D10 dozer	3	70	116
	Articulated truck	8	70	114
	Grader	2	70	108
	Water cart	3	70	100
	Bobcat	2	70	103
	Excavator – 30t	3	100	104
	Excavator 45t	1	100	108
	Compactor - small	1	70	108
	Compactor - large	2	70	113
	Roller - large	1	70	110
Drains and culverts	Articulated truck	2	70	114
	Grader	1	70	108

Task	Equipment type	Equipment quantity	Acoustic usage %	Sound power $L_{Aeq,15minute}$ dB
	Water cart	2	70	100
	Bobcat	2	70	103
	Excavator – 30t	3	100	104
	Excavator – 5t	2	100	101
	Compactor - small	2	70	108
Lemington Road/Golden Highway intersection	Articulated truck	8	70	114
	D8 dozer	1	70	107
	Excavator – 30t	3	100	104
	Excavator – 45t	1	100	108
	Grader	3	70	108
	Water cart	3	70	100
	Bobcat	1	70	103
	Compactor - small	3	70	108
	Roller - large	3	70	110
	D10 dozer	2	70	116
Lake James enlargement				
Earthworks	D8 dozer	3	70	107
	D10 dozer	2	70	116
	Highway truck	3	70	104
	Articulated truck	10	70	114
	Grader	1	70	108
	Water cart	4	70	100
	Bobcat	2	70	103
	Excavator – 50t	2	100	108
	Excavator – 30t	2	100	104
	Excavator – 5t	2	100	101
	Compactor - small	1	70	108
	Compactor - large	2	70	113
	Roller - large	1	70	110
Parnells Dam enlargement				
Earthworks	D8 dozer	3	70	107

Task	Equipment type	Equipment quantity	Acoustic usage %	Sound power $L_{Aeq,15minute}$ dB
	D10 dozer	4	70	116
	Highway truck	3	70	104
	Articulated truck	6	70	114
	Scraper 651	12	70	117
	Grader	1	70	108
	Water cart	4	70	100
	Bobcat	2	70	103
	Excavator – 50t	2	100	108
	Excavator – 30t	2	100	104
	Excavator – 5t	2	100	101
	Compactor - small	1	70	108
	Compactor - large	3	70	113
	Roller - large	1	70	110
Transmission and telecommunication line relocations				
Site preparation	Pole borers	3	70	112
	Articulated truck	5	70	114
	Crane	2	50	101
	Excavator – 30t	1	100	104
	D8 dozer	1	70	107

Equipment was modelled with acoustic energy distributed over the length of each work area as appropriate. Work that is confined to a distinct area such as the Lemington Road/Golden Highway intersection is modelled within that area. As the Lemington Road construction project covers a relatively long operating strip, equipment is modelled along three separate 1,000 m sections that cover the closest construction areas to receptors in Maison Dieu, which represents worst case impact. The highest result for each receptor is presented from the three construction areas. That is, each section was modelled separately, and the highest prediction from the three different sections was determined for each receptor. Figure 4.3 shows the proximity of NAGs 1A, 1B and 1C to the Lemington Road realignment.

Transmission and telecommunication line construction works were assessed in two areas. The first represents the worst case for receptors in NAGs 1A, 1B, 1C and 2. The second represents the worst case for receptors in NAG's 3, 4 and 5. The two areas are shown in Figure 4.4 and Figure 4.5.



KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Noise assessment group
- Alternative Golden Highway alignment
- Proposed Lemington Road realignment

Receptor location

- Private- residential
- Private- non residential
- Community Infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

Land ownership

- HVO JV land
- Other mine owned- Glencore land
- Other mine owned- Yancoal
- Other mine owned
- AGL Macquarie
- Private
- Public/Crown

Existing environment

- Cadastral boundary
- Rail line
- Major road
- Named watercourse

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Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 1 2 km

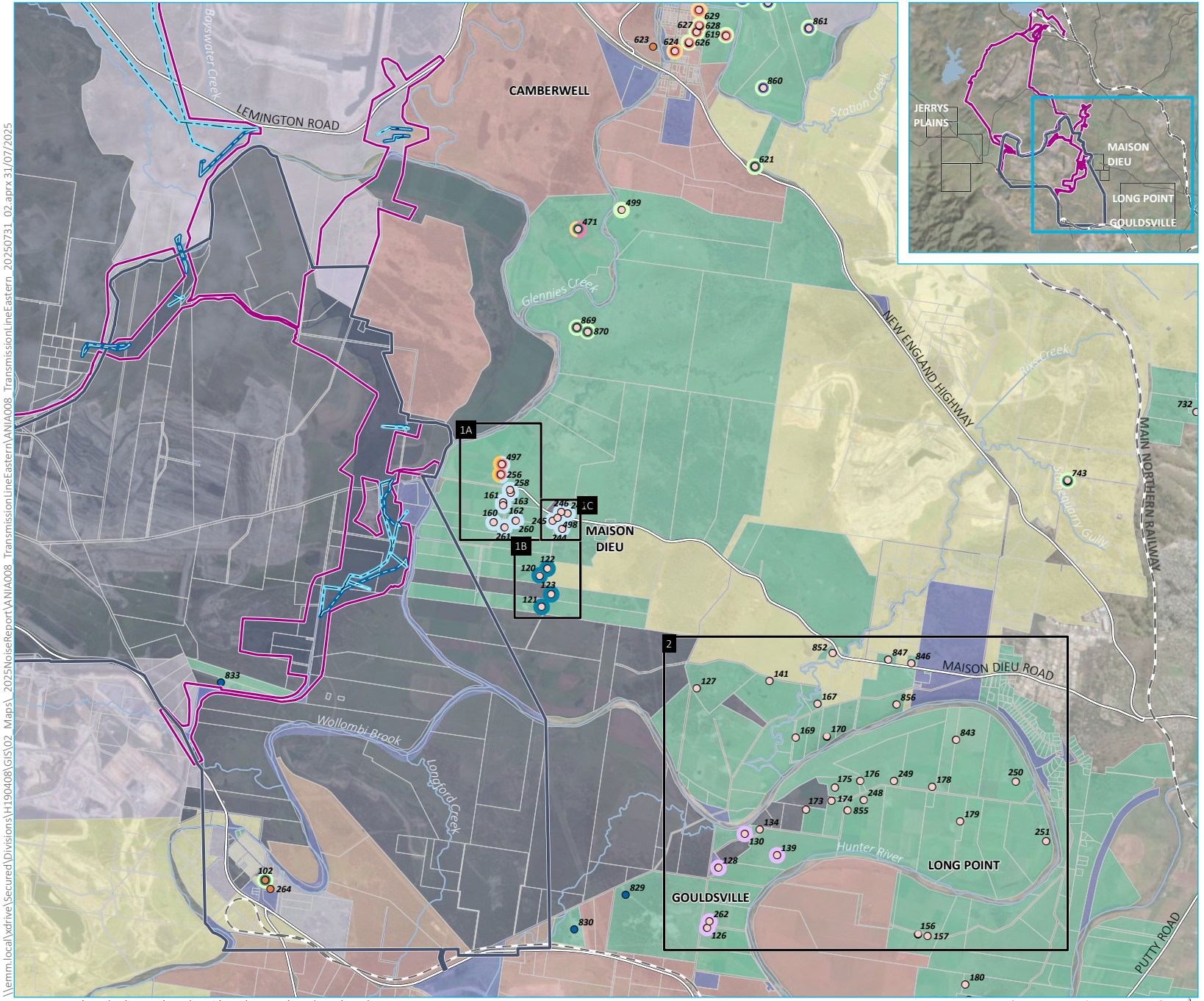
GDA2020 MGA Zone 56

N

Lemington Road realignment

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 4.3

EMM
creating opportunities



KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Noise assessment group

Transmission lines

- Ausgrid- new
- Ausgrid- to be removed

Receptor location

- Private- residential
- Private- non residential
- Community Infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

Land ownership

- HVO JV land
- Other mine owned- Glencore land
- Other mine owned- Yancoal
- Other mine owned
- AGL Macquarie
- Private
- Public/Crown

Existing environment

- Cadastral boundary
- Rail line
- Major road
- Named watercourse

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 1 2 km

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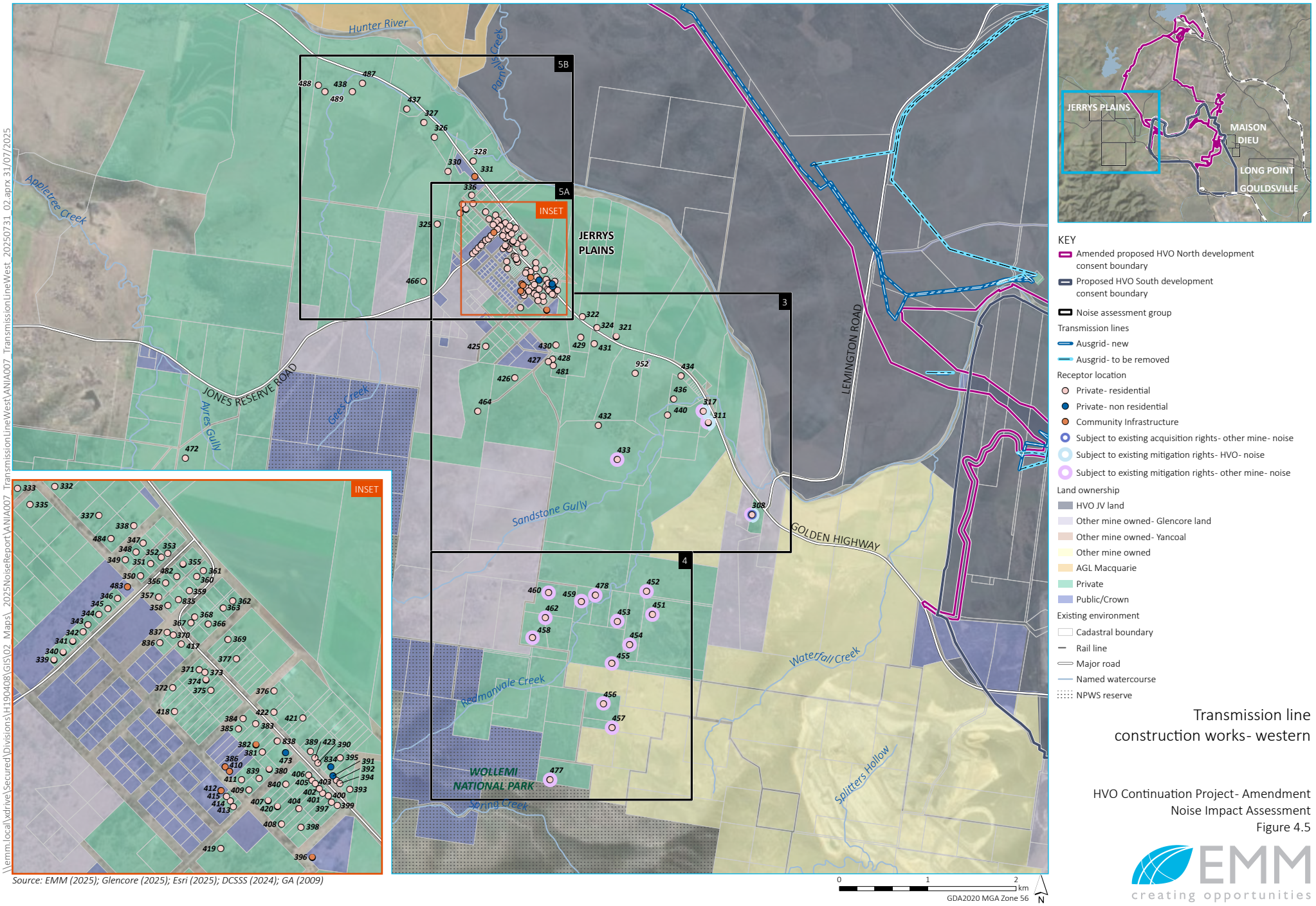
Transmission line construction works- eastern

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 4.4

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

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Transmission line construction works- western

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure 4.5

EMM
creating opportunities

Three combinations of construction and operational noise were evaluated being HVO South and HVO North construction and relevant site only, and the same construction noise combined with operational noise from both sites. Table 4.19 presents the combinations considered.

Table 4.19 Construction task combinations

Construction task / Area	Site	HVON	HVOS	Combined
Lake James enlargement	HVOS	×	✓	✓
Lemington Road base/sub-base [1]	HVON	✓	×	✓
Lemington Road drains/culverts	HVON	✓	×	✓
Golden Highway intersection	HVON	✓	×	✓
Parnells Dam enlargement	HVON	✓	×	✓
Transmission line eastern area 1 [2]	HVON	✓	×	✓
Transmission line western area 2 [3]	HVON	✓	×	✓

Notes: 1. Includes three separate 1,000 metre sections
2. Worst case for NAG's 1 and 2
3. Worst case for NAG's 3 to 5.

To account for noise that may be generated concurrently by the HVO North and HVO South mining areas, day period model predictions for the Year 3 stage plan for each site were logarithmically added to construction noise predictions to obtain cumulative noise levels including both operational and construction noise.

Construction noise impact assessment predictions for private residential receptors are presented in Table 4.20. Results are 90th percentile construction noise predictions for the worst-case season during standard construction hours. Results are provided for any receptor with a 90th percentile construction noise prediction exceeding $L_{Aeq,15minute}$ 45 dB, which is the ICNG 'noise affected management level'. All other receptors have construction noise predictions less than or equal to $L_{Aeq,15minute}$ 45 dB. Of note, construction noise predictions remain below the 'noise affected level' for all receptors in NAGs 2, 3, 4, 5A and 5B. Predictions for all non-residential receptors are well below relevant management levels presented in Table 4.20.

Table 4.20 Construction noise predictions – $L_{Aeq,15minute}$ dB

Receptor ID	NAG	Management levels		Construction task combination		
		Noise affected	Highly noise affected	HVON [1]	HVOS	Combined
120	1B	45	75	47	45	47
121	1B	45	75	46	45	49
122	1B	45	75	46	46	48
123	1B	45	75	45	46	48
160	1A	45	75	52	53	54
161	1A	45	75	50	53	55
162	1A	45	75	50	53	54

Receptor ID	NAG	Management levels		Construction task combination		
		Noise affected	Highly noise affected	HVON [1]	HVOS	Combined
163	1A	45	75	50	53	54
244	1C	45	75	46	48	49
245	1C	45	75	46	49	50
246	1C	45	75	46	47	49
247	1C	45	75	45	47	49
256	1A	45	75	50	55	56
258	1A	45	75	50	53	54
260	1A	45	75	49	51	53
261	1A	45	75	51	52	54
497	1A	45	75	50	55	56
498	1C	45	75	46	48	49

Notes: 1. Highest result for all modelled construction activities

Results presented in Table 4.20 indicate all private residential receptors in NAGs 1A, 1B and 1C have construction noise predictions higher than the 'noise affected' management level, but significantly less than the 'highly noise affected' management level. These are worst case construction noise predictions that may occur during noise enhancing weather conditions during the peak of the construction period, that is, an expected infrequent occurrence. Consequently, received levels should typically be less than those presented in Table 4.20.

All receptors with predicted construction noise levels higher than the 'noise affected' management level are located in Maison Dieu (NAG 1A, 1B and 1C). Both HVO North and HVO South have potential to generate levels in the $L_{Aeq,15minute}$ 47 to 56 dB range at the nearest receptors. The construction tasks primarily responsible for predicted levels are the Lemington Road realignment and Lake James enlargement. Approval for these tasks is being sought under the HVO North and HVO South consents, respectively.

At receptors with the highest predictions, the cumulative impact due to both HVO North and HVO South construction tasks being conducted concurrently only causes an increase of 1 to 2 dB relative to just HVO South works being conducted in isolation. Given that listeners in Maison Dieu would not be able to distinguish which site is generating received noise levels, and an increase of up 2 dB would not be perceptible to the human ear, it is recommended that all construction tasks be allowed to occur concurrently. This has potential to significantly reduce the duration of construction noise, with only a minor and likely imperceptible increase in received noise levels.

HVO may occasionally be required to complete selective or critical construction works outside of standard construction hours. It is accepted that all out of hours construction activities are to comply with approved operational noise limits. HVO will develop and implement a Construction Environmental Management Plan (CEMP), or equivalent, which will be prepared prior to the commencement of any construction activities. The CEMP will include the identification of feasible and reasonable noise mitigation measures relevant to the construction aspects for implementation during construction activities.

4.6 Sleep disturbance assessment

4.6.1 Sleep disturbance methodology

Potential sleep disturbance impact was assessed by predicting noise from plant items known to generate levels that at times stand out above the general mining continuum. Excavator bucket noise, first pass loads into empty truck bodies, rear dump truck exhaust, and dozer track noise are recognised as sources that can generate high, short term noise levels that have the potential to cause sleep disturbance.

The following sources were modelled for the purpose of assessing the potential for sleep disturbance:

- Impact noise generated by excavator buckets impacting truck bodies or hard ground material, or rocks impacting the bottom of empty haul truck trays was modelled at each dig location. A sound power of L_{max} 136 dB (linear) and L_{Amax} 130 dB (A-weighted) was modelled for each impact event.

- Dozer track slap was modelled at each exposed dozer operating location, typically overburden emplacement areas. A sound power of L_{max} 127 dB (linear) and L_{Amax} 122 dB (A-weighted) representing dozer operation in 1st gear reverse was modelled.

- Haul truck exhaust surges were modelled by assessing a maximum sound power event of L_{max} 127 dB (linear) and L_{Amax} 119 dB (A-weighted) at each overburden emplacement area, and, at exposed sections along haul routes. This sound power is an addition of 5 dB to the full rated power/uphill loaded sound power spectrum in engine and exhaust frequencies (31.5 to 500 Hz).

Assessment of sleep disturbance for each model stage involved modelling each of these sources, and then combining the highest source prediction with results for the remainder of operational plant to obtain an estimate of possible short-term maximum noise emission.

4.6.2 Sleep disturbance results

Receptors in NAG 1A have a proposed ANL of $L_{Aeq,15minute}$ 41 dB, which is above one of the maximum noise event trigger levels of $L_{Aeq,15minute}$ 40 dB. All reasonable and feasible mitigation measures have been implemented in determining ANL for the Project and the likelihood and frequency of occurrence for receptors in NAG 1A to receive levels 1 dB higher than $L_{Aeq,15minute}$ 40 dB is low. Additionally, each of these receptors will continue to be afforded voluntary mitigation rights due to the Project, therefore the requirements for a detailed assessment due to possible 1 dB exceedances of the maximum noise event trigger levels of $L_{Aeq,15minute}$ 40 dB at NAG 1A receptors is not considered necessary.

Sleep disturbance model predictions are less than the L_{Amax} trigger level of 52 dB for all receptors. As such, there is no requirement for a detailed assessment of maximum noise events as per NPfI methodology.

There is only one receptor where a result greater than the current HVO South sleep disturbance criterion of L_{Amax} 45 dB has been predicted. This is receptor 121, which already has voluntary mitigation rights with HVO, where L_{Amax} 46 dB has been calculated for year 8 (approximately 2034). All other receptor results are less than the criterion.

All results also meet the current HVO North and EPL sleep disturbance criterion of $L_{A1,1minute}$ 46 dB. Given this, it is proposed this criterion is retained for the Project and is detailed in Section 5.1.

4.7 Low frequency assessment

To evaluate low frequency noise modifying factor applicability, each stage plan was modelled in ENM using one-third octave sound power inputs to obtain one-third octave model predictions. Predicted one-third octave L_{Aeq} spectra for each of 260 modelled meteorological conditions were evaluated directly against NPfI low frequency noise thresholds.

Initial model iteration results showed low frequency modifying factors were at times applicable to the Project. Analysis of equipment and associated frequencies was then done to ascertain whether improvements to equipment sound power could alleviate this. Focus on the 400 tonne/600 tonne excavators, drills and loaders modelled as operating on site showed attenuation of this equipment at key frequencies could significantly reduce the potential for low frequency noise emissions.

The 90th percentile results presented in Section 4.3.2 and Attachment A that meet or are below ANL are inclusive of low frequency noise modifying factors where applicable and Table 4.21 details receptors for each stage where the 90th percentile result has been adjusted to include a low frequency modifying factor.

Table 4.21 Low frequency modifying factor adjustment

Stage	Site	Receptors with adjustment to 90th percentile result
Year 3	HVO North	-
	HVO South	-
Year 6	HVO North	-
	HVO South	-
Year 8	HVO North	-
	HVO South	-
Year 12	HVO North	324, 362, 952
	HVO South	-
Year 15	HVO North	376, 379, 389, 407, 408, 420, 421, 422, 440, 473, 840, 841
	HVO South	-

4.8 Cumulative noise assessment

4.8.1 Cumulative noise methodology

Other industrial noise sources around HVO with potential to cause cumulative noise impact to receptors within the assessment area include:

- United Wambo Joint Venture (UWJV)
- Wambo Underground (WU)
- Rixs Creek South (RCS)
- Mount Thorley Warkworth (MTW)
- Ravensworth Operations (RO)

- Ashton Coal Project (ACP).

These sources were assessed in combinations with HVO North and HVO South dependant on geographical location and directionally where there is potential to cause cumulative noise impact with HVO North and/or HVO South. When enhancement is from one direction, weather effects tend to mitigate noise from sources in other directions, and vice versa, so it's not likely that elevated noise levels would be received from sources in different directions at the same time.

The Glendell Continued Operations Project was considered in the EIS NIA; however, it is now withdrawn and has not been considered in this amendment NIA.

The assessed combinations are detailed in Table 4.22.

Table 4.22 Cumulative noise assessment combinations

Locality	Combination 1	Combination 2	Combination 3
Camberwell	HVO North, RO, ACP	-	-
NAG 1A, 1B and 1C	HVO South, HVO North	HVO South, UWJV, WU	HVO North, RO
NAG 2	HVO South, UWJV, WU, RCS	HVO South, UWJV, WU, MTW	
NAG 3	HVO South, HVO North	HVO South, UWJV, WU	
NAG 4	HVO South, HVO North	HVO South, UWJV, WU	
NAG 5	HVO North, HVO South	HVO South, UWJV, WU	

Predictions for other mining operations were combined with HVO North and HVO south 90th percentile predictions for privately owned receptors in Attachment A to assess cumulative noise impact.

In lieu of predictions for some operations, it has been assumed the maximum predicted intrusive noise levels for these are commensurate with intrusiveness noise criteria in their development consent.

Sources of intrusive noise levels for other operations (predicted or assumed) are:

- United Wambo Open Cut Coal Mine Project Noise Impact Assessment (Umwelt 2016)
- Rixs Creek South Continuation of Mining Project Development Consent SSD-6300
- Warkworth Continuation Project Development Consent SSD-6464
- Mount Thorley Continuation Project Development Consent SSD-6465
- Ravensworth Operations Project, Project Approval 09_0176
- Ashton Coal Project Development Consent DA 309-11-2001-i.

4.8.2 Cumulative noise results

Table D.1 in Attachment D presents the cumulative noise results. All results met or were below the recommended amenity noise levels listed in Table 2.2 of the NPfI, with the exception of receptor 308 in NAG 3. This receptor has current noise mitigation rights for HVO South and is subject to voluntary noise acquisition by UWJV.

5 Proposed noise criteria

Based on outcomes presented in this NIA, recommended noise criteria are outlined in the following sections.

5.1 Operational noise criteria

Properties that may be afforded voluntary mitigation rights due to intrusive noise impact (marginal) are listed in Table 5.1.

It should be noted that the NPfI specifies that receiver treatment is normally only applicable for isolated residences in rural areas. On this basis, all 17 receptors in NAG 5A predicted to receive noise levels 3 to 5 dB above the PNTL are not recommended to receive mitigation rights given they are within Jerrys Plains village. These are receptors 348, 362, 389, 390, 392, 393, 394, 395, 397, 399, 400, 402, 403, 405, 406, 421, and 423.

It is noted that there are an additional 12 receptors that hold existing noise mitigation rights under the HVO South project approval, and will be offered to maintain their rights, despite not being required to by the Project (receptors 120, 122, 123, 163, 244, 245, 246, 247, 260, 308, 311, 317).

Receptor 327 was assessed as a privately owned residence and recommended for mitigation rights in the EIS NIA, however following a visual assessment in June 2023, it was noted the residence had been demolished. It has not been included in this amendment NIA.

Table 5.1 Receptors recommended for mitigation rights

Mitigation	Property number
Mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity	326, 328, 330, 437, 487, 121^, 160^, 161^, 162^, 256^, 258^, 261^, 497^

Notes: 1. ^ indicates receptor is currently entitled to voluntary mitigation in accordance with the HVO South Project Approval 06_0261, and HVO will continue to afford mitigation rights due to the Project.

Table 5.2 lists recommended noise impact assessment criteria based on achievable noise levels for the Project. These are consistent with the EIS NIA, with the exception of adjustments to the day period $L_{Aeq,15minute}$ for NAG 1C, 2 and 4 based on the EPA advice on the Submissions Report where:

- for NAG 1C the daytime criteria is 1 dB lower
- for NAG 2, the daytime criteria is 3 dB lower
- for NAG 4, the daytime criteria is 3 dB lower.

With consideration of the EPA RTS advice, the recommended L_{Amax} has also been adjusted down from the EIS NIA of 52 dB to 45 and 46 dB.

Table 5.2 Recommended operational noise impact assessment criteria, dB

NAG	Property number	Day	Evening	Night	
		$L_{Aeq,15minute}$	$L_{Aeq,15minute}$	$L_{Aeq,15minute}$	L_{Amax}
1A	160, 161, 162, 163, 256, 258, 260, 261, 497	41	41	41	46
1B	120, 121, 122, 123	40	40	40	46
1C	244, 245, 246, 247, 498	39	39	39	46

NAG	Property number	Day	Evening	Night	
		$L_{Aeq,15minute}$	$L_{Aeq,15minute}$	$L_{Aeq,15minute}$	L_{Amax}
2	126, 127, 128, 130, 134, 139, 141, 156, 157, 167, 169, 170, 173, 174, 175, 176, 178, 179, 248, 249, 250, 251, 262, 843, 846, 847, 852, 855, 856	37	35	35	46
3	308, 311, 317, 318, 321, 322, 324, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 436, 440, 464, 481, 952	41	41	40	46
4	451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 462, 477, 478	37	37	37	46
5A	332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353 355, 356, 357, 358, 359, 360, 361, 362, 363, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 380, 381, 383, 384, 385, 389, 390, 392, 393, 394, 395, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 411, 413, 414, 415, 417, 418, 419, 420, 421, 422, 423, 482, 484, 835, 836, 837, 838, 839, 840	40	40	40	46
5B	326, 328, 330, 437, 438, 466, 487, 488, 489	40	40	40	46
-	All other privately owned residential land	40	35	35	45

Recommended noise criteria for non-residential privately owned receptors such as schools, recreational sites, churches, industrial and commercial receptors are the appropriate amenity noise levels as specified Table 2.2 of the NPfI.

Table 5.3 lists recommended compliance noise monitoring locations for the Project.

Table 5.3 Recommended compliance noise monitoring locations, dB

NAG	Coordinates (GDA94)	
	Easting	Northing
1A	317994	6399021
1B	318616	6398438
1C	318570	6399332
2	321128	6396863
3	306014	6399906
3	305485	6401177
4	304666	6399100
5A	303718	6402475
5B	303120	6403452

5.2 Construction noise criteria

Recommended construction noise criteria are listed in Table 5.4. Construction noise predictions presented in Section 4.5 of this NIA are cumulative noise levels from both construction and operational activities.

Table 5.4 Recommended construction noise criteria – $L_{Aeq,15minute}$ dB

Construction hours	Property number	Noise affected	Highly noise affected
Standard construction hours	All privately owned residential land	45	75
Outside standard construction hours	All privately owned residential land	Approved operational noise impact assessment criteria	NA [1]

Notes: 1. Highly noise affected criterion not applicable outside standard construction hours.

Standard construction hours are:

- Monday to Friday, 7.00 am to 6.00 pm
- Saturday, 8:00 am to 1:00 pm
- no construction work on Sunday and public holidays.

HVO should apply all feasible and reasonable work practices to meet the 'noise affected' level and should schedule construction works within standard construction hours where practical. For short duration, high noise emitting activities, for example should rock breaking be required, the 'highly noise affected' criterion may apply. In this case, HVO should inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details. Such activities should be scheduled for the least noise sensitive time of day.

6 Noise management and controls

6.1 Overview

Noise management and control strategies remain unchanged from those proposed in the EIS NIA, with no additional controls are required under the amendment. While proposed ANL are consistent, differences in predicted residual impacts occur due to updated mine plans, changes to pit progression, fleet, and project duration. These operational changes have altered the distribution of noise but not the overall approach to its management.

6.2 Operational controls

Noise controls and management strategies described in Section 4.2.4 were included in the computer noise model for the purpose of assessing HVO noise emissions. HVO is committed to implementing the following noise mitigation controls for the Project:

- various levels (height options) will be provided for overburden emplacement to allow shielded emplacement to occur deeper in the mining area during adverse meteorological conditions
- haul route alignments within the mining area will maximise the available topographical shielding provided by the mine design where practical
- progressively attenuate the remaining fleet of large mining equipment and implement BATEA sound power where reasonable and feasible for significant noise generating mobile equipment
- dozers will be restricted if deemed to be a primary source of noise during periods of meteorological enhancement
- continue to implement BMP, which is described in Section 4.1 of this NIA
- restricting operation of exposed drills if required during periods of meteorological enhancement
- an 8 metre high roadside bund is to be constructed on the exposed side of the haul road from the Mitchell Pit towards the Howick CPP for approximately 900 metres.

6.3 Noise management

The NMP will be updated to reflect project approval and licence conditions resulting from this application and will include updated management measures to ensure all commitments are implemented, and monitoring is done as required to maintain compliance with approved noise limits.

A review of both real-time and attended compliance monitoring locations will be undertaken once the approval process is complete to ensure the monitoring network provides adequate coverage of the Project Area, and the existing NMP will be updated accordingly.

HVO will develop and implement a Construction Environmental Management Plan (CEMP), or equivalent, which will be prepared prior to the commencement of any construction activities. The CEMP will include the identification of feasible and reasonable noise mitigation measures relevant to the construction aspects for implementation during construction activities.

7 Summary

This NIA has considered potential noise impacts associated with the amended Project, including operational noise, construction noise, cumulative noise, modifying factor adjustments and sleep disturbance. The assessment was appropriately completed in accordance with relevant NSW guidelines and policies, including the NPfI.

The amendment proposes the noise management approach and limiting noise period achievable noise limits established in the original EIS NIA, with no additional controls required. While there are some variations in predicted residual noise impacts, these are a result of revised mine plans, including changes to pit progression, fleet composition, and project duration. These operational changes have altered the distribution of noise but not the overall approach to its management or conclusions of this assessment.

7.1 Operational noise

Five operational scenarios were modelled representing stages in progression of mining operations over the proposed life of HVO North and HVO South, with emphasis on targeting the expected highest noise impact. The stages nominally relate to Year 3, Year 6, Year 8, Year 12 and Year 15 of the Project. All known private residential receptors that may be impacted by noise from the Project were modelled. Sound power levels used in modelling were primarily based on measured in-service levels of plant operating at HVO. Feasible and reasonable noise controls were identified and applied to the modelling assessment.

The cumulative distribution of results method was adopted to account for the effects of noise enhancing meteorological conditions. 90th percentile predictions for the worst-case season were used to represent intrusive noise impact. Modifying factor adjustments were evaluated and applied where required.

132 receptors had a 90th percentile prediction that exceeded PNTL in at least one time period for at least one of the five stages. None of these exceeded PNTL by more than 5 dB. The significance of residual noise impacts was determined in accordance with both Section 4 of the NPfI and the VLAMP.

This assessment has found that 13 receptors will be entitled to voluntary mitigation rights based on predicted marginal residual noise impacts, eight of which already have existing rights under existing HVO approvals. In addition, there are 17 receptors in the village of Jerrys Plains where marginal noise impacts are predicted; however, they do not qualify for mitigation as per Section 4.2 of the NPfI. Further, 12 receptors that already have mitigation rights in accordance with the HVO South project approval are not predicted to experience noise levels such that they would be entitled to voluntary mitigation rights for the Project; however, HVO proposes to retain mitigation rights for these receptors.

Recommended operational noise criteria for the Project are outlined in Section 5.1 of this NIA.

7.2 Construction noise

Worst-case construction scenarios considered to have the greatest potential to result in construction noise impact have been quantitatively assessed in accordance with the ICNG. Results indicate all private residential receptors in NAG 1A, 1B and 1C are predicted to experience construction noise levels higher than the ‘noise affected’ management level, but significantly less than the ‘highly noise affected’ management level. These are worst case construction noise predictions that may occur during noise enhancing weather conditions during the peak of the construction period, that is, an expected infrequent occurrence. Consequently, received levels should typically be less than those presented in this NIA. Recommended construction noise criteria for the Project are outlined in Section 5.2 of this NIA.

7.3 Private land assessment

Private land was assessed in accordance with the VLAMP to determine whether acceptable amenity noise levels plus 5 dB would be exceeded over more than 25% of any privately-owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls. Predictions for all privately owned land areas were below the acceptable amenity noise level plus 5 dB (Table 2.2 of the NPfI).

7.4 Cumulative noise

Noise from other industrial sources with the potential to cause cumulative impact when combined with HVO North and HVO South noise emissions were evaluated. These sources were grouped and combined with HVO North and HVO South dependant on geographical location and directionally, as relevant, for each NAG. All results met or were below the recommended amenity noise levels listed in Table 2.2 of the NPfI, with the exception of receptor 308 in NAG 3. This receptor has existing mitigation rights for HVO South that will continue to be afforded and is also subject to voluntary acquisition by UWJV.

7.5 Sleep disturbance

Potential sleep disturbance impact was assessed by predicting levels from plant items known to generate noise that can stand out above the general mining continuum. Shovel and excavator bucket noise, first pass loads into empty truck bodies, rear dump truck exhaust, and dozer track noise are recognised as sources that can generate higher short term noise levels.

Sleep disturbance model predictions were less than the L_{Amax} trigger level for all receptors. As such, there is no requirement for a detailed assessment of maximum noise events, as per NPfI methodology.

References

Ashton Coal Project Development Consent DA309-11-2001-I.

HVO South Project Approval 06_0261.

HVO North development consent 450-10-2003.

HVO Continuation Project, 2022. *Noise Impact Assessment.* EMM.

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Mount Thorley Continuation Project Development Consent SSD-6465.

NSW Environment Protection Authority, 2017. *NSW Noise Policy for Industry*. Sydney: NSW Environment Protection Authority.

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NSW Department of Environment and Climate Change, 2009. *Interim Construction Noise Guideline*. Sydney: NSW Environment Protection Authority.

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NSW Roads and Maritime Services, 2016. *Construction Noise and Vibration Guideline.*

Ravensworth Operations Project, Project Approval 09_0176.

Rixs Creek South Continuation of Mining Project Development Consent SSD-6300.

United Wambo Open Cut Coal Mine Project, 2016. *Noise Impact Assessment*. Umwelt.

Warkworth Continuation Project Development Consent SSD-6464.

Attachment A

Operational noise results

EMM
creating opportunities

Table A.1 HVO North 90th percentile operational predictions $L_{Aeq,15minute}$ dB

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
17	40	35	35	19	19	21	19	20	21	20	21	22	21	22	23	20	21	22	21	22	23
19	40	35	35	19	20	21	19	20	21	20	21	22	21	22	23	20	21	22	21	22	23
37	40	35	35	19	20	21	19	20	21	20	21	22	21	22	23	20	21	22	21	22	23
102	53	53	53	24	24	25	25	26	26	25	26	27	26	26	27	25	26	27	26	26	27
120	40	36	36	26	27	27	27	28	28	27	28	28	28	28	29	27	28	28	28	28	29
121	40	36	36	26	27	27	27	28	28	27	28	28	28	28	29	27	28	28	28	28	29
122	40	36	36	26	27	27	27	28	28	27	28	28	28	28	29	27	28	28	28	28	29
123	40	36	36	26	27	27	27	28	28	27	28	28	28	28	28	27	28	28	28	28	28
126	40	35	35	18	19	19	18	18	18	18	18	18	18	18	18	17	18	18	18	19	19
127	40	35	35	21	22	22	22	22	22	22	23	23	23	23	23	22	22	23	23	23	23
128	40	35	35	21	21	21	21	22	22	22	22	23	22	22	23	22	23	23	22	23	23
130	40	35	35	23	23	24	24	24	24	24	25	25	24	25	25	24	24	25	24	25	25
134	40	35	35	23	23	23	24	24	24	24	24	24	24	24	25	24	24	24	24	24	25
139	40	35	35	18	18	19	17	18	18	17	18	18	18	18	18	17	18	18	18	18	19
141	40	35	35	21	22	22	22	22	23	22	22	22	22	23	23	21	22	22	22	23	23
160	40	36	36	27	28	28	28	28	29	28	29	29	28	29	29	28	28	29	28	29	29
161	40	36	36	27	28	28	28	29	29	28	29	29	28	29	29	28	28	29	28	29	29
162	40	36	36	27	28	28	28	29	29	28	29	29	28	29	29	28	28	29	28	29	29
163	40	36	36	27	28	28	28	28	29	28	29	29	28	29	29	28	28	29	28	29	29

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
167	40	35	35	21	22	22	21	22	22	21	22	23	21	22	22	21	22	22	21	22	23
169	40	35	35	21	22	22	21	22	22	21	22	23	22	22	22	21	22	22	22	22	23
170	40	35	35	22	23	23	23	23	24	23	24	24	24	24	24	23	24	24	24	24	24
173	40	35	35	21	21	22	21	22	22	22	22	23	22	23	23	22	22	23	22	23	23
174	40	35	35	20	21	21	21	22	22	21	22	22	22	22	23	21	22	22	22	22	23
175	40	35	35	20	21	21	20	21	21	21	21	22	21	21	22	20	21	21	21	21	22
176	40	35	35	19	19	20	19	20	20	19	20	20	19	20	20	19	20	20	19	20	20
178	40	35	35	20	21	21	21	21	22	21	21	21	21	21	22	20	21	21	21	21	22
179	40	35	35	20	21	21	20	21	21	21	21	21	21	22	22	20	21	21	21	22	22
244	40	36	36	27	27	27	27	28	28	28	28	28	28	29	29	27	28	28	28	29	29
245	40	36	36	27	27	27	28	28	28	28	28	29	28	29	29	28	28	28	28	29	29
246	40	36	36	27	28	28	28	28	28	28	29	29	28	29	29	28	28	29	28	29	29
247	40	36	36	27	28	28	28	28	29	28	29	29	28	29	29	28	28	29	28	29	29
248	40	35	35	19	20	20	19	20	21	20	20	21	20	21	21	20	21	21	20	21	21
249	40	35	35	19	20	20	19	20	20	19	20	20	19	20	20	18	19	20	19	20	20
250	40	35	35	19	20	20	20	20	20	20	21	21	20	21	21	20	20	21	20	21	21
251	40	35	35	20	20	21	21	21	21	21	21	21	21	22	22	21	21	21	21	22	22
256	40	36	36	27	28	28	27	28	29	28	28	29	28	29	29	27	28	28	28	29	29
258	40	36	36	27	28	28	28	28	29	28	29	29	28	29	29	27	28	29	28	29	29
260	40	36	36	27	27	28	28	28	29	28	28	29	28	29	29	27	28	28	28	29	29

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
261	40	36	36	27	28	28	28	28	29	28	29	29	28	29	29	28	28	29	28	29	29
262	40	35	35	22	22	22	22	23	23	23	23	23	23	23	24	23	23	24	23	23	24
264	53	53	53	24	24	25	25	26	26	25	26	27	26	26	27	25	26	27	26	26	27
266	40	35	35	18	19	22	19	20	22	19	21	23	20	22	24	20	22	24	20	22	24
308	41	41	38	29	32	35	32	31	37	31	33	37	35	34	38	33	33	38	35	34	38
311	41	41	38	29	29	37	30	29	39	27	26	39	31	33	39	30	34	39	31	34	39
317	41	41	38	28	29	37	29	30	39	26	26	39	30	33	39	31	34	39	31	34	39
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ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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381	41	38	37	31	35	38	33	36	39	35	37	39	36	37	39	35	37	38	36	37	39
382	53	53	53	31	35	39	33	36	39	35	37	39	36	37	39	35	37	38	36	37	39

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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386	68	68	68	31	35	38	34	36	39	35	37	39	35	37	39	35	36	38	35	37	39
389	41	38	37	30	34	39	33	36	39	34	37	40	36	37	39	35	36	39	36	37	40
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391	68	68	68	30	33	39	33	36	39	33	37	40	36	37	39	36	37	39	36	37	40
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ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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407	41	38	37	31	34	38	33	36	39	34	36	39	36	37	39	35	36	39	36	37	39
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409	41	38	37	31	35	38	33	36	39	34	37	39	36	37	39	35	37	38	36	37	39
410	68	68	68	31	35	38	33	36	39	35	37	39	35	37	39	35	36	38	35	37	39
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412	48	48	48	31	35	38	33	36	39	34	37	39	35	36	38	35	36	38	35	37	39
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425	41	41	38	30	33	36	32	34	38	33	35	37	34	35	37	34	35	37	34	35	38
426	41	41	38	30	33	36	31	33	38	32	35	37	34	35	37	34	35	37	34	35	38

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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436	41	41	38	28	28	37	30	31	39	28	28	39	31	34	39	33	35	40	33	35	40
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438	40	35	35	27	28	29	29	29	32	28	27	30	28	27	30	27	26	30	29	29	32
440	41	41	38	28	28	37	30	30	39	28	27	38	31	34	39	33	35	40	33	35	40
451	40	35	35	27	29	32	29	28	34	30	30	34	31	31	35	30	29	34	31	31	35
452	40	35	35	27	29	33	28	27	34	30	29	34	30	30	35	30	29	34	30	30	35
453	40	35	35	28	28	32	28	27	34	29	28	33	31	29	34	30	29	34	31	29	34
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ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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462	40	35	35	28	26	32	28	27	33	28	28	33	31	30	34	30	30	34	31	30	34
464	41	41	38	30	32	35	30	32	36	31	33	36	33	34	36	33	34	36	33	34	36
466	40	35	35	33	34	36	34	35	37	34	35	37	34	35	36	34	35	36	34	35	37
471	40	35	35	27	28	28	27	28	28	27	28	28	28	28	28	27	27	28	28	28	28
472	40	35	35	21	24	27	23	25	27	24	25	27	25	27	28	24	26	28	25	27	28
473	68	68	68	31	34	39	34	36	39	34	37	39	36	37	39	35	37	39	36	37	39
477	40	35	35	27	26	29	27	27	31	28	27	31	29	29	32	28	28	32	29	29	32
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481	41	41	38	31	32	37	31	33	39	31	35	38	34	36	38	35	36	38	35	36	39
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488	40	35	35	33	33	36	35	35	37	34	33	36	34	33	36	33	32	34	35	35	37
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497	40	36	36	27	28	28	28	28	29	28	28	29	28	29	29	28	28	29	28	29	29
498	40	36	36	27	27	28	28	28	28	28	28	29	28	29	29	27	28	28	28	29	29
499	40	35	35	28	28	29	28	29	29	28	28	29	28	29	29	27	28	28	28	29	29

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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511	68	68	68	20	21	22	19	20	21	20	20	21	19	20	21	19	19	20	20	21	22
592	40	35	35	21	22	23	21	22	23	21	22	23	21	22	23	22	22	24	22	22	24
596	40	35	35	26	26	27	27	27	27	27	27	27	27	28	28	27	27	28	27	28	28
598	40	35	35	19	20	21	18	19	20	19	20	21	18	19	20	18	18	19	19	20	21
599	40	35	35	19	20	21	18	19	20	19	19	20	18	19	20	18	18	19	19	20	21
613	40	35	35	20	27	32	20	28	33	20	27	32	21	27	32	20	27	32	21	28	33
614	40	35	35	20	28	31	20	28	31	19	27	31	20	28	31	19	27	31	20	28	31
619	40	35	35	27	27	28	26	27	28	26	27	28	26	27	27	26	26	27	27	27	28
621	40	35	35	29	29	29	29	30	30	30	30	30	30	31	31	30	30	31	30	31	31
623	53	53	53	27	28	28	27	27	28	27	28	28	27	27	28	26	27	28	27	28	28
624	40	35	35	27	28	28	27	28	29	27	28	28	27	27	28	26	27	28	27	28	29
626	40	35	35	27	28	28	27	27	28	27	27	28	27	27	28	26	27	28	27	28	28
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629	40	35	35	26	27	28	26	27	28	26	27	27	26	27	27	25	26	27	26	27	28
735	68	68	68	32	33	34	31	32	33	31	32	33	31	32	33	30	31	32	32	33	34
797	53	53	53	20	26	32	21	27	32	20	26	32	21	27	32	20	26	32	21	27	32
799	68	68	68	12	18	23	12	18	24	12	17	23	14	19	24	11	17	23	14	19	24
800	68	68	68	15	18	22	15	18	22	14	17	21	15	18	22	14	17	21	15	18	22

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
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830	68	68	68	21	22	22	21	21	22	21	22	22	21	22	22	21	21	22	21	22	22
833	58	58	58	25	26	27	26	27	28	26	27	28	27	28	29	26	27	28	27	28	29
834	68	68	68	30	34	39	33	36	39	33	37	40	36	37	39	36	37	39	36	37	40
835	41	38	37	33	36	38	35	37	39	36	37	39	36	37	39	35	36	38	36	37	39
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837	41	38	37	33	36	38	35	36	39	36	37	39	36	37	39	35	36	38	36	37	39
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839	41	38	37	31	35	38	33	36	39	34	37	39	36	37	39	35	37	38	36	37	39
840	41	38	37	30	34	39	33	35	39	34	37	39	36	37	39	35	36	39	36	37	39
843	40	35	35	19	19	19	18	19	19	19	19	19	19	19	19	18	19	19	19	19	19
846	40	35	35	22	22	23	22	23	23	22	23	23	22	23	23	22	22	23	22	23	23
847	40	35	35	22	22	23	22	23	23	22	23	23	22	23	23	22	22	23	22	23	23
852	40	35	35	18	19	19	18	18	18	18	18	18	18	19	19	17	17	17	18	19	19
855	40	35	35	20	21	21	21	21	22	21	22	22	21	22	22	21	21	22	21	22	22
856	40	35	35	22	22	22	22	23	23	22	23	23	22	23	23	22	23	23	22	23	23
860	40	35	35	27	27	28	27	28	28	27	28	28	27	28	28	26	27	28	27	28	28
861	40	35	35	24	25	26	23	24	25	23	24	25	23	24	25	22	24	25	24	25	26
862	40	35	35	27	27	28	27	28	29	27	28	29	28	29	30	28	29	30	28	29	30
863	40	35	35	27	27	28	27	28	29	27	28	29	27	27	28	26	26	27	27	28	29

ID	PNTL			Year 3			Year 6			Year 8			Year 12			Year 15			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
869	40	35	35	26	27	27	26	27	27	26	27	27	27	27	27	26	26	27	27	27	27
870	40	35	35	28	29	29	28	29	29	28	29	29	29	30	30	28	29	29	29	30	30
949	40	35	35	30	32	33	31	33	34	30	32	33	30	32	33	30	32	33	31	33	34
950	40	35	35	28	31	32	29	32	33	28	31	32	28	31	32	28	31	32	29	32	33
952	41	41	38	28	28	38	30	32	39	30	30	39	33	36	40	34	37	40	34	37	40

Table A.2 HVO South 90th percentile operational predictions $L_{Aeq,15minute}$ dB

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
17	40	35	35	23	24	25	24	25	25	22	23	25	18	19	20	18	20	22	24	25	25
19	40	35	35	23	25	26	24	25	26	22	23	25	18	19	20	18	20	22	24	25	26
37	40	35	35	23	25	26	24	25	26	23	24	26	18	19	20	17	20	22	24	25	26
102	53	53	53	36	37	38	35	35	36	42	43	47	31	32	33	40	40	42	42	43	47
120	40	36	36	35	36	37	31	32	33	34	35	38	30	31	32	27	31	35	35	36	38
121	40	36	36	35	36	37	31	32	33	35	36	39	30	31	32	29	31	37	35	36	39
122	40	36	36	35	35	37	31	32	33	33	34	37	29	31	32	27	31	34	35	35	37
123	40	36	36	35	36	37	31	32	33	34	35	38	29	31	32	28	33	36	35	36	38
126	40	35	35	21	21	22	20	20	21	24	25	26	19	19	19	27	28	29	27	28	29
127	40	35	35	31	31	32	28	29	29	32	33	34	26	26	27	28	32	33	32	33	34
128	40	35	35	29	30	30	27	28	28	33	33	34	25	25	25	33	34	35	33	34	35
130	40	35	35	29	29	30	27	27	28	32	32	33	24	25	25	31	32	34	32	32	34
134	40	35	35	29	29	29	27	27	27	31	32	33	24	24	25	31	32	33	31	32	33
139	40	35	35	23	24	25	22	23	24	22	25	26	19	20	20	18	19	22	23	25	26
141	40	35	35	26	27	27	24	25	25	26	30	31	20	21	22	23	29	31	26	30	31
160	40	36	36	36	37	39	32	33	34	34	35	38	31	32	34	31	32	34	36	37	39
161	40	36	36	36	37	39	32	33	34	34	34	37	31	32	34	30	31	34	36	37	39
162	40	36	36	36	37	39	32	33	34	34	35	37	31	32	34	30	31	34	36	37	39
163	40	36	36	35	36	38	32	33	34	33	34	36	30	32	33	28	29	31	35	36	38

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
167	40	35	35	25	26	26	24	24	25	27	28	30	20	21	22	24	28	29	27	28	30
169	40	35	35	25	26	26	23	24	25	28	29	31	20	21	21	27	29	29	28	29	31
170	40	35	35	28	28	29	26	27	27	28	29	30	23	23	24	27	28	29	28	29	30
173	40	35	35	23	23	24	21	22	23	24	26	28	19	19	20	20	22	24	24	26	28
174	40	35	35	25	25	26	23	23	24	26	27	29	22	22	23	25	26	28	26	27	29
175	40	35	35	27	27	28	25	25	26	28	28	29	22	23	23	26	27	29	28	28	29
176	40	35	35	21	22	23	20	20	21	20	21	23	17	18	18	24	25	27	24	25	27
178	40	35	35	24	24	25	23	23	24	24	25	25	20	21	21	23	24	25	24	25	25
179	40	35	35	25	26	26	24	24	25	24	25	26	21	21	21	22	23	24	25	26	26
244	40	36	36	34	35	37	31	31	32	33	34	36	29	30	31	28	30	33	34	35	37
245	40	36	36	34	36	37	31	31	33	33	34	36	29	30	32	29	30	33	34	36	37
246	40	36	36	34	35	37	30	31	32	32	33	35	29	30	31	28	30	33	34	35	37
247	40	36	36	34	35	37	30	31	32	32	33	35	28	29	31	28	30	33	34	35	37
248	40	35	35	25	26	26	23	24	24	26	26	28	21	22	22	24	25	26	26	26	28
249	40	35	35	24	24	25	23	24	24	25	26	27	20	21	22	23	24	25	25	26	27
250	40	35	35	23	23	24	22	22	23	21	21	23	16	17	18	18	19	20	23	23	24
251	40	35	35	24	25	25	23	23	24	23	23	24	19	20	20	20	20	21	24	25	25
256	40	36	36	36	37	39	32	33	34	32	34	36	30	32	34	29	30	33	36	37	39
258	40	36	36	36	37	39	32	33	34	33	34	36	30	32	33	28	29	32	36	37	39
260	40	36	36	35	37	38	32	32	34	34	35	38	30	32	33	30	31	34	35	37	38

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
261	40	36	36	36	37	39	32	33	34	34	35	38	31	32	34	31	31	34	36	37	39
262	40	35	35	27	28	28	25	26	26	29	30	31	21	22	22	31	31	32	31	31	32
264	53	53	53	36	37	38	34	35	36	41	42	46	30	31	33	40	41	43	41	42	46
266	40	35	35	22	23	28	22	24	29	21	23	28	18	19	23	18	19	23	22	24	29
308	41	41	38	37	37	40	37	36	39	38	38	40	37	37	40	35	35	39	38	38	40
311	41	41	38	35	36	39	36	37	39	36	37	38	35	35	39	33	34	37	36	37	39
317	41	41	38	35	36	38	36	37	39	36	37	38	34	35	39	32	34	37	36	37	39
321	41	41	38	34	35	37	34	35	37	33	34	35	32	33	35	31	32	33	34	35	37
322	41	41	38	33	34	36	34	35	36	32	33	34	32	32	34	30	31	32	34	35	36
324	41	41	38	34	35	36	34	35	36	33	33	34	32	33	34	30	31	33	34	35	36
326	40	35	35	29	29	30	29	30	31	28	28	29	27	27	28	26	26	27	29	30	31
328	40	35	35	29	30	31	30	31	32	29	29	30	27	28	29	27	27	28	30	31	32
330	40	35	35	29	30	31	30	31	32	29	29	30	27	28	29	27	27	28	30	31	32
331	58	58	58	30	30	32	30	31	32	29	30	31	28	28	29	27	28	29	30	31	32
332	41	38	37	30	31	32	31	32	33	29	30	31	28	29	30	27	28	29	31	32	33
333	41	38	37	30	31	32	31	31	33	29	29	30	28	28	29	27	28	29	31	31	33
334	41	38	37	30	31	32	31	31	32	29	30	30	28	28	29	27	28	29	31	31	32
335	41	38	37	31	31	32	31	32	33	29	30	31	28	28	29	27	28	29	31	32	33
336	41	38	37	30	31	32	31	31	33	29	30	31	28	28	30	27	28	29	31	31	33
337	41	38	37	31	31	33	31	32	33	30	30	31	28	29	30	28	28	29	31	32	33

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
338	41	38	37	31	31	33	32	32	33	30	30	31	29	29	30	28	28	29	32	32	33
339	41	38	37	31	31	32	31	32	33	30	30	31	28	29	30	27	28	29	31	32	33
340	41	38	37	31	31	32	31	32	33	30	30	31	28	29	30	28	28	29	31	32	33
341	41	38	37	31	31	33	31	32	33	30	30	31	29	29	30	28	28	29	31	32	33
342	41	38	37	31	31	33	31	32	33	30	30	31	29	29	30	28	28	29	31	32	33
343	41	38	37	31	31	33	31	32	33	30	30	31	29	29	30	28	28	29	31	32	33
344	41	38	37	31	32	33	31	32	33	30	30	31	29	29	30	28	28	29	31	32	33
345	41	38	37	31	32	33	31	32	33	30	30	31	29	29	30	28	28	29	31	32	33
346	41	38	37	31	32	33	31	32	33	30	30	31	29	29	30	28	29	30	31	32	33
347	41	38	37	31	32	33	32	32	34	30	30	31	29	29	30	28	29	30	32	32	34
348	41	38	37	31	32	33	32	32	33	30	30	31	29	29	30	28	28	29	32	32	33
349	41	38	37	31	32	33	32	32	33	30	30	31	29	29	30	28	28	29	32	32	33
350	41	38	37	31	32	33	32	32	33	30	30	31	29	29	30	28	28	29	32	32	33
351	41	38	37	31	32	33	32	32	34	30	30	31	29	30	31	28	29	30	32	32	34
352	41	38	37	31	32	33	32	32	34	30	30	31	29	30	31	28	29	30	32	32	34
353	41	38	37	31	32	33	32	33	34	30	31	32	29	29	31	28	29	30	32	33	34
355	41	38	37	31	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
356	41	38	37	31	32	33	32	32	34	30	31	32	29	30	31	28	29	30	32	32	34
357	41	38	37	31	32	33	32	32	34	30	31	32	29	29	30	28	29	30	32	32	34
358	41	38	37	32	32	33	32	33	34	30	31	32	29	29	31	28	29	30	32	33	34

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
359	41	38	37	32	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
360	41	38	37	31	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
361	41	38	37	32	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
362	41	38	37	32	32	33	32	33	34	30	31	32	30	30	31	29	29	30	32	33	34
363	41	38	37	32	32	33	32	33	34	30	31	32	30	30	31	29	29	30	32	33	34
366	41	38	37	32	32	34	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
367	41	38	37	32	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
368	41	38	37	32	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
369	41	38	37	32	33	34	32	33	34	31	31	32	30	30	31	29	29	30	32	33	34
370	41	38	37	31	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
371	41	38	37	32	32	33	32	33	34	31	31	32	29	30	31	29	29	30	32	33	34
372	41	38	37	32	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
373	41	38	37	32	32	34	32	33	34	31	31	32	29	30	31	29	29	30	32	33	34
374	41	38	37	32	32	34	32	33	34	31	31	32	30	30	31	29	29	30	32	33	34
375	41	38	37	32	32	34	32	33	34	31	31	32	30	30	31	29	29	30	32	33	34
376	41	38	37	32	33	34	33	33	34	31	31	33	30	31	32	29	30	31	33	33	34
377	41	38	37	32	33	34	32	33	34	31	31	32	30	30	32	29	29	30	32	33	34
380	41	38	37	32	33	34	33	33	34	31	32	33	30	31	32	29	30	31	33	33	34
381	41	38	37	32	33	34	33	33	34	31	32	33	30	30	32	29	30	31	33	33	34
382	53	53	53	32	33	34	33	33	34	31	31	33	30	30	31	29	30	31	33	33	34

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
383	41	38	37	32	33	34	33	33	34	31	32	33	30	30	32	29	29	31	33	33	34
384	41	38	37	32	33	34	33	33	34	31	31	33	30	30	31	29	29	30	33	33	34
385	41	38	37	32	33	34	33	33	34	31	31	33	30	30	31	29	30	31	33	33	34
386	68	68	68	32	33	34	32	33	34	31	31	32	30	30	31	29	29	30	32	33	34
389	41	38	37	33	33	34	33	34	35	31	32	33	30	31	32	30	30	31	33	34	35
390	41	38	37	33	33	35	33	34	35	31	32	33	30	31	32	29	30	31	33	34	35
391	68	68	68	33	33	35	33	34	35	32	32	33	30	31	32	30	30	31	33	34	35
392	41	38	37	33	33	35	33	34	35	32	32	33	30	31	32	30	30	31	33	34	35
393	41	38	37	33	33	35	33	34	35	32	32	33	31	31	32	30	30	31	33	34	35
394	41	38	37	33	33	35	33	34	35	32	32	33	31	31	32	30	30	31	33	34	35
395	41	38	37	33	34	35	33	34	35	31	32	33	31	31	32	29	30	31	33	34	35
396	53	53	53	33	33	35	33	34	35	31	32	33	30	31	32	29	30	31	33	34	35
397	41	38	37	33	33	35	33	34	35	32	32	33	31	31	32	30	30	31	33	34	35
398	41	38	37	33	33	35	33	34	35	31	32	33	30	31	32	30	30	31	33	34	35
399	41	38	37	33	33	35	33	34	35	32	32	33	31	31	32	30	30	32	33	34	35
400	41	38	37	33	33	35	33	34	35	32	32	33	30	31	32	30	30	31	33	34	35
401	41	38	37	33	33	35	33	34	35	32	32	33	30	31	32	30	30	31	33	34	35
402	41	38	37	33	33	35	33	34	35	32	32	33	30	31	32	30	30	31	33	34	35
403	41	38	37	33	33	35	33	33	35	32	32	33	30	31	32	30	30	31	33	33	35
404	41	38	37	33	33	35	33	33	35	31	32	33	30	31	32	30	30	31	33	33	35

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
405	41	38	37	33	33	35	33	33	35	32	32	33	30	31	32	30	30	31	33	33	35
406	41	38	37	33	33	35	33	33	35	31	32	33	30	31	32	30	30	31	33	33	35
407	41	38	37	33	33	34	33	33	34	31	32	33	30	31	32	29	30	31	33	33	34
408	41	38	37	33	33	34	33	33	35	31	32	33	30	31	32	29	30	31	33	33	35
409	41	38	37	32	33	34	33	33	34	31	31	33	30	31	32	29	30	31	33	33	34
410	68	68	68	32	33	34	33	33	34	31	31	32	30	30	32	29	29	30	33	33	34
411	41	38	37	32	33	34	32	33	34	31	31	33	30	31	32	29	29	31	32	33	34
412	48	48	48	32	33	34	32	33	34	31	31	32	30	30	32	29	30	31	32	33	34
413	41	38	37	32	33	34	33	33	34	31	31	32	30	30	32	29	30	31	33	33	34
414	41	38	37	32	33	34	33	33	34	31	31	32	30	30	32	29	30	31	33	33	34
415	41	38	37	32	33	34	32	33	34	31	31	32	30	30	32	29	30	31	32	33	34
417	41	38	37	32	32	33	32	33	34	30	31	32	29	30	31	28	29	30	32	33	34
418	41	38	37	32	32	33	32	33	34	31	31	32	29	30	31	29	29	30	32	33	34
419	41	38	37	32	33	34	33	33	34	31	31	32	30	31	32	29	30	31	33	33	34
420	41	38	37	33	33	34	33	33	35	31	32	33	30	31	32	29	30	31	33	33	35
421	41	38	37	33	33	34	33	34	35	31	32	33	30	31	32	29	30	31	33	34	35
422	41	38	37	32	33	34	33	33	35	31	32	33	30	31	32	29	30	31	33	33	35
423	41	38	37	33	33	35	33	34	35	31	32	33	30	31	32	29	30	31	33	34	35
425	41	41	38	32	32	33	32	32	33	31	31	32	30	30	31	29	29	30	32	32	33
426	41	41	38	33	33	34	33	33	34	31	31	32	31	31	32	30	30	31	33	33	34

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
427	41	41	38	33	33	35	33	34	35	32	32	33	31	32	33	30	31	32	33	34	35
428	41	41	38	33	33	35	34	34	35	32	32	33	31	32	33	30	31	32	34	34	35
429	41	41	38	34	34	36	34	35	36	32	33	34	31	32	33	30	31	32	34	35	36
430	41	41	38	33	33	35	34	34	35	32	32	33	31	32	33	30	31	32	34	34	35
431	41	41	38	34	35	36	34	35	36	32	33	34	31	32	34	29	30	31	34	35	36
432	41	41	38	34	34	36	34	35	36	34	34	35	32	33	34	32	32	34	34	35	36
433	41	41	38	29	28	31	31	30	32	32	32	34	28	28	30	24	24	26	32	32	34
434	41	41	38	35	36	39	36	37	39	35	36	37	34	35	38	31	33	35	36	37	39
436	41	41	38	35	36	38	35	36	39	35	36	37	34	35	37	32	33	36	35	36	39
437	40	35	35	28	28	29	29	29	30	27	28	29	26	26	27	25	26	27	29	29	30
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458	40	35	35	28	26	30	29	27	30	30	29	32	27	26	29	25	23	28	30	29	32

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
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473	68	68	68	33	33	34	33	33	34	31	32	33	30	31	32	29	30	31	33	33	34
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478	40	35	35	28	27	31	29	28	31	31	31	33	28	28	30	24	23	27	31	31	33
481	41	41	38	33	34	35	34	34	35	32	32	33	31	32	33	30	31	32	34	34	35
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498	40	36	36	34	35	37	31	31	32	33	34	36	29	30	32	29	30	33	34	35	37
499	40	35	35	27	29	31	25	26	27	26	27	28	23	24	25	20	21	24	27	29	31

ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
507	53	53	53	21	21	22	18	19	20	19	20	20	16	16	17	16	17	18	21	21	22
511	68	68	68	12	14	15	11	13	14	12	13	15	10	10	10	10	10	10	12	14	15
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626	40	35	35	23	25	27	21	23	24	22	23	25	17	18	20	15	16	17	23	25	27
627	40	35	35	23	24	26	21	23	24	22	23	25	17	18	20	14	15	17	23	24	26
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799	68	68	68	10	10	14	10	10	13	10	10	15	10	10	11	10	10	10	10	10	15
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ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
829	68	68	68	30	30	30	29	29	29	34	35	36	26	27	27	39	40	41	39	40	41
830	68	68	68	27	28	28	26	26	27	35	37	37	23	23	24	42	43	43	42	43	43
833	58	58	58	42	43	44	39	40	41	45	47	48	44	45	47	35	36	38	45	47	48
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852	40	35	35	18	19	20	17	18	18	20	22	23	11	11	13	17	19	22	20	22	23
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856	40	35	35	25	26	27	24	25	25	25	26	28	19	20	21	24	26	26	25	26	28
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ID	PNTL			Year 3			Year 7			Year 11			Year 18			Year 22			Maximum envelope		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
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949	40	35	35	16	17	18	16	17	17	16	17	18	12	13	14	10	11	12	16	17	18
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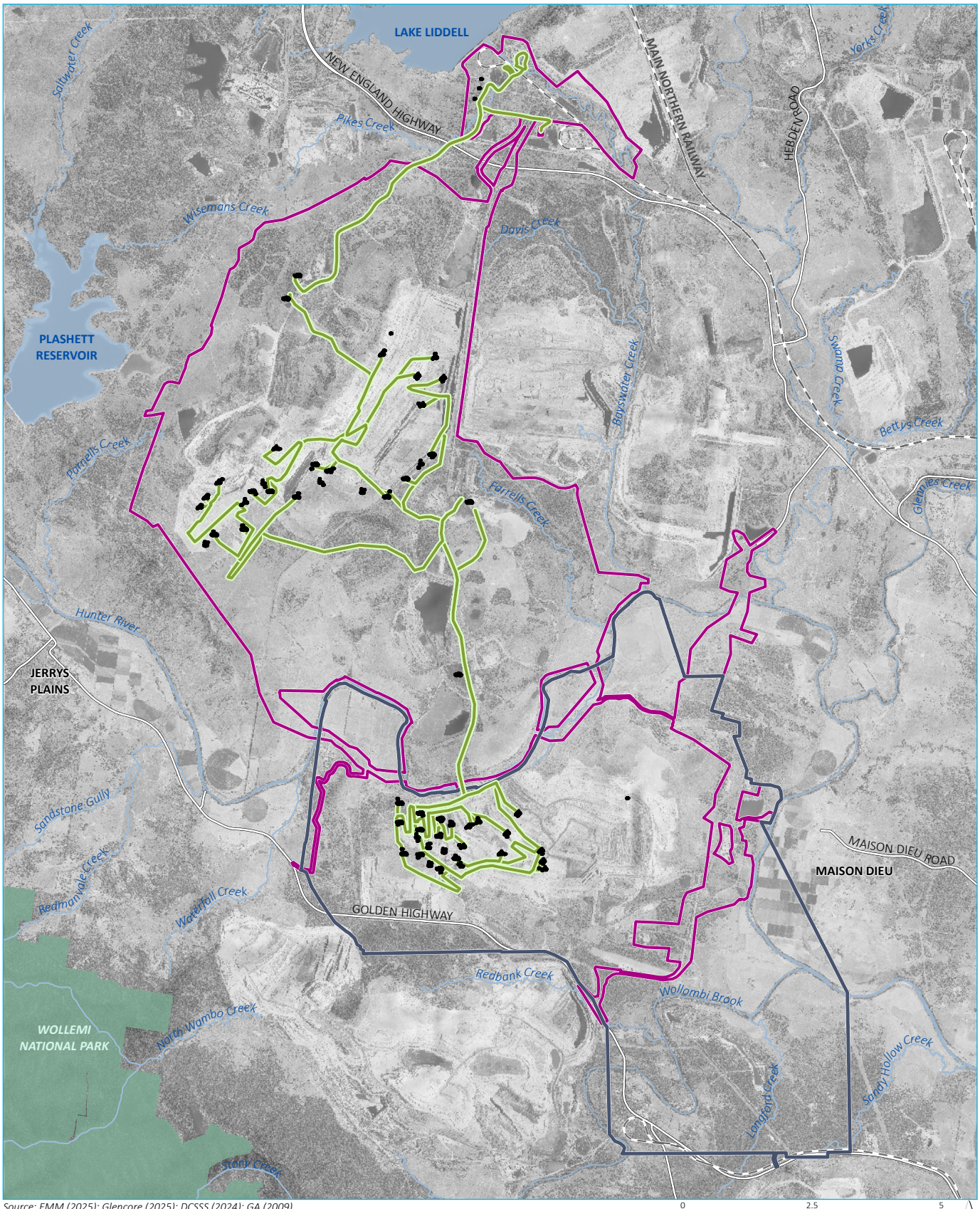
952	41	41	38	34	35	37	34	35	37	33	33	34	32	33	35	30	31	32	34	35	37

Attachment B

Modelled source locations

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Modelled plant location
- Haul route

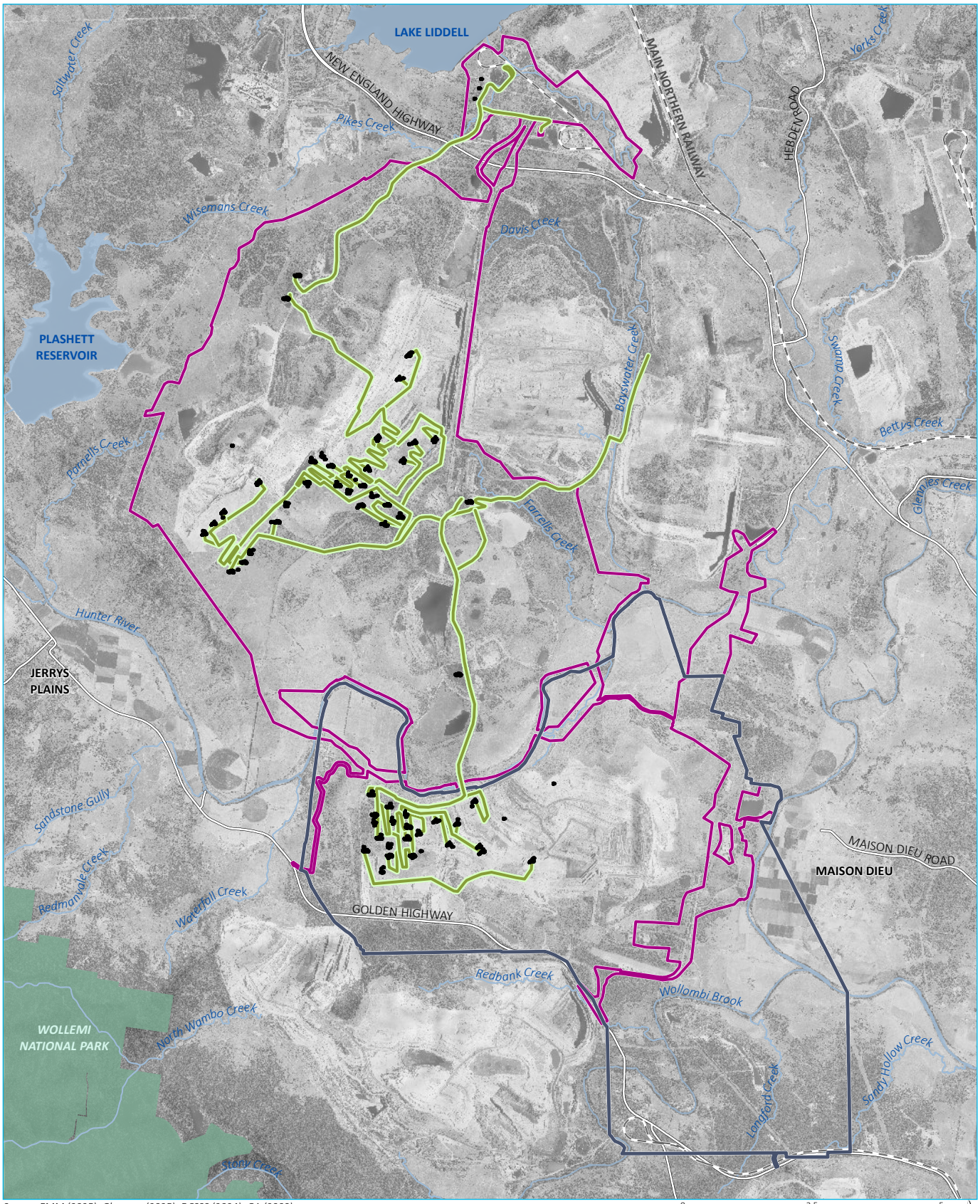
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Year 3 modelled plant locations

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure B.1

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Modelled plant location
- Haul route

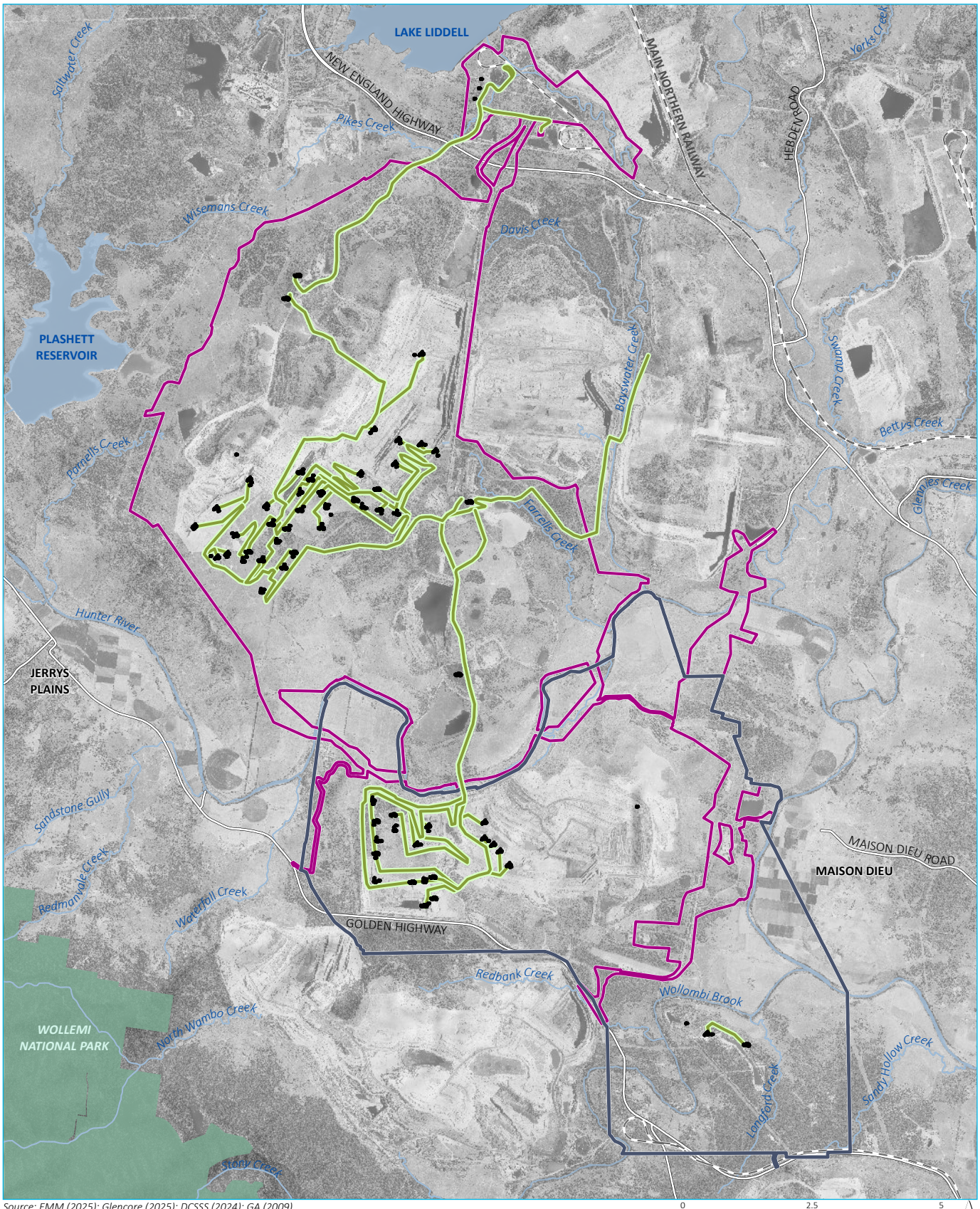
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Year 6 modelled plant locations

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure B.2

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Modelled plant location
- Haul route

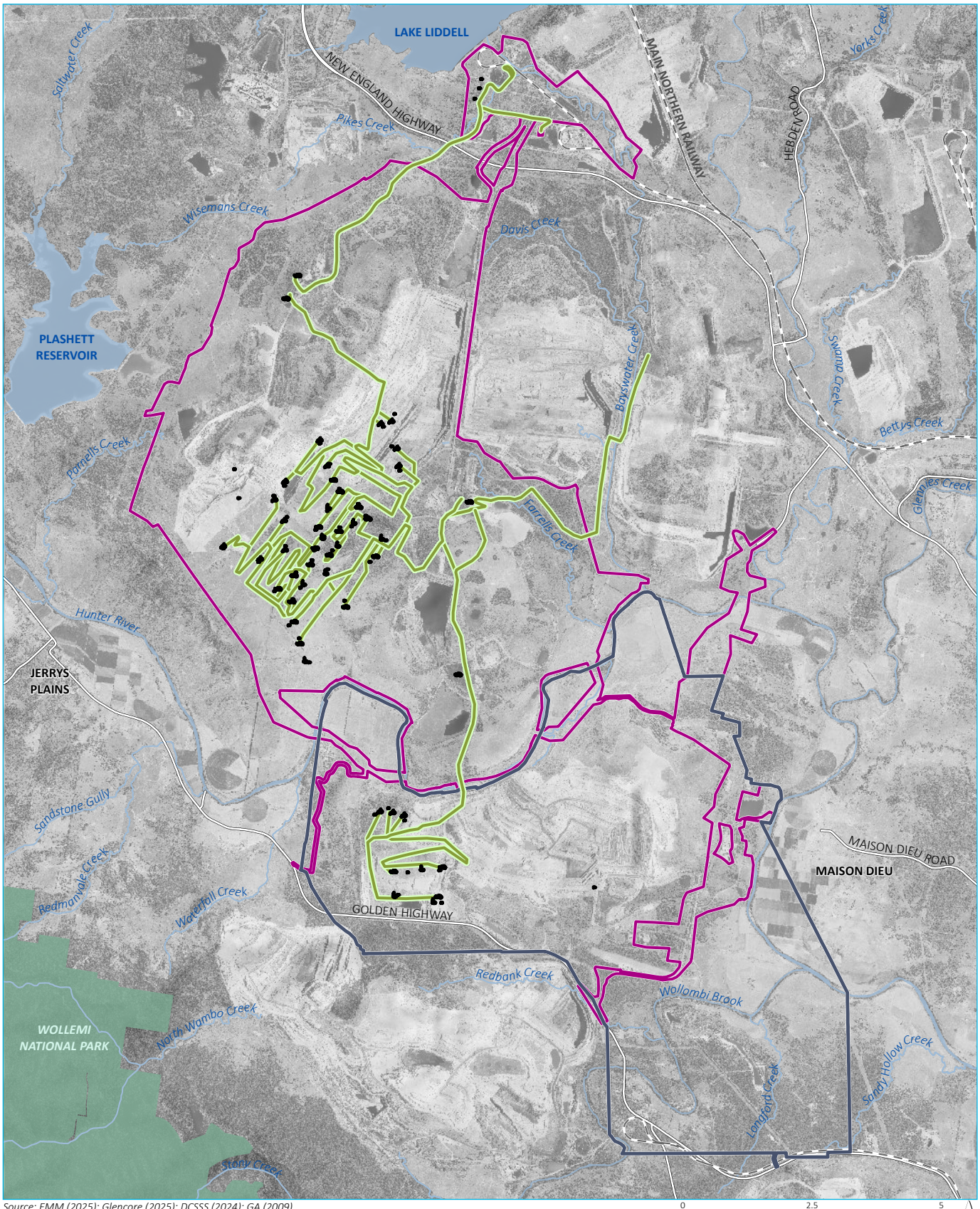
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Year 8 modelled plant locations

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure B.3

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Modelled plant location
- Haul route

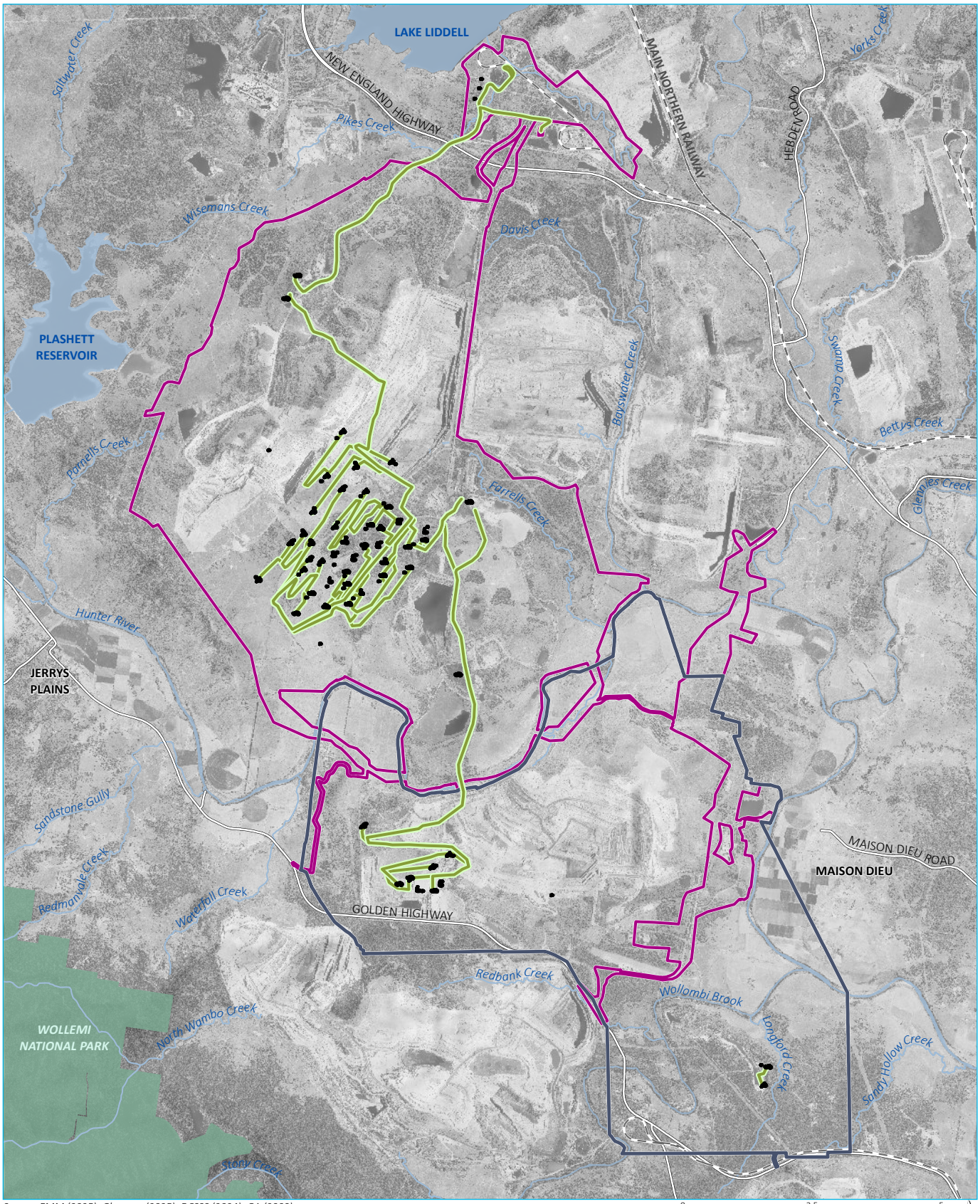
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Year 12 modelled plant locations

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure B.4

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary
- Proposed HVO South development consent boundary
- Modelled plant location
- Haul route

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

Year 15 modelled plant locations

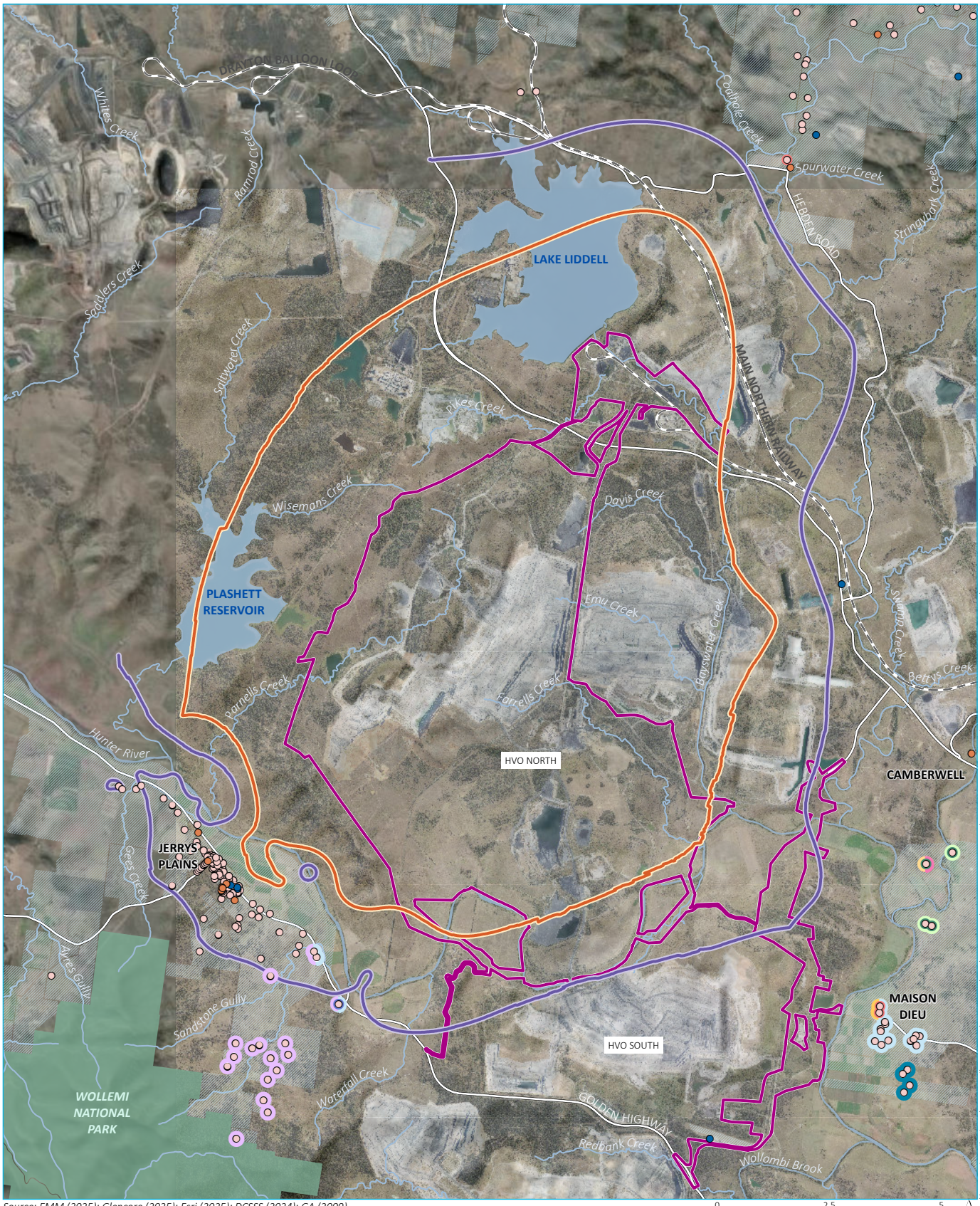
HVO Continuation Project- Amendment
Noise Impact Assessment
Figure B.5

EMM
creating opportunities

Attachment C

Noise contour figures

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

KEY

- Amended proposed HVO North development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North Year 3 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.1

EMM
creating opportunities

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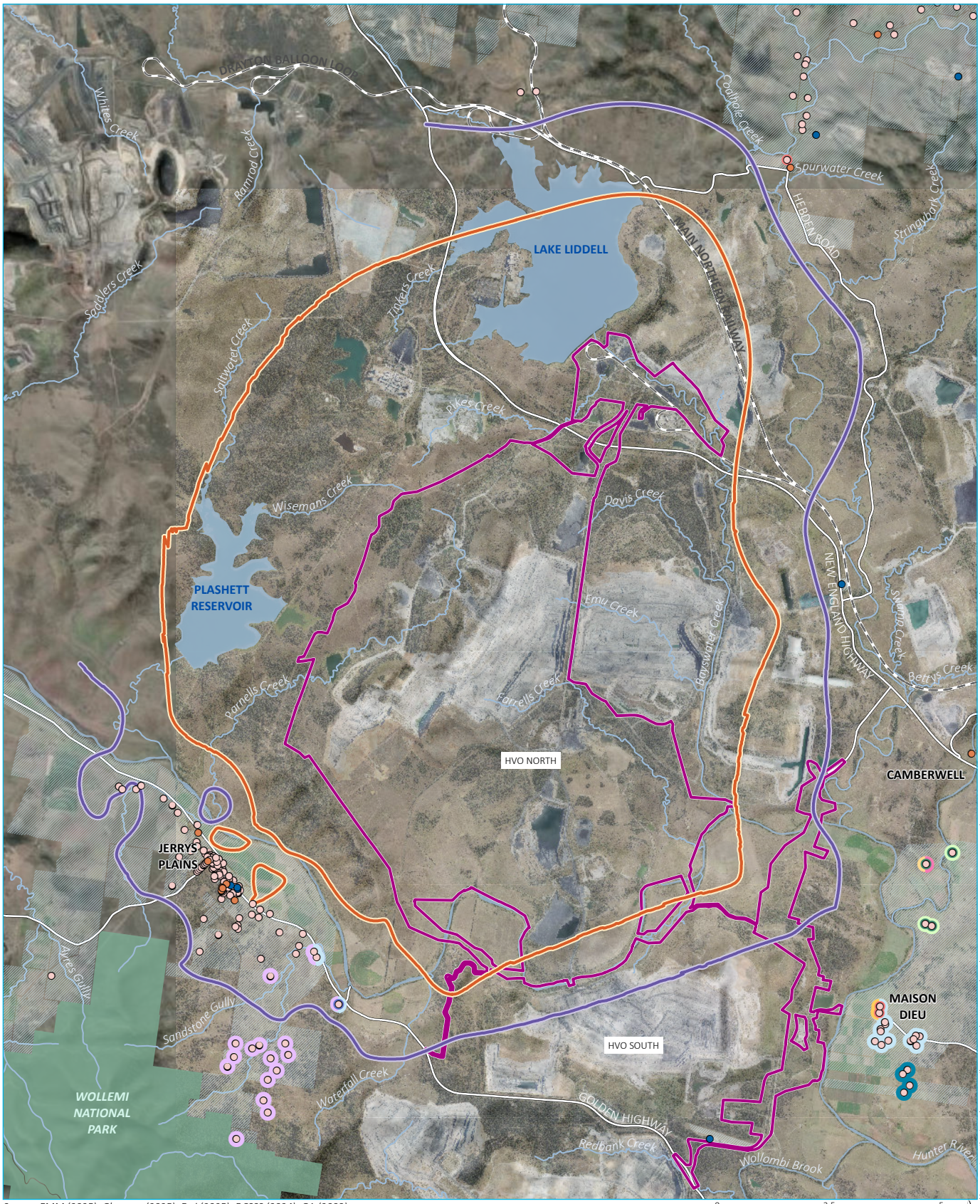

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Amended proposed HVO North development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North Year 6 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.2

EMM
creating opportunities

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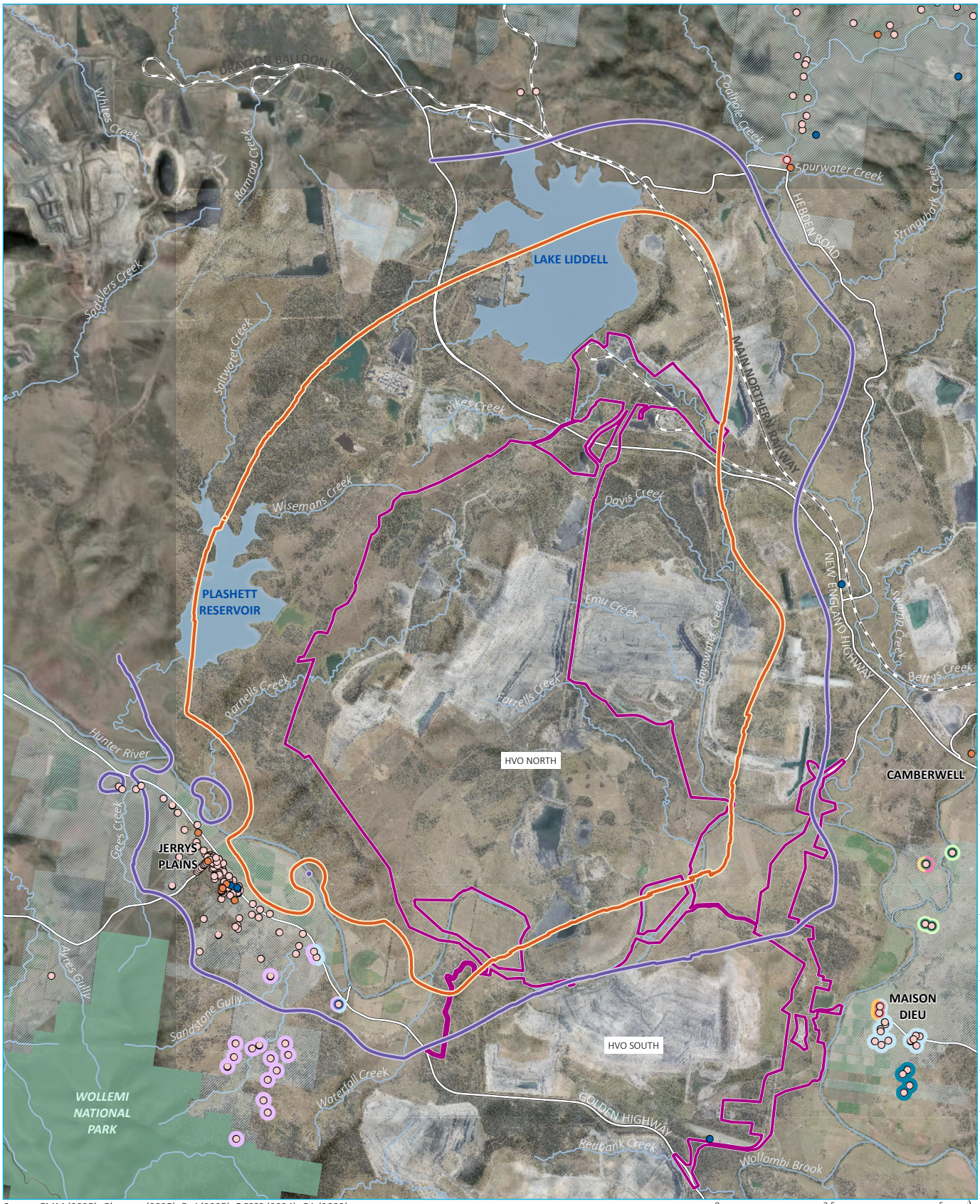

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

KEY

- Amended proposed HVO North development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North Year 8 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.3

EMM
creating opportunities

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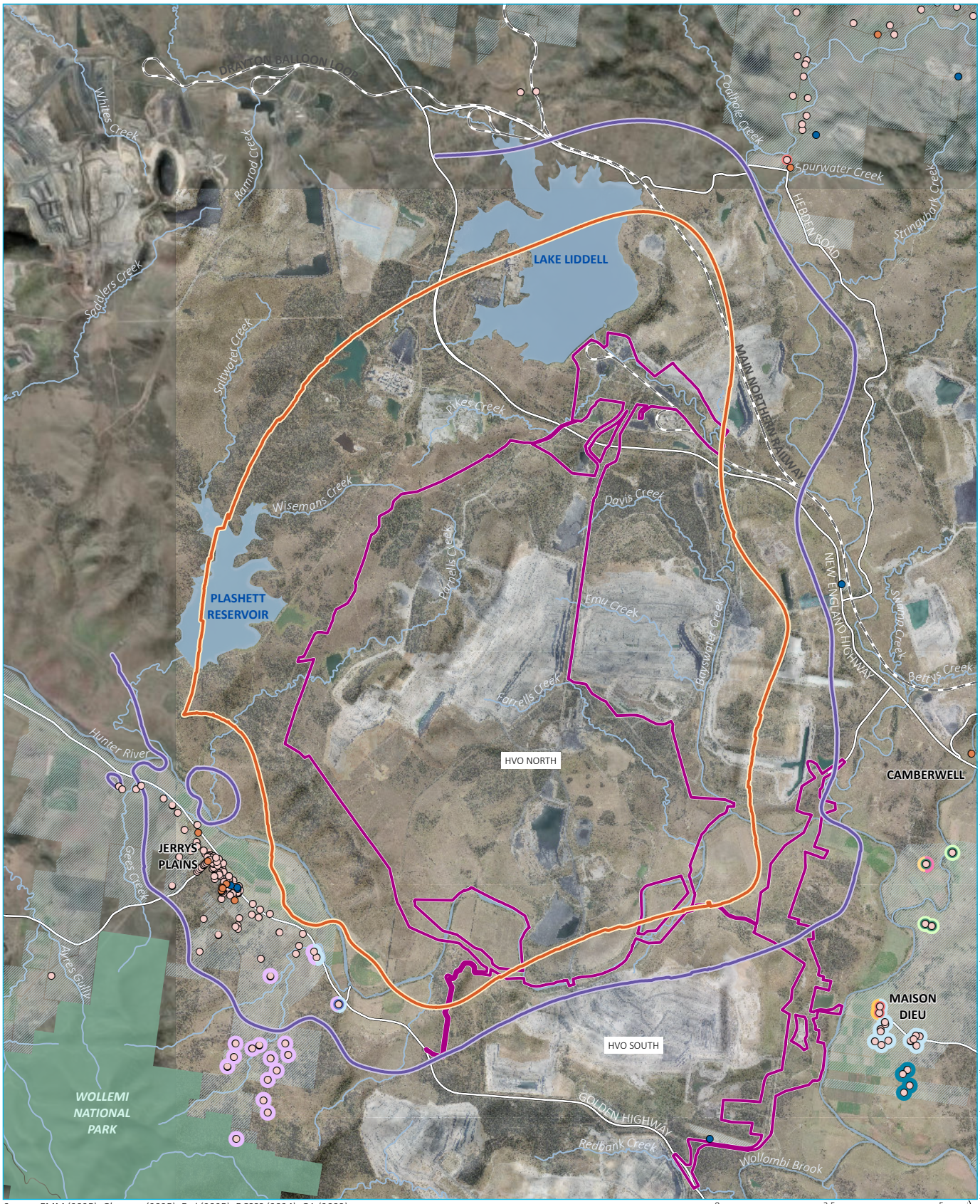

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

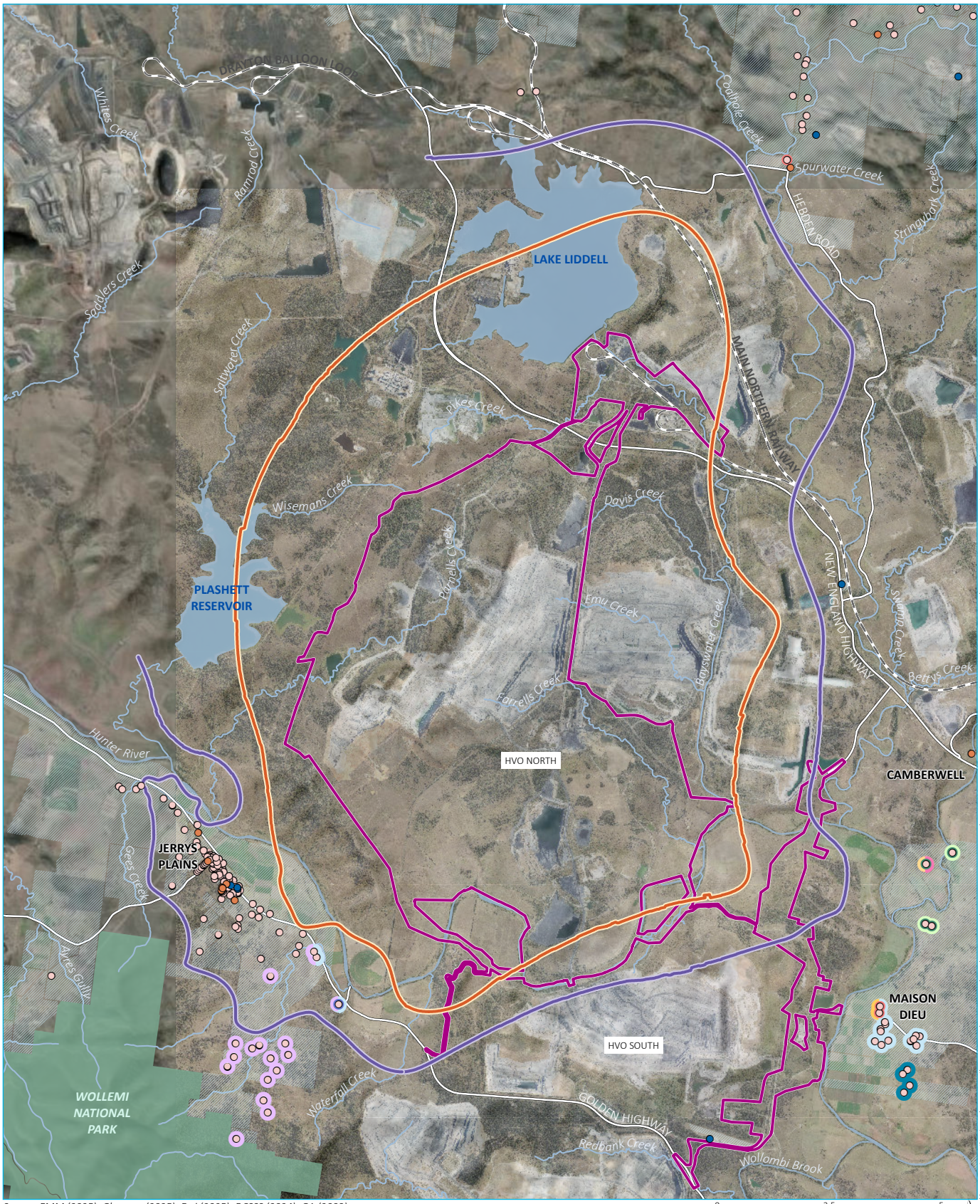
Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North Year 12 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.4

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

KEY

- Amended proposed HVO North development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North Year 15 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.5

EMM
creating opportunities

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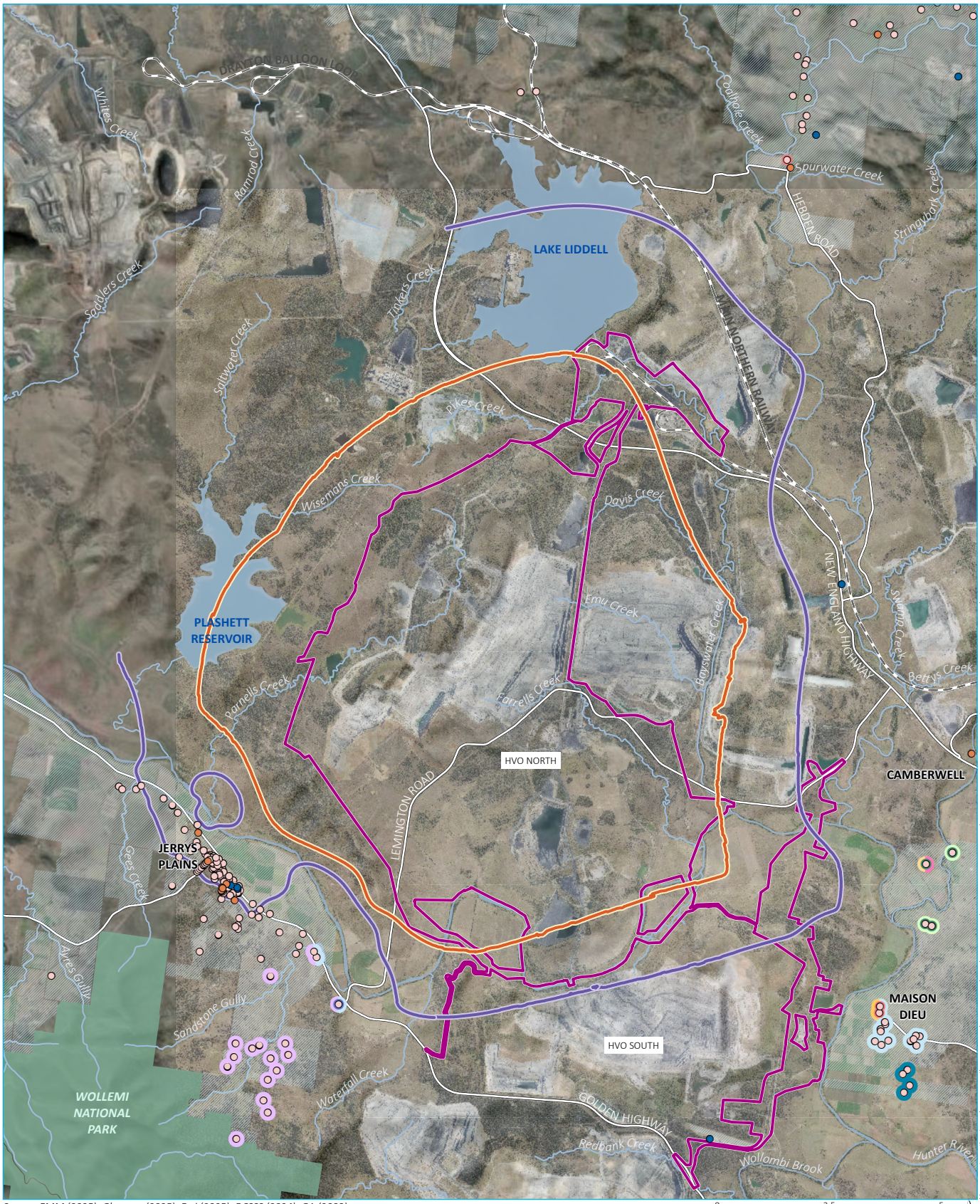

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Amended proposed HVO North development consent boundary
- Privately owned land

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

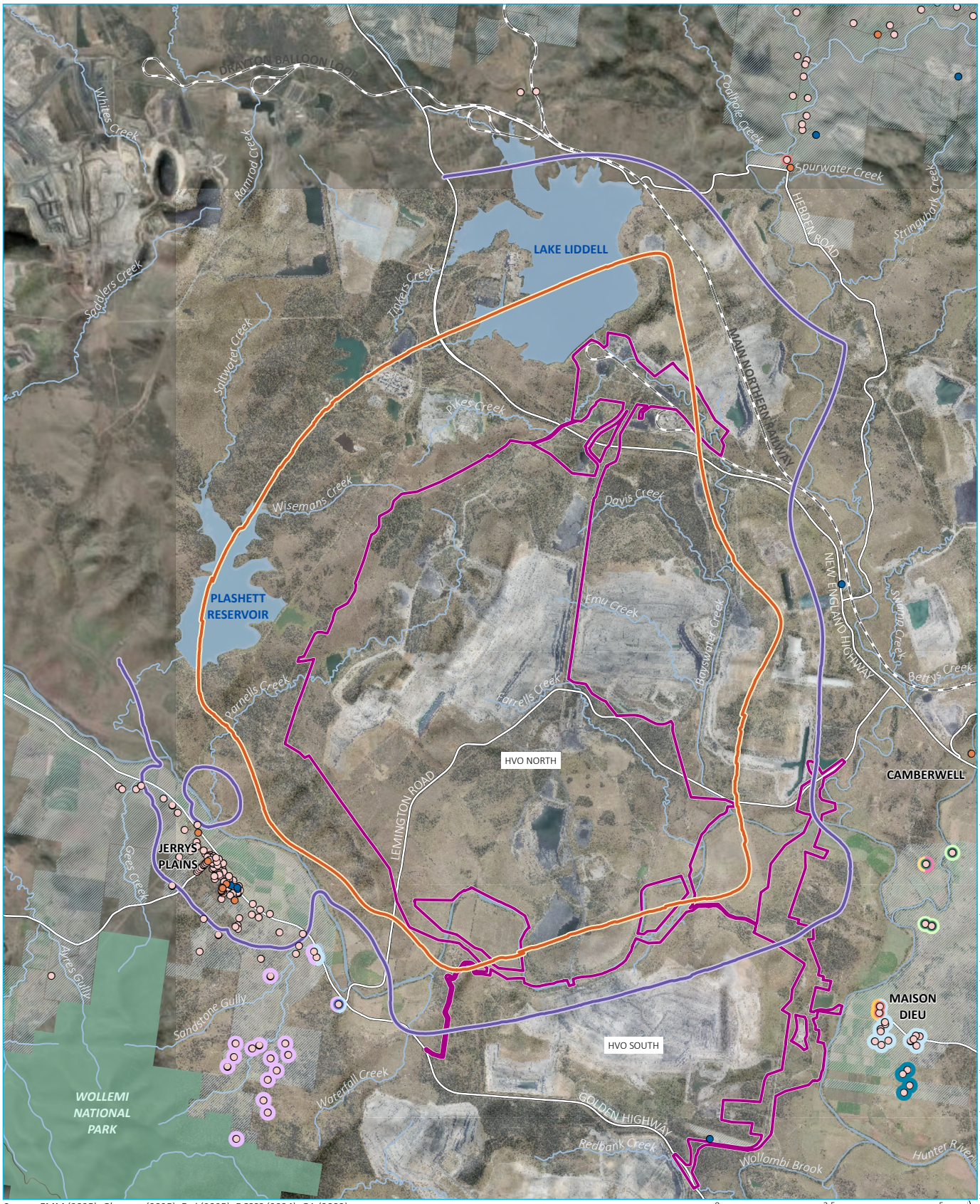
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North day period maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.6

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

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KEY

- Amended proposed HVO North development consent boundary
- Privately owned land

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

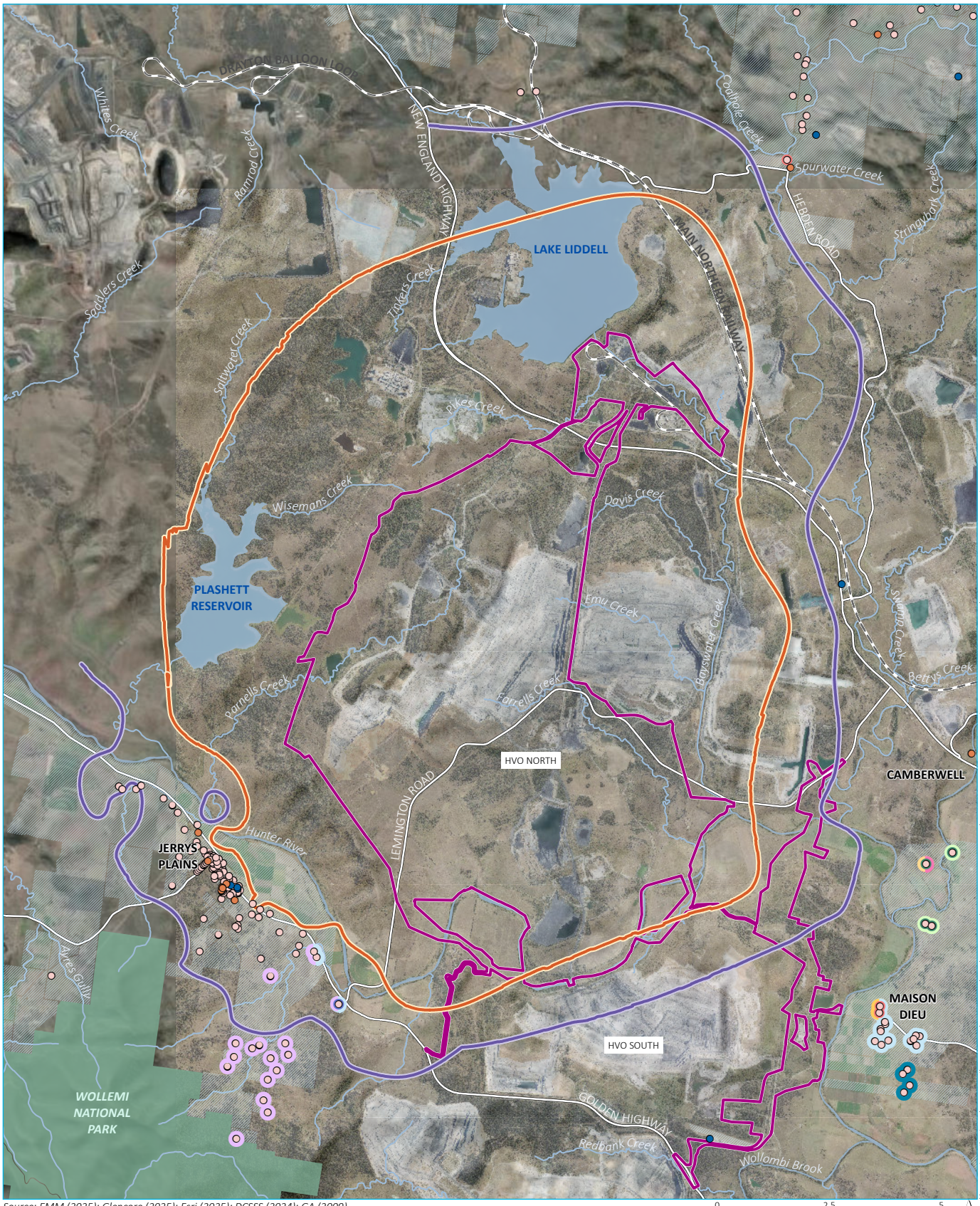
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North evening period maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.7

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Amended proposed HVO North development consent boundary
- Privately owned land

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO North night period maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.8

EMM
creating opportunities

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Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Proposed HVO South development consent boundary

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South Year 3 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.9

EMM
creating opportunities

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Proposed HVO South development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

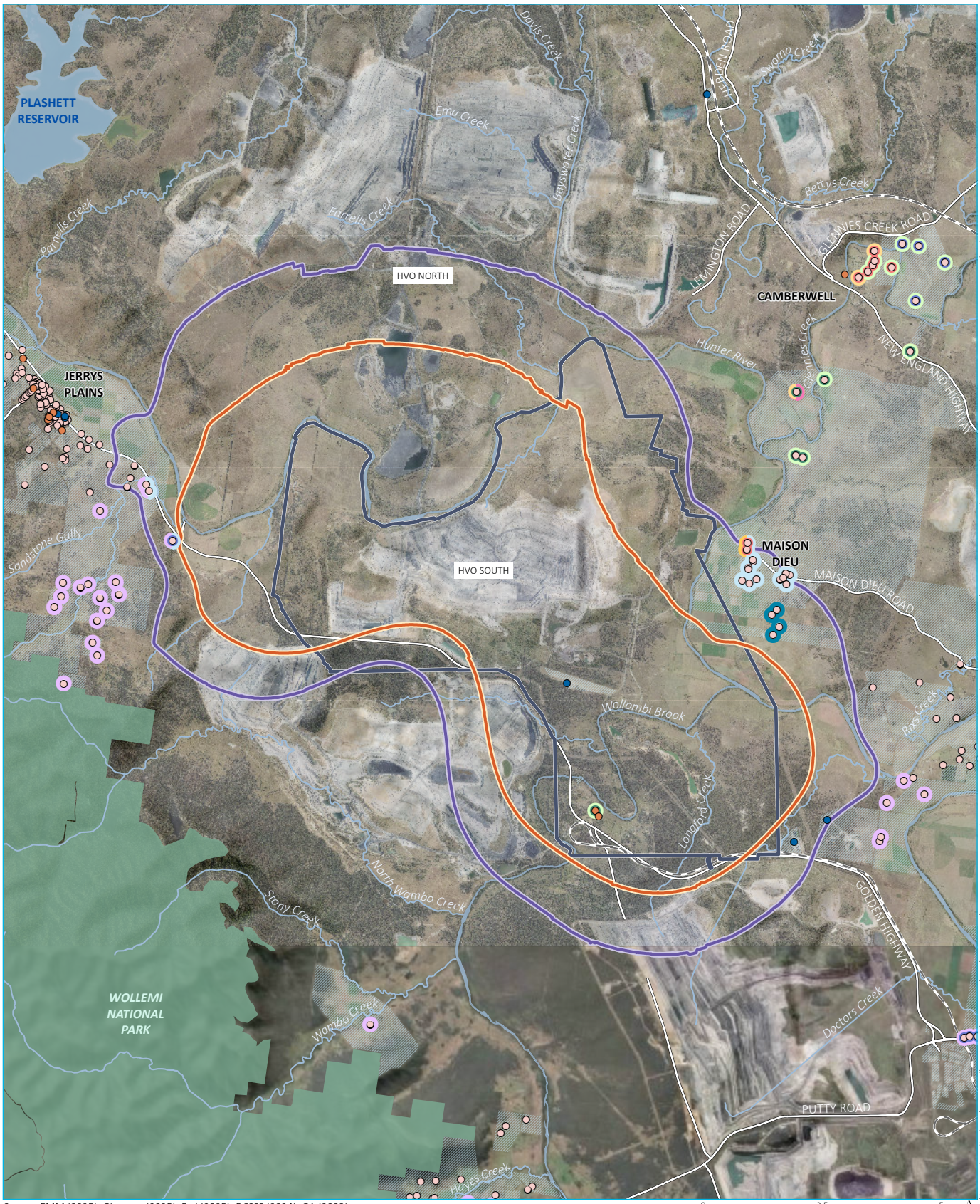
Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South Year 6 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.10

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Proposed HVO South development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

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HVO South Year 8 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.11

EMM
creating opportunities

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Proposed HVO South development consent boundary

Noise contour ($dB_{LAeq,15min}$)
- 35
- 40

Receptor location
- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South Year 12 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.12

EMM creating opportunities

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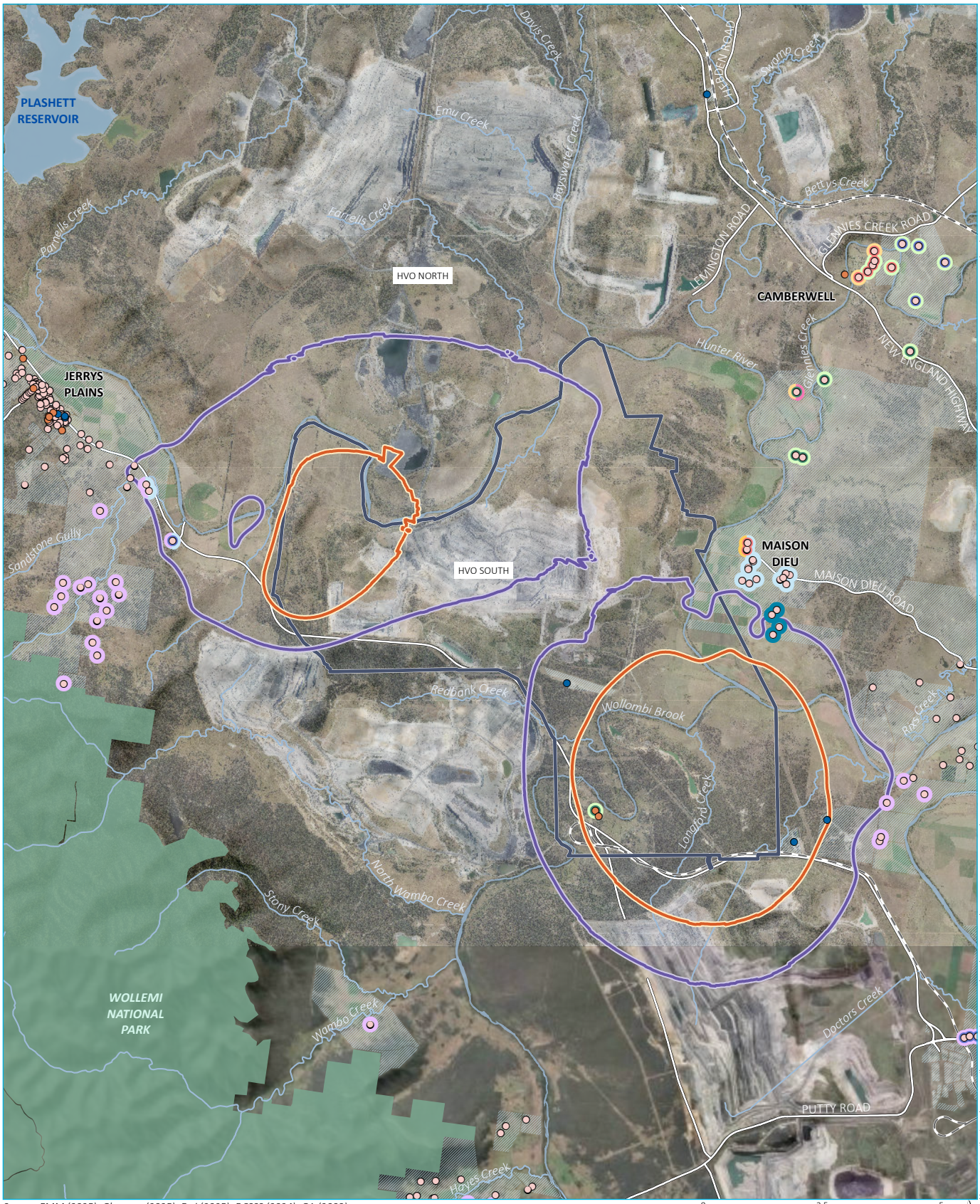

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Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

KEY

- Proposed HVO South development consent boundary

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise
- Privately owned land

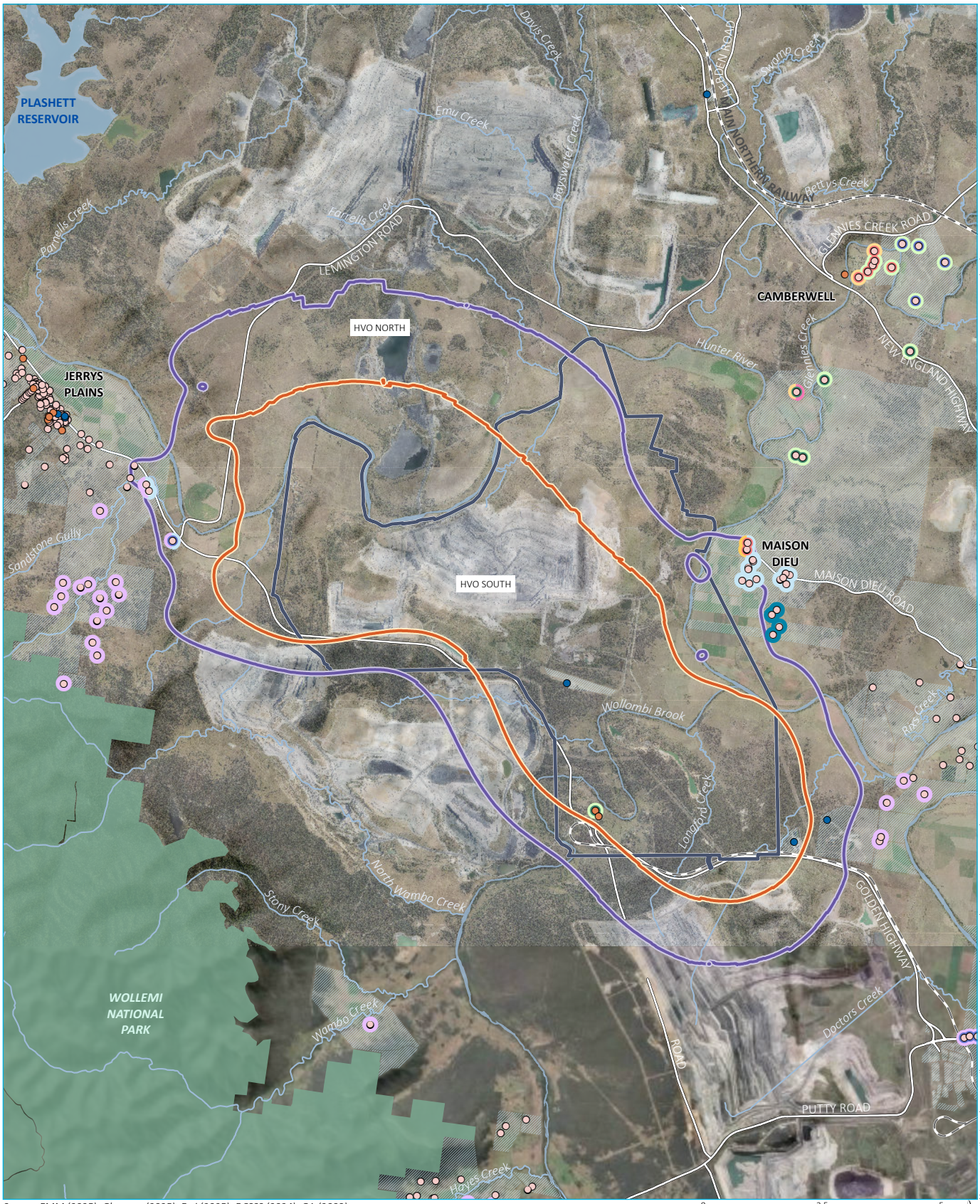
Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South Year 15 maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project- Amendment
Noise Impact Assessment
Figure C.13

EMM
creating opportunities



Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Proposed HVO South development consent boundary
- Privately owned land

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South day period maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project - Amendment
Noise Impact Assessment
Figure C.14

EMM
creating opportunities

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Proposed HVO South development consent boundary
- Privately owned land

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South evening period maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project - Amendment
Noise Impact Assessment
Figure C.15

EMM
creating opportunities

Source: EMM (2025); Glencore (2025); Esri (2025); DCSSS (2024); GA (2009)

KEY

- Proposed HVO South development consent boundary
- Privately owned land

Noise contour ($dB_{LAeq,15min}$)

- 35
- 40

Receptor location

- Private- residential
- Private- non residential
- Community infrastructure
- Subject to existing acquisition rights- other mine- AQ
- Subject to existing acquisition rights- other mine- noise
- Subject to existing acquisition rights- other mine- AQ & noise
- Subject to existing mitigation rights- HVO- AQ
- Subject to existing mitigation rights- HVO- noise & AQ
- Subject to existing mitigation rights- HVO- noise
- Subject to existing mitigation rights- other mine- noise & AQ
- Subject to existing mitigation rights- other mine- AQ
- Subject to existing mitigation rights- other mine- noise

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

HVO South night period maximum envelope 90th percentile $L_{Aeq,15min}$ noise contours

HVO Continuation Project - Amendment
Noise Impact Assessment
Figure C.16

EMM
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Attachment D

Cumulative noise assessment results

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Table D.1 Cumulative noise assessment predictions – $L_{Aeq,period}$ dB

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
102	50	50	50	39	40	44
120	50	45	40	37	37	39
121	50	45	40	37	37	39
122	50	45	40	37	36	38
123	50	45	40	37	36	39
126	50	45	40	39	39	40
127	50	45	40	40	39	40
128	50	45	40	40	39	40
130	50	45	40	40	39	40
134	50	45	40	40	39	40
139	50	45	40	39	39	40
141	50	45	40	39	39	40
160	50	45	40	37	37	39
161	50	45	40	37	37	39
162	50	45	40	37	37	39
163	50	45	40	37	37	39
167	50	45	40	39	39	40
169	50	45	40	39	39	40
170	50	45	40	39	39	40
173	50	45	40	39	39	40
174	50	45	40	39	39	40
175	50	45	40	39	39	40
176	50	45	40	39	39	40
178	50	45	40	39	39	40
179	50	45	40	39	39	40
244	50	45	40	37	36	38
245	50	45	40	37	36	38
246	50	45	40	37	36	38
247	50	45	40	37	36	38
248	50	45	40	39	39	40

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
249	50	45	40	39	39	40
250	50	45	40	39	39	40
251	50	45	40	39	39	40
256	50	45	40	37	37	39
258	50	45	40	37	37	39
260	50	45	40	37	37	39
261	50	45	40	37	37	39
262	50	45	40	39	39	40
264	50	50	50	38	39	43
308	50	45	40	40	39	43
311	50	45	40	38	38	40
317	50	45	40	38	38	40
321	50	45	40	37	38	39
322	50	45	40	37	37	39
324	50	45	40	37	38	39
326	50	45	40	35	34	37
328	50	45	40	35	35	37
330	50	45	40	35	35	37
331	55	55	55	35	35	37
332	50	45	40	35	35	37
333	50	45	40	34	35	37
334	50	45	40	34	35	37
335	50	45	40	34	35	37
336	50	45	40	35	35	37
337	50	45	40	34	35	37
338	50	45	40	34	35	37
339	50	45	40	34	34	36
340	50	45	40	34	34	37
341	50	45	40	34	35	37
342	50	45	40	34	35	37
343	50	45	40	34	35	37
344	50	45	40	34	35	37

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
345	50	45	40	34	35	37
346	50	45	40	34	35	37
347	50	45	40	34	35	37
348	50	45	40	34	35	37
349	50	45	40	34	35	37
350	50	45	40	34	35	37
351	50	45	40	34	35	37
352	50	45	40	34	35	37
353	50	45	40	34	35	37
355	50	45	40	34	35	37
356	50	45	40	34	35	37
357	50	45	40	34	35	37
358	50	45	40	34	35	37
359	50	45	40	34	35	37
360	50	45	40	34	35	37
361	50	45	40	34	35	37
362	50	45	40	34	35	37
363	50	45	40	34	35	37
366	50	45	40	34	35	37
367	50	45	40	34	35	37
368	50	45	40	34	35	37
369	50	45	40	34	35	37
370	50	45	40	34	35	37
371	50	45	40	34	35	37
372	50	45	40	34	35	37
373	50	45	40	34	35	37
374	50	45	40	34	35	37
375	50	45	40	34	35	37
376	50	45	40	34	35	38
377	50	45	40	34	35	37
380	50	45	40	34	35	37
381	50	45	40	34	35	37

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
382	50	50	50	34	35	37
383	50	45	40	34	35	37
384	50	45	40	34	35	37
385	50	45	40	34	35	37
386	65	65	65	34	35	37
389	50	45	40	34	35	38
390	50	45	40	34	35	38
391	65	65	65	34	35	38
392	50	45	40	34	35	38
393	50	45	40	34	35	38
394	50	45	40	34	35	38
395	50	45	40	34	35	38
396	50	50	50	34	34	37
397	50	45	40	34	35	38
398	50	45	40	34	35	37
399	50	45	40	34	35	37
400	50	45	40	34	35	38
401	50	45	40	34	35	37
402	50	45	40	34	35	37
403	50	45	40	34	35	38
404	50	45	40	34	35	37
405	50	45	40	34	35	38
406	50	45	40	34	35	38
407	50	45	40	34	35	37
408	50	45	40	34	34	37
409	50	45	40	34	35	37
410	65	65	65	34	35	37
411	50	45	40	34	35	37
412	45	45	45	34	35	37
413	50	45	40	34	35	37
414	50	45	40	34	35	37
415	50	45	40	34	35	37

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
417	50	45	40	34	35	37
418	50	45	40	34	35	37
419	50	45	40	34	34	37
420	50	45	40	34	35	37
421	50	45	40	34	35	38
422	50	45	40	34	35	37
423	50	45	40	34	35	38
425	50	45	40	37	37	39
426	50	45	40	37	37	39
427	50	45	40	37	37	39
428	50	45	40	37	37	39
429	50	45	40	37	37	39
430	50	45	40	37	37	39
431	50	45	40	37	37	39
432	50	45	40	37	37	39
433	50	45	40	37	37	39
434	50	45	40	38	38	40
436	50	45	40	38	38	40
437	50	45	40	34	34	37
438	50	45	40	32	31	33
440	50	45	40	38	38	40
451	50	45	40	38	38	37
452	50	45	40	38	38	37
453	50	45	40	38	38	37
454	50	45	40	37	37	37
455	50	45	40	38	37	37
456	50	45	40	37	37	37
457	50	45	40	37	37	36
458	50	45	40	37	37	37
459	50	45	40	38	38	37
460	50	45	40	38	38	37
462	50	45	40	38	38	37

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
464	50	45	40	37	37	39
466	50	45	40	33	33	35
471	50	45	40	35	35	37
472	50	45	40	32	31	33
473	65	65	65	34	35	37
477	50	45	40	37	38	37
478	50	45	40	38	38	37
481	50	45	40	37	37	39
482	50	45	40	34	35	37
483	65	65	65	34	35	37
484	50	45	40	34	35	37
487	50	45	40	33	33	35
488	50	45	40	33	32	34
489	50	45	40	33	32	34
497	50	45	40	37	37	39
498	50	45	40	37	36	38
499	50	45	40	36	35	37
596	50	45	40	37	37	36
619	50	45	40	38	38	37
621	50	45	40	38	38	37
623	50	50	50	38	38	37
624	50	45	40	38	38	37
626	50	45	40	38	38	37
627	50	45	40	38	38	37
628	50	45	40	38	38	37
629	50	45	40	38	38	37
735	65	65	65	38	38	38
829	65	65	65	38	38	38
830	65	65	65	38	39	39
833	55	55	55	43	44	46
834	65	65	65	34	35	38
835	50	45	40	34	35	37

Receptor ID	Amenity noise criteria $L_{Aeq,period}$ dB			Maximum cumulative predictions $L_{Aeq,period}$ dB		
	Day	Evening	Night	Day	Evening	Night
836	50	45	40	34	35	37
837	50	45	40	34	35	37
838	50	45	40	34	35	37
839	50	45	40	34	35	37
840	50	45	40	34	35	37
843	50	45	40	39	39	40
846	50	45	40	39	39	40
847	50	45	40	39	39	40
852	50	45	40	39	39	40
855	50	45	40	39	39	40
856	50	45	40	39	39	40
860	50	45	40	38	38	37
861	50	45	40	38	38	37
862	50	45	40	38	38	37
863	50	45	40	38	38	37
869	50	45	40	35	35	37
870	50	45	40	36	36	38
952	50	45	40	37	37	39

Attachment E

Modelled meteorological conditions

EMM
creating opportunities

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	0	-	-1.5
10	80	0	-	-0.5
10	80	0	-	1.5
10	80	0	-	4
10	80	0.5	0	-1.5
10	80	0.5	22.5	-1.5
10	80	0.5	45	-1.5
10	80	0.5	67.5	-1.5
10	80	0.5	90	-1.5
10	80	0.5	112.5	-1.5
10	80	0.5	135	-1.5
10	80	0.5	157.5	-1.5
10	80	0.5	180	-1.5
10	80	0.5	202.5	-1.5
10	80	0.5	225	-1.5
10	80	0.5	247.5	-1.5
10	80	0.5	270	-1.5
10	80	0.5	292.5	-1.5
10	80	0.5	315	-1.5
10	80	0.5	337.5	-1.5
10	80	1.25	0	-1.5
10	80	1.25	22.5	-1.5
10	80	1.25	45	-1.5
10	80	1.25	67.5	-1.5
10	80	1.25	90	-1.5
10	80	1.25	112.5	-1.5
10	80	1.25	135	-1.5
10	80	1.25	157.5	-1.5
10	80	1.25	180	-1.5
10	80	1.25	202.5	-1.5
10	80	1.25	225	-1.5
10	80	1.25	247.5	-1.5

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	1.25	270	-1.5
10	80	1.25	292.5	-1.5
10	80	1.25	315	-1.5
10	80	1.25	337.5	-1.5
10	80	2	0	-1.5
10	80	2	22.5	-1.5
10	80	2	45	-1.5
10	80	2	67.5	-1.5
10	80	2	90	-1.5
10	80	2	112.5	-1.5
10	80	2	135	-1.5
10	80	2	157.5	-1.5
10	80	2	180	-1.5
10	80	2	202.5	-1.5
10	80	2	225	-1.5
10	80	2	247.5	-1.5
10	80	2	270	-1.5
10	80	2	292.5	-1.5
10	80	2	315	-1.5
10	80	2	337.5	-1.5
10	80	3	0	-1.5
10	80	3	22.5	-1.5
10	80	3	45	-1.5
10	80	3	67.5	-1.5
10	80	3	90	-1.5
10	80	3	112.5	-1.5
10	80	3	135	-1.5
10	80	3	157.5	-1.5
10	80	3	180	-1.5
10	80	3	202.5	-1.5
10	80	3	225	-1.5
10	80	3	247.5	-1.5

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	3	270	-1.5
10	80	3	292.5	-1.5
10	80	3	315	-1.5
10	80	3	337.5	-1.5
10	80	0.5	0	-0.5
10	80	0.5	22.5	-0.5
10	80	0.5	45	-0.5
10	80	0.5	67.5	-0.5
10	80	0.5	90	-0.5
10	80	0.5	112.5	-0.5
10	80	0.5	135	-0.5
10	80	0.5	157.5	-0.5
10	80	0.5	180	-0.5
10	80	0.5	202.5	-0.5
10	80	0.5	225	-0.5
10	80	0.5	247.5	-0.5
10	80	0.5	270	-0.5
10	80	0.5	292.5	-0.5
10	80	0.5	315	-0.5
10	80	0.5	337.5	-0.5
10	80	1.25	0	-0.5
10	80	1.25	22.5	-0.5
10	80	1.25	45	-0.5
10	80	1.25	67.5	-0.5
10	80	1.25	90	-0.5
10	80	1.25	112.5	-0.5
10	80	1.25	135	-0.5
10	80	1.25	157.5	-0.5
10	80	1.25	180	-0.5
10	80	1.25	202.5	-0.5
10	80	1.25	225	-0.5
10	80	1.25	247.5	-0.5

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	1.25	270	-0.5
10	80	1.25	292.5	-0.5
10	80	1.25	315	-0.5
10	80	1.25	337.5	-0.5
10	80	2	0	-0.5
10	80	2	22.5	-0.5
10	80	2	45	-0.5
10	80	2	67.5	-0.5
10	80	2	90	-0.5
10	80	2	112.5	-0.5
10	80	2	135	-0.5
10	80	2	157.5	-0.5
10	80	2	180	-0.5
10	80	2	202.5	-0.5
10	80	2	225	-0.5
10	80	2	247.5	-0.5
10	80	2	270	-0.5
10	80	2	292.5	-0.5
10	80	2	315	-0.5
10	80	2	337.5	-0.5
10	80	3	0	-0.5
10	80	3	22.5	-0.5
10	80	3	45	-0.5
10	80	3	67.5	-0.5
10	80	3	90	-0.5
10	80	3	112.5	-0.5
10	80	3	135	-0.5
10	80	3	157.5	-0.5
10	80	3	180	-0.5
10	80	3	202.5	-0.5
10	80	3	225	-0.5
10	80	3	247.5	-0.5

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	3	270	-0.5
10	80	3	292.5	-0.5
10	80	3	315	-0.5
10	80	3	337.5	-0.5
10	80	0.5	0	1.5
10	80	0.5	22.5	1.5
10	80	0.5	45	1.5
10	80	0.5	67.5	1.5
10	80	0.5	90	1.5
10	80	0.5	112.5	1.5
10	80	0.5	135	1.5
10	80	0.5	157.5	1.5
10	80	0.5	180	1.5
10	80	0.5	202.5	1.5
10	80	0.5	225	1.5
10	80	0.5	247.5	1.5
10	80	0.5	270	1.5
10	80	0.5	292.5	1.5
10	80	0.5	315	1.5
10	80	0.5	337.5	1.5
10	80	1.25	0	1.5
10	80	1.25	22.5	1.5
10	80	1.25	45	1.5
10	80	1.25	67.5	1.5
10	80	1.25	90	1.5
10	80	1.25	112.5	1.5
10	80	1.25	135	1.5
10	80	1.25	157.5	1.5
10	80	1.25	180	1.5
10	80	1.25	202.5	1.5
10	80	1.25	225	1.5
10	80	1.25	247.5	1.5

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	1.25	270	1.5
10	80	1.25	292.5	1.5
10	80	1.25	315	1.5
10	80	1.25	337.5	1.5
10	80	2	0	1.5
10	80	2	22.5	1.5
10	80	2	45	1.5
10	80	2	67.5	1.5
10	80	2	90	1.5
10	80	2	112.5	1.5
10	80	2	135	1.5
10	80	2	157.5	1.5
10	80	2	180	1.5
10	80	2	202.5	1.5
10	80	2	225	1.5
10	80	2	247.5	1.5
10	80	2	270	1.5
10	80	2	292.5	1.5
10	80	2	315	1.5
10	80	2	337.5	1.5
10	80	3	0	1.5
10	80	3	22.5	1.5
10	80	3	45	1.5
10	80	3	67.5	1.5
10	80	3	90	1.5
10	80	3	112.5	1.5
10	80	3	135	1.5
10	80	3	157.5	1.5
10	80	3	180	1.5
10	80	3	202.5	1.5
10	80	3	225	1.5
10	80	3	247.5	1.5

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	3	270	1.5
10	80	3	292.5	1.5
10	80	3	315	1.5
10	80	3	337.5	1.5
10	80	0.5	0	4
10	80	0.5	22.5	4
10	80	0.5	45	4
10	80	0.5	67.5	4
10	80	0.5	90	4
10	80	0.5	112.5	4
10	80	0.5	135	4
10	80	0.5	157.5	4
10	80	0.5	180	4
10	80	0.5	202.5	4
10	80	0.5	225	4
10	80	0.5	247.5	4
10	80	0.5	270	4
10	80	0.5	292.5	4
10	80	0.5	315	4
10	80	0.5	337.5	4
10	80	1.25	0	4
10	80	1.25	22.5	4
10	80	1.25	45	4
10	80	1.25	67.5	4
10	80	1.25	90	4
10	80	1.25	112.5	4
10	80	1.25	135	4
10	80	1.25	157.5	4
10	80	1.25	180	4
10	80	1.25	202.5	4
10	80	1.25	225	4
10	80	1.25	247.5	4

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	1.25	270	4
10	80	1.25	292.5	4
10	80	1.25	315	4
10	80	1.25	337.5	4
10	80	2	0	4
10	80	2	22.5	4
10	80	2	45	4
10	80	2	67.5	4
10	80	2	90	4
10	80	2	112.5	4
10	80	2	135	4
10	80	2	157.5	4
10	80	2	180	4
10	80	2	202.5	4
10	80	2	225	4
10	80	2	247.5	4
10	80	2	270	4
10	80	2	292.5	4
10	80	2	315	4
10	80	2	337.5	4
10	80	3	0	4
10	80	3	22.5	4
10	80	3	45	4
10	80	3	67.5	4
10	80	3	90	4
10	80	3	112.5	4
10	80	3	135	4
10	80	3	157.5	4
10	80	3	180	4
10	80	3	202.5	4
10	80	3	225	4
10	80	3	247.5	4

Temperature ^{0}C	Humidity %	Wind speed m/s	Wind direction (degrees)	VTG ^{0}C/100m
10	80	3	270	4
10	80	3	292.5	4
10	80	3	315	4
10	80	3	337.5	4

Attachment F
Modelled receptors

EMM
creating opportunities

Table F.1 Modelled receptors

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
17	280//571290	Private - Dwelling	312814	6387573
19	92//586792	Private - Dwelling	312920	6387731
37	91//586792	Private - Dwelling	313347	6387867
102	21//1109631	Community Infrastructure	314800	6394348
120	11//3005	Private - Dwelling	318504	6398457
121	9//3005	Private - Dwelling	318530	6398039
122	2//348678	Private - Dwelling	318608	6398554
123	1//937751	Private - Dwelling	318658	6398205
126	74//755267	Private - Dwelling	320764	6393699
127	4//261349	Private - Dwelling	320624	6396932
128	62//755267	Private - Dwelling	320916	6394511
130	19//621875	Private - Dwelling	321271	6394970
134	200//777038	Private - Dwelling	321472	6395034
139	201//777038	Private - Dwelling	321707	6394686
141	3//261349	Private - Dwelling	321604	6397030
160	3//3005	Private - Dwelling	317883	6399178
161	1//1217808	Private - Dwelling	318010	6399448
162	1//1217808	Private - Dwelling	318011	6399407
163	2//1217808	Private - Dwelling	318114	6399572
167	2//261349	Private - Dwelling	322254	6396725
169	45//752442	Private - Dwelling	321959	6396271
170	43//752442	Private - Dwelling	322379	6396285
173	13//732038	Private - Dwelling	322099	6395301
174	14//732038	Private - Dwelling	322442	6395419
175	17//736075	Private - Dwelling	322488	6395598
176	20//736075	Private - Dwelling	322830	6395688
178	19//736075	Private - Dwelling	323801	6395607
179	42//1186730	Private - Dwelling	324177	6395141
244	2//616940	Private - Dwelling	318808	6399092
245	2//112093	Private - Dwelling	318679	6399194
246	102//817010	Private - Dwelling	318795	6399314

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
247	101//817010	Private - Dwelling	318879	6399292
248	21//828765	Private - Dwelling	322876	6395431
249	18//736075	Private - Dwelling	323284	6395685
250	A//153004	Private - Dwelling	324927	6395679
251	1//37628	Private - Dwelling	325339	6394874
256	104//817010	Private - Dwelling	317979	6399821
258	2//1217808	Private - Dwelling	318104	6399611
260	14//3005	Private - Dwelling	318182	6399195
261	14//3005	Private - Dwelling	318030	6399106
262	73//755267	Private - Dwelling	320794	6393794
264	2//1171764	Community Infrastructure	314870	6394227
266	1//178612	Private - Dwelling	310074	6389857
308	3//700476	Private - Dwelling	305926	6400011
311	72//1040611	Private - Dwelling	305432	6401054
317	72//1040611	Private - Dwelling	305375	6401182
321	45//860466	Private - Dwelling	304390	6402028
322	2//234710	Private - Dwelling	304009	6402249
324	3//234710	Private - Dwelling	304172	6402127
326	2//825150	Private - Dwelling	302335	6404279
328	102//1253129	Private - Dwelling	302773	6404013
330	1//37004	Private - Dwelling	302488	6403896
331	203//753817	Community Infrastructure	302791	6403833
332	144//753817	Private - Dwelling	302771	6403528
333	139//753817	Private - Dwelling	302651	6403521
334	138//753817	Private - Dwelling	302624	6403419
335	137//753817	Private - Dwelling	302691	6403468
336	143//753817	Private - Dwelling	302756	6403623
337	148//753817	Private - Dwelling	302914	6403433
338	150//753817	Private - Dwelling	303027	6403399
339	229//46777	Private - Dwelling	302768	6402966
340	228//46777	Private - Dwelling	302799	6402990
341	227//46777	Private - Dwelling	302829	6403026
342	226//46777	Private - Dwelling	302863	6403055

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
343	225//44377	Private - Dwelling	302879	6403079
344	224//44377	Private - Dwelling	302914	6403113
345	223//44377	Private - Dwelling	302944	6403132
346	222//44377	Private - Dwelling	302975	6403164
347	3/21/758542	Private - Dwelling	303058	6403344
348	4/21/758542	Private - Dwelling	303035	6403315
349	5/21/758542	Private - Dwelling	303000	6403289
350	6/21/758542	Private - Dwelling	303049	6403237
351	7/21/758542	Private - Dwelling	303082	6403277
352	C//395246	Private - Dwelling	303116	6403299
353	B//395246	Private - Dwelling	303137	6403310
355	2/20/758542	Private - Dwelling	303187	6403276
356	4/20/758542	Private - Dwelling	303130	6403214
357	5/20/758542	Private - Dwelling	303108	6403168
358	6/20/758542	Private - Dwelling	303138	6403141
359	8/20/758542	Private - Dwelling	303207	6403190
360	9/20/758542	Private - Dwelling	303231	6403235
361	10/20/758542	Private - Dwelling	303253	6403253
362	10/19/758542	Private - Dwelling	303348	6403156
363	9/19/758542	Private - Dwelling	303317	6403133
366	7/19/758542	Private - Dwelling	303268	6403081
367	5/19/758542	Private - Dwelling	303212	6403085
368	4/19/758542	Private - Dwelling	303224	6403105
369	1/2/758542	Private - Dwelling	303332	6403032
370	12//509516	Private - Dwelling	303155	6403045
371	9/1/758542	Private - Dwelling	303239	6402933
372	21/1/758542	Private - Dwelling	303153	6402874
373	8/1/758542	Private - Dwelling	303257	6402924
374	7/1/758542	Private - Dwelling	303261	6402901
375	6/1/758542	Private - Dwelling	303277	6402867
376	1//196169	Private - Dwelling	303481	6402864
377	5/2/758542	Private - Dwelling	303359	6402968
380	43//836894	Private - Dwelling	303466	6402611

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
381	4//1147127	Private - Dwelling	303443	6402666
382	6//1147127	Community Infrastructure	303423	6402691
383	8/4/758542	Private - Dwelling	303422	6402758
384	2//709673	Private - Dwelling	303381	6402774
385	1//709673	Private - Dwelling	303366	6402742
386	14/4/758542	Community Infrastructure	303323	6402619
389	1/6/758542	Private - Dwelling	303599	6402669
390	3/6/758542	Private - Dwelling	303623	6402631
391	1//529413	Private - Commercial	303672	6402589
392	B//970216	Private - Dwelling	303683	6402575
393	2//503902	Private - Dwelling	303726	6402547
394	1//503902	Private - Dwelling	303694	6402565
395	5/6/758542	Private - Dwelling	303695	6402648
396	89//753817	Community Infrastructure	303605	6402326
397	2/5/758542	Private - Dwelling	303667	6402504
398	18/5/758542	Private - Dwelling	303568	6402424
399	1/5/758542	Private - Dwelling	303686	6402494
400	3/5/758542	Private - Dwelling	303657	6402525
401	4/5/758542	Private - Dwelling	303639	6402533
402	5/5/758542	Private - Dwelling	303628	6402548
403	6/5/758542	Private - Dwelling	303615	6402565
404	16/5/758542	Private - Dwelling	303562	6402484
405	7/5/758542	Private - Dwelling	303604	6402574
406	8/5/758542	Private - Dwelling	303593	6402592
407	12/5/758542	Private - Dwelling	303462	6402509
408	16/5/758542	Private - Dwelling	303506	6402433
409	21//1172495	Private - Dwelling	303400	6402544
410	15/4/758542	Community Infrastructure	303337	6402604
411	1//803526	Private - Dwelling	303376	6402577
412	4/7/758542	Community Infrastructure	303310	6402542
413	219//39497	Private - Dwelling	303350	6402490
414	218//39497	Private - Dwelling	303340	6402509
415	217//39497	Private - Dwelling	303327	6402524

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
417	10/18/758542	Private - Dwelling	303181	6403016
418	14/1/758542	Private - Dwelling	303159	6402798
419	142//753817	Private - Dwelling	303309	6402354
420	13/5/758542	Private - Dwelling	303492	6402491
421	2//195724	Private - Dwelling	303575	6402776
422	32//1076955	Private - Dwelling	303481	6402796
423	2/6/758542	Private - Dwelling	303613	6402648
425	99//753817	Private - Dwelling	302915	6401913
426	141//753817	Private - Dwelling	303243	6401558
427	4//627011	Private - Dwelling	303622	6401740
428	3//627011	Private - Dwelling	303671	6401773
429	2//627011	Private - Dwelling	303989	6402014
430	1//627011	Private - Dwelling	303709	6401932
431	44//860466	Private - Dwelling	304142	6401941
432	12//234710	Private - Dwelling	304188	6401020
433	12//234710	Private - Dwelling	304403	6400637
434	11//658775	Private - Dwelling	305124	6401584
436	1//986787	Private - Dwelling	305040	6401316
437	1//825150	Private - Dwelling	302021	6404598
438	1//1253131	Private - Dwelling	301406	6404797
440	271//1147091	Private - Dwelling	304972	6401136
451	11//1076983	Private - Dwelling	304800	6398880
452	198//753817	Private - Dwelling	304734	6399141
453	3//786170	Private - Dwelling	304404	6398805
454	2//879834	Private - Dwelling	304542	6398538
455	10//1076983	Private - Dwelling	304341	6398327
456	1//1087595	Private - Dwelling	304246	6397874
457	2//1087595	Private - Dwelling	304344	6397603
458	972//618795	Private - Dwelling	303444	6398622
459	1//786170	Private - Dwelling	303996	6399030
460	971//618795	Private - Dwelling	303625	6399131
462	973//618795	Private - Dwelling	303589	6398843
464	1862//873575	Private - Dwelling	302824	6401181

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
466	1722//589125	Private - Dwelling	302212	6402653
471	70//1107703	Private - Dwelling	319024	6403132
472	79//753808	Private - Dwelling	299517	6400651
473	42//836894	Private - Commercial	303519	6402664
477	163//753817	Private - Dwelling	303642	6397011
478	2//786170	Private - Dwelling	304155	6399097
481	3//627011	Private - Dwelling	303679	6401699
482	3/20/758542	Private - Dwelling	303166	6403236
483	1/16/758542	Community Infrastructure	303007	6403201
484	151//753817	Private - Dwelling	302953	6403358
487	1//1253131	Private - Dwelling	301521	6404890
488	1//1253131	Private - Dwelling	301023	6404866
489	1//1253131	Private - Dwelling	301097	6404799
497	104//817010	Private - Dwelling	317994	6399960
498	1//327606	Private - Dwelling	318745	6399233
499	2//1111313	Private - Dwelling	319610	6403390
507	11//1100029	Community Infrastructure	325820	6407714
511	173//727751	Community Infrastructure	326129	6408016
592	79//1161577	Private - Dwelling	324994	6408133
596	8//246434	Private - Dwelling	323684	6405339
598	5//851867	Private - Dwelling	324934	6408827
599	4//851867	Private - Dwelling	324766	6408927
613	34//6842	Private - Dwelling	315922	6418830
614	351//853217	Private - Dwelling	316266	6419505
619	3//1088108	Private - Dwelling	321018	6405747
621	30//1018512	Private - Dwelling	321408	6403979
623	103//738182	Community Infrastructure	320035	6405594
624	5/9/758214	Private - Dwelling	320327	6405536
626	1/8/758214	Private - Dwelling	320518	6405649
627	105//855187	Private - Dwelling	320622	6405793
628	102//852484	Private - Dwelling	320660	6405877
629	103//852484	Private - Dwelling	320653	6406086
735	1//124977	Private - Commercial	317143	6409370

Receptor ID	Lot/sec/DP	Assessment classification	Easting (GDA94)	Northing (GDA94)
797	2290//1203350	Community Infrastructure	316000	6418658
799	41//877618	Community Infrastructure	317946	6421632
800	354//853217	Private - Commercial	316571	6419387
829	126//665628	Private - Commercial	319664	6394150
830	450//1119428	Private - Commercial	318970	6393684
833	92//733895	Private - Commercial	314201	6397017
834	5/6/758542	Private - Commercial	303665	6402619
835	7/20/758542	Private - Dwelling	303172	6403161
836	2/18/758542	Private - Dwelling	303112	6403020
837	11//509516	Private - Dwelling	303135	6403053
838	4//1147127	Private - Dwelling	303492	6402702
839	22//1172495	Private - Dwelling	303433	6402581
840	100//1117846	Private - Dwelling	303519	6402563
843	8//37628	Private - Dwelling	324123	6396244
846	1003//811415	Private - Dwelling	323519	6397274
847	1001//811415	Private - Dwelling	323207	6397323
852	102//777898	Private - Dwelling	322458	6397415
855	21//828765	Private - Dwelling	322658	6395288
856	11//877362	Private - Dwelling	323320	6396712
860	11//1169092	Private - Dwelling	321521	6405038
861	1//745211	Private - Dwelling	322136	6405846
862	10//1169092	Private - Dwelling	321242	6406235
863	11//1169092	Private - Dwelling	321585	6406191
869	75//1124347	Private - Dwelling	319005	6401801
870	75//1124347	Private - Dwelling	319151	6401750
949	1//929149	Private - Dwelling	310329	6420360
950	6//258548	Private - Dwelling	309980	6420344
952	10//234710	Private - Dwelling	304600	6401595

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