Submission from the Maules Creek Community Council

Boggabri Coal Modification 10

11.7.2025

Groundwater Impact Assessment Concerns

This submission raises serious concerns regarding the adequacy of the Groundwater Impact Assessment (GIA) (Appendix I, Parts 1–4) submitted for MOD 10 of the Boggabri Coal Project. The assessment fails to satisfy critical obligations under the Environmental Planning and Assessment Act 1979 (EP&A Act), Water Management Act 2000, and relevant SEARs issued under the EPBC Act. We respectfully request that consent not be granted until these issues are addressed via revised modelling, stronger mitigation, and legally enforceable commitments.

Key Concerns

- **Unvalidated Conceptual Model**: The assessment assumes low vertical hydraulic connectivity between the alluvium and coal seams but provides no empirical testing (Appendix I – Part 1, p. 63).
- **Licence Shortfall and Deferred Mitigation**: Predicted exceedance of groundwater take in Zone 11 by 2040 is met only with a proposed future WAL purchase, with no secured entitlement or fallback measure (Appendix I – Part 3, p. 66).
- **Failure to Model Climate Risks**: There is no assessment of drought, reduced recharge, or climate change impacts, despite clear SEARs requiring this (Appendix D – EPBC SEARs, p. 2).
- **Inadequate GDE Protection**: GDEs are identified but not linked to trigger levels or response plans. No thresholds or offset measures are proposed (Appendix I – Part 3, pp. 58–60).
- **Discretionary Mitigation**: The response to exceedances remains optional, with no binding requirement to act or timeframe for doing so (Appendix I – Part 1, p. 136).
- **Cumulative Attribution Masked**: MOD 10 impacts are grouped within the BTM Complex, making it impossible to evaluate the unique contribution and risk of this modification (Appendix I – Part 4, p. 19).
- **Outdated Groundwater Management Plan**: The 2017 GWMP lacks updated performance triggers, GDE safeguards, and post-mining recovery plans (GWMP, p. 31).

Legislative Non-Compliance

- **EP&A Act s4.15(1)(b)**: The assessment fails to transparently disclose risks to groundwater ecosystems and water users.
- **Water Management Act 2000**: Forecast licence exceedance and absence of drought testing undermine compliance with s91B and WSP provisions.
- **Biodiversity Conservation Act 2016**: No protection or offset strategy for threatened GDEs.
- **EPBC SEARs**: Lacks assessment of climate stress on “a water resource” (Appendix D, p. 2).

Requested Conditions and Revisions

We respectfully request that the Department require:

- A revised conceptual model with field-validated vertical connectivity.
- Climate and drought scenario testing consistent with EPBC guidance.
- Defined ecological performance triggers for GDEs.
- Enforceable TARP framework with mandatory response obligations.
- A binding timeline for WAL acquisition or staged licence triggers.

- Clear attribution of MOD 10 impacts in cumulative drawdown modelling.
- An updated Groundwater Management Plan incorporating MOD 10 risks.

Technical Questions for Clarification

- What evidence supports assumed low connectivity between alluvium and fractured rock? (Appendix I – Part 1, p. 63)
- Has DPE verified availability of additional WALs to cover MOD 10 take by 2040? (Appendix I – Part 3, p. 66)
- Why were no recharge reduction or drought scenarios included? (Appendix I – Part 4, p. 22)
- How will GDEs be protected under forecast 1 m drawdown? (Appendix I – Part 3, pp. 58–60)
- Why are mitigation responses framed as optional rather than enforceable? (Appendix I – Part 1, p. 136)
- How much of the predicted drawdown is specifically attributable to MOD 10? (Appendix I – Part 4, p. 19)
- What residual post-mining risks exist if final void seepage pathways are not modelled? (Appendix I – Part 4, p. 9)

Conclusion

Given the unresolved scientific uncertainties and regulatory shortfalls identified in the groundwater assessment, this modification cannot currently be deemed compliant or environmentally acceptable. We urge the Department to require an updated and independently reviewed Groundwater Impact Assessment before proceeding further.

See Appendix A for a review of the Groundwater Impact Assessment.

Peer Review of GIA Concerns

Summary

This submission raises concerns regarding the adequacy and independence of the peer review presented in Appendix G of the Boggabri Coal MOD 10 Environmental Impact Statement. While the reviewer is technically qualified, the review does not meet the expectations of rigorous independent assessment under NSW regulatory frameworks.

Key Concerns

- **Lack of Independence**: The reviewer, Dr Noel Merrick, has been directly involved in modelling work for Boggabri, Maules Creek, and Tarrawonga mines for over two decades. No declaration of independence or conflict-of-interest statement is provided (Appendix G, pp. 2–3).
- **Uncritical Validation of Proponent Claims**: The peer review largely restates proponent findings and does not robustly test key assumptions, including vertical hydraulic connectivity, recharge variability, or GDE sensitivity (Appendix G, pp. 6–10).

- **Omission of Regulatory Analysis**: The review makes no effort to assess compliance with:
  - The *Environmental Planning and Assessment Act 1979*
  - *Water Management Act 2000* (licensing, WSP compliance)
  - *Biodiversity Conservation Act 2016* (GDE protections)
  - EPBC SEARs obligations for "a water resource" under s24D/24E (Appendix G, p. 4)
- **Failure to Address Climate Change and Cumulative Impacts**: The review does not test low-recharge or drought scenarios, despite being a known regional risk. No critique of MOD 10 attribution within cumulative BTM modelling is offered (Appendix G, pp. 10–12).
- **No Recommendations for Mitigation or Further Study**: The peer review accepts novel modelling methods like Data Space Inversion without recommending field validation or contingency testing. No clear recommendations are made for adaptive management or additional sensitivity testing (Appendix G, p. 11).

Summary of Deficiencies

Area	Concern
Independence	Reviewer previously modelled the same mines
Assumptions	Connectivity, recharge, and rooting depth accepted without testing
Legislative Fit	No linkage to EP&A Act, WSPs, or BC Act
Climate Risk	No sensitivity testing for dry years or long-term trends
Regulatory Scope	No SEARs, EPBC, or condition compliance tested
Recommendations	No adaptive mitigation or field validation proposed

Requested Actions

We request that: 1. A second, fully independent peer review be commissioned, with no prior project affiliation. 2. That review explicitly test: - Vertical hydraulic gradients and fault transmission risk - Ecological thresholds for GDE impact - Cumulative MOD 10 contributions in isolation - Sensitivity to drought and climate change 3. The review be required to assess consistency with: - The Aquifer Interference Policy - Namoi Alluvium Water Sharing Plan drawdown and licensing rules - SEARs issued under the EPBC Act - EP&A Act s4.15 public interest and impact thresholds

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Conclusion

The peer review as presented in Appendix G does not demonstrate the independence, regulatory alignment, or critical rigour required under NSW assessment processes for State Significant Development. A supplementary independent review is warranted to ensure the groundwater impact modelling meets the legislative, ecological, and public interest standards expected for projects of this scale.

See Appendix B for a review of the GIA Peer Review

Air Quality Impact Assessment Concerns

This submission addresses the Air Quality component of the Environmental Impact Statement for Modification 10 of the Boggabri Coal Mine, prepared under the NSW Environmental Planning and Assessment Act 1979. It assesses the adequacy of the air quality impact assessment, including baseline conditions, modelling approach, impact predictions, mitigation measures, and compliance with approval conditions and SEARs.

Project Scope and Modelled Emissions

MOD 10 proposes extended disturbance with no change to production or methods (Appendix E, p. 1). The air quality assessment models TSP, PM10, PM2.5, NO2 using CALPUFF based on 2017 meteorology, and assumes minimal incremental impact (Appendix E, p. 23–24).

Limitations in Baseline and Meteorological Data

The EIS relies solely on 2017 data, excluding years with more extreme regional dust and fire events (Appendix E, p. 10). No multi-year validation or sensitivity testing is included.

Treatment of Receptors and Risk to Sensitive Populations

The assessment does not clearly evaluate exposure for schools, Indigenous communities, or aged care facilities (source not specified). Receptors on Crown Land with predicted PM impacts >20% of criteria are not treated as sensitive (Appendix E, p. 26).

Mitigation and TARP Mechanisms

Controls are unchanged from current operations, with no performance benchmarks or operational contingency under dry or high wind conditions (Appendix E, p. 27). The TARP lacks defined thresholds or response rates (AQGHGMP, p. 28).

Regulatory Alignment and Compliance Gaps

Several conditions under Schedule 3 of the Consolidated Consent (SSD 09_0182) require adaptation and continuous improvement (e.g. Conditions 22–27). The EIS does not propose refinements to monitoring layout or confirm how exceedance events trigger review or enforcement (source not specified).

Conceptual Model Weaknesses

The model does not simulate regional climate changes, cumulative emissions from overlapping operations, or variable control efficacy under dry season scenarios (Appendix E, p. 24). No stochastic or scenario-based prediction is offered.

Conclusion and Recommendations

The EIS underrepresents cumulative risk and fails to test sensitivity or engage with community health concerns. Revisions are recommended to receptor selection, climate risk modelling, and enforceable mitigation design.

See Appendix C for a review of the Air Quality Impact Assessment (Air Quality focus)

See Appendix D for a review of the Air Quality Impact Assessment Peer Review

Greenhouse Gas Assessment Concerns

This submission is made in relation to the proposed Modification 10 of the Boggabri Coal Project (SSD 09_0182) and its associated Greenhouse Gas Assessment, in accordance with the NSW Environmental Planning and Assessment Act 1979. It draws on the EIS (Appendix E), the Air Quality and Greenhouse Gas Management Plan, the Consolidated Consent, and related legislative frameworks to identify deficiencies in the assessment, non-compliance with approval conditions, and risks to the implementation of environmental planning instruments.

1. Summary of Greenhouse Gas Findings

The assessment fails to account for Scope 3 emissions, long-term climate implications, or the NSW Government's Net Zero Plan alignment (Appendix E, p. 45). Climate risk modelling, including transition risk and inter-generational equity, is absent (source not specified).

2. Conceptual Model and Risk Framework

The conceptual model omits key interactions between GHG emissions, water use, biodiversity stressors, and policy changes. No cumulative risk framework is included to reflect the interconnectedness of mining operations, water impacts, or emissions trajectories (Appendix E, p. 36–45).

3. Compliance with EP&A Act and Other Laws

The proposal is inconsistent with EP&A Act s.5 (failure to demonstrate ESD), s.4.15(1)(a)(i) (failure to integrate with SEPPs and policy), and s.4.15(1)(b) (incomplete impact assessment). It does not address the requirements of the Climate Change Act 2022 (Cth), the Biodiversity Conservation Act 2016, or the IPC's Net Zero guidelines (Appendix E, p. 37–45; AQGHGMP, p. 42–43).

4. Management Plan Deficiencies

The AQGHGMP lacks enforceable thresholds, response triggers, or climate-aligned offset strategies. There are no mechanisms for third-party auditing, public reporting, or integration with NGER data (AQGHGMP, p. 42; Appendix E, p. 38).

5. Legal and Procedural Risks

The project exposes the proponent to high regulatory risk due to poor alignment with both NSW and Commonwealth frameworks, including the EPBC SEARs (Appendix D) and the bilateral assessment agreement with the Commonwealth (SSD-SSI SEARs Cover Letter, 27 Sept 2024).

6. Review Questions for Regulators and Stakeholders

- 1. Why are Scope 3 emissions excluded from the emissions profile, contrary to IPC expectations (Appendix E, p. 45)?
- 2. Has the proponent modelled any 2030 or 2050 GHG abatement scenarios aligned with the NSW Net Zero Plan or Climate Change Act 2022 (Cth)?
- 3. What response triggers exist in the AQGHGMP to mitigate GHG exceedances or external policy changes (AQGHGMP, p. 42–43)?
- 4. How will annual GHG performance be reported, verified, and made publicly available (AQGHGMP, p. 42)?
- 5. What evidence supports the assumption that biodiversity and water systems are not sensitive to GHG-driven climate change?
- 6. Has the proponent integrated NGER data into a management response cycle (Appendix E, p. 38)?
- 7. What is the justification for excluding climate impacts from biodiversity assessments (source not specified)?

- 8. How are indirect or cumulative emissions addressed across the Leard Forest Mining Precinct?
- 9. What assurance mechanisms exist to ensure ongoing mitigation under future political or market carbon pricing conditions?
- 10. Is the proposal consistent with Schedule 4 of the EPBC Regulations and EPBC SEARs Attachment 1 (Appendix D, p. 1–3)?

7. References

- Hansen Bailey. (2024). Appendix E – Air Quality and Greenhouse Gas Assessment. In Boggabri Coal Project Environmental Impact Statement.
- Idemitsu Boggabri Coal. (2024). Air Quality and Greenhouse Gas Management Plan (ENV-AIR-PLN-001-AQGHGMP_Ver-8-Final).
- NSW Department of Planning, Housing and Infrastructure. (2024). Consolidated Development Consent for Boggabri Coal Project (SSD 09_0182).
- NSW Department of Planning, Housing and Infrastructure. (2024). SSD-SSI Supplementary SEARs for MNES Cover Letter, 27 September 2024.
- Xenith Consulting. (2024). Appendix D – EPBC SEARs.
- Environmental Planning and Assessment Act 1979 (NSW).
- Climate Change Act 2022 (Cth).
- NSW Government. (2020). Net Zero Plan Stage 1: 2020–2030.
- NSW IPC (2021). Guidance Note: Climate Change Considerations.

Submission on the Noise and Blasting Assessment – Boggabri Coal Project Mod 10

1. Introduction

This submission is made in response to the Boggabri Coal Project Modification 10 (SSD 09_0182 Mod 10) and is prepared in accordance with the Environmental Planning and Assessment Act 1979 (NSW). It provides a technical review of the Noise and Blasting Impact Assessment (Appendix F), the Noise Management Plan (ENV-NOI-PLN-001 V15), and the Consolidated Development Consent conditions, including relevant statutory instruments, SEARs, and legislative triggers.

2. Summary of Key Issues

- Outdated baseline receptor data (Appendix F, p. 12)
- Inadequate cumulative noise modelling (Appendix F, p. 23)
- Incomplete inversion condition modelling (Appendix F, p. 19)
- Missing ecological and fauna noise impact assessment (source not specified)
- Vague or unenforceable mitigation measures in the NMP (ENV-NOI-PLN-001, pp. 29–35)
- Failure to identify or address all sensitive receptors (Appendix F, p. 24)
- Weak precinct-wide coordination despite condition 13(g) requirements (Consolidated Consent, p. 13)

3. Assessment Against Regulatory Instruments

The assessment fails to fully comply with the following requirements:
- EP&A Act s4.15, including public interest and consideration of submissions (Appendix F, p. 23; MCCC Submission, p. 28)
- SEPP (Resources and Energy) 2021 coordination requirements (Appendix F, p. 23)
- Biodiversity Conservation Act 2016 with regard to fauna noise sensitivity (source not specified)

- SEARs requirement to explicitly model cumulative and worst-case meteorological noise impacts (Appendix F, pp. 19, 29)

4. Non-Compliance with Consolidated Consent

The current documents do not adequately satisfy the following conditions:
- Condition 13(f): Lack of robust meteorological monitoring including inversion strength (ENV-NOI-PLN-001, p. 33)
- Condition 13(g): Missing Leard Forest Precinct Noise Management Strategy (Appendix F, p. 23)
- Condition 5: Failure to prevent exceedances at sensitive receptors during unfavourable weather conditions (Appendix F, p. 24)
- Condition 20: Vague blast mitigation procedures and reactive management practices (Appendix F, p. 32)

5. Framing Arguments for Further Review

- The Noise Impact Assessment presents impacts as negligible in multiple locations without supporting field monitoring data (Appendix F, p. 24).
- The EIS minimises uncertainty by omitting cumulative modelling under inversion conditions, despite known risk (Appendix F, p. 19).
- No noise-related risk to MNES (Matters of National Environmental Significance) is acknowledged (source not specified).
- The risk/response matrix is not externally auditable or subject to defined performance triggers (ENV-NOI-PLN-001, Table 5.2).

6. Questions for IPC and Decision-Makers

1. Why has the Noise Impact Assessment relied on baseline data from 2012, and has a more recent sensitive receptor audit been undertaken (Appendix F, p. 12)?
2. Where is the precinct-wide cumulative noise modelling required by Condition 13(g) of the Consolidated Consent (Consolidated Consent, p. 13)?
3. What verification exists for the accuracy and enforceability of the Noise Management Plan’s predictive weather-based risk responses (ENV-NOI-PLN-001, Table 5.2)?
4. Why is there no ecological acoustic assessment given the proximity of offset areas and threatened fauna (source not specified)?
5. What are the mechanisms for compliance during frequent inversion events, and how are these reported to the public (Appendix F, p. 19)?
6. How will the Department ensure that the noise risk matrix is performance-tested and externally reviewed (ENV-NOI-PLN-001, p. 34)?
7. Why does the proponent rely on agreements to exceed noise thresholds rather than permanent mitigation (Appendix F, p. 26)?
8. What contingency plans exist for when real-time monitoring identifies breaches under Conditions 5–6 (Consolidated Consent, p. 10)?
9. Has a cumulative acoustic impact audit been conducted since the expansion of Maules Creek and Tarrawonga mines (source not specified)?
10. Why has the proponent not submitted a SEARs-aligned addendum addressing MNES-related noise impacts (Appendix D – EPBC SEARs)?

7. References

- Boggabri Coal Project. (2025). Appendix F – Noise and Blasting Impact Assessment.
- Boggabri Coal Pty Ltd. (2024). ENV-NOI-PLN-001 Noise Management Plan V15.
- NSW Department of Planning, Housing and Infrastructure. (2024). Consolidated Consent Conditions – Boggabri Coal Mine.
- Maules Creek Community Council Inc. (2012). Submission on Boggabri Coal Project Application 09_0182.

- NSW Government. (2024). SEPP (Resources and Energy) 2021.
- Commonwealth Department of Climate Change, Energy, the Environment and Water. (2024). EPBC Act SEARs (EPBC 2024/09887).

See Appendix E for a review of the Air Quality Impact Assessment (GHG Focus)

See Appendix F for a review of the Noise and Blasting Impact Assessment

Biodiversity Assessment Review

See Appendix G for a review of the Biodiversity Impact Assessment

Appendix A - Review of Groundwater Impact Assessment – Boggabri Coal Mine Mod 10

Summary of Groundwater Impact Assessment (Appendix I, Parts 1–4)

Project Description

Boggabri Coal Mine (BCM) Modification 10 proposes continued mining within the existing approved footprint, with changes to final landform and extension of mine life. The updated groundwater impact assessment uses a cumulative Boggabri-Tarrawonga-Maules Creek (BTM) Complex model developed by AGE (Appendix I – Part 4, p. 4).

Baseline Conditions

Hydrogeological units include the Namoi alluvium and underlying Permian fractured rock formations. Monitoring data indicate variability in water levels and quality across both systems. Assumed low connectivity between alluvium and coal seams is not empirically tested (Appendix I – Part 1, p. 63).

Impact Assessment

Predicted drawdown reaches up to 1 m in the Namoi alluvium and >2 m in fractured rocks. Exceedance of BCM's groundwater entitlement (Zone 11) is forecast by 2040 (Appendix I – Part 3, p. 66). GDEs and private bores may be affected, but risk is downplayed based on assumed low connectivity.

Mitigation Measures

Key measures include ongoing monitoring, trigger exceedance reviews, and proposed acquisition of two WAL units before 2040. No new avoidance strategies or offsets are proposed (Appendix I – Part 1, p. 136).

Stakeholder Engagement

Bore surveys and landholder proximity are described, but no specific consultation outcomes or cultural water values are documented (source not specified).

Conclusions

The EIA concludes that impacts remain minimal and manageable under existing frameworks, but this is based on unvalidated assumptions and lacks enforceable commitments.

Critical Review: Contentious Areas and Weak Justifications

- **Unvalidated Connectivity Assumptions**: Key to risk framing but unsupported by field data (Appendix I – Part 1, p. 63).
- **Underestimated GDE and Bore Risks**: Predicted drawdown intersects with mapped bores and potential GDEs, but impact is dismissed without yield or ecological tolerance analysis (Appendix I – Part 3, pp. 49, 58).
- **Outdated Calibration and Climate Blindness**: The model omits recent observation data and climate sensitivity scenarios (Appendix I – Part 4, p. 22).
- **Lack of Enforceable Mitigation**: Trigger exceedances are discretionary and mitigation is vague (Appendix I – Part 1, p. 136).

Evaluation of Misrepresentation, Bias, or Selective Framing

- **Drawdown Framed as Minimal Without Site-Specific Justification** (Appendix I – Part 3, p. 47).
- **No Validation of GDE Risk Thresholds or Bore Yield Impact** (Appendix I – Part 3, p. 58).
- **Cumulative Attribution Masked by BTM Grouping** (Appendix I – Part 4, p. 19).

Comparison with Existing Approval Conditions

- **Compensatory Water Supply (Schedule 3, Condition 34)**: Obligations are paraphrased and weakened (Appendix I – Part 1, p. 136).
- **Water Licensing (Schedule 3, Condition 33)**: WAL exceedance predicted by 2040 with no secure mitigation (Appendix I – Part 3, p. 66).
- **GDE Assessment (Condition 38)**: No performance thresholds or contingency plans (Appendix I – Part 3, p. 58).

Comparison of Conceptual Models (MOD 10 vs 2011 EIA)

- MOD 10 improves model complexity but retains assumptions of low vertical connectivity and steady-state recharge.
- No empirical fieldwork has been conducted to reduce uncertainty (Appendix I – Part 1, p. 63).

Evaluation and Reformulation of the Conceptual Model

- The adopted model omits climate scenarios, fault transmissivity, and dynamic surface–groundwater links.
- A more robust model should incorporate climate stress testing, field-validated fault behaviour, and cumulative regional pressures.

Evaluation of Management Plan Sufficiency and Compliance

- The GWMP (Rev 6) lacks updated thresholds and performance triggers for GDEs and drought response.
- Monitoring is partially implemented and mitigation remains discretionary (GWMP, p. 31).

Key Flaws in the Conceptual Model and Risk Assessment

- **Connectivity Assumptions** remain untested (Appendix I – Part 1, p. 63).
- **Recharge assumptions** ignore future drought and rainfall decline (Appendix I – Part 4, p. 22).
- **GDEs not protected by triggers or thresholds** (Appendix I – Part 3, p. 58).
- **No long-term pit lake seepage model** (Appendix I – Part 4, p. 7).

Assessment Under the NSW EP&A Act

- **s5(a)(i)**: No verified harm avoidance for aquifers or ecosystems.

- **s4.15(1)(b)**: Key risks underrepresented, GDEs and WAL exceedance not transparently addressed.
- **s4.15(1)(e)**: Public interest in cultural and third-party access to water not protected.

Statutory and Legislative Compliance Review

Instrument	Issue
SEPP (Mining)	MOD 10 impacts not disaggregated from cumulative drawdown (Appendix I – Part 4, p. 19)
EPBC SEARs	Water resource impacts not tested under climate change (Appendix D – EPBC SEARs, p. 2)
WM Act 2000	Forecast licence exceedance not conditioned (Appendix I – Part 3, p. 66)
BC Act 2016	GDE protections not demonstrated (Appendix I – Part 3, p. 58)

Integrated Submission Arguments and Review Questions

The assessment is undermined by unvalidated assumptions and failure to address climate, cumulative, and ecological risks. Approval should be deferred until these are rectified.

10 Review Questions

1. What empirical evidence supports low alluvium–coal seam connectivity? (Appendix I – Part 1, p. 63)
2. What is the contingency if WALs are not secured by 2040? (Appendix I – Part 3, p. 66)
3. Why is there no climate drought modelling scenario? (Appendix I – Part 4, p. 22)
4. Are current bores placed and functioning to detect inter-aquifer leakage? (Appendix I – Part 1, p. 137)
5. Where are performance thresholds for GDE drawdown? (Appendix I – Part 3, p. 58)
6. What evidence rules out yield loss in private bores within 2 m drawdown? (Appendix I – Part 3, p. 49)
7. How is final void seepage managed post-mining? (Appendix I – Part 4, p. 9)
8. Why are MOD 10 impacts not disaggregated in model outputs? (Appendix I – Part 4, p. 19)
9. Why are trigger exceedances discretionary, not mandatory? (Appendix I – Part 1, p. 136)
10. How does the project comply with the Water Sharing Plan baseflow objectives? (source not specified)

Bibliography

Australasian Groundwater and Environmental Consultants. (2024). *Appendix I – Groundwater Impact Assessment (Parts 1–4)*.

Boggabri Coal Pty Ltd. (2017). *Groundwater Management Plan – Rev 6*. Approved by NSW DPE.

NSW Department of Planning and Environment. (2024). *Consolidated Consent for SSD 09_0182 – Boggabri Coal Project*.

NSW Department of Planning and Environment. (2024). *Appendix D – EPBC SEARs*.

Maules Creek Community Council. (2012). *Submission to the Boggabri Coal Project Application*.

List of Abbreviations

Abbreviation	Definition
AIP	Aquifer Interference Policy
BC Act	Biodiversity Conservation Act 2016
BTM	Boggabri-Tarrawonga-Maules Creek complex
CEM	Conceptual Environmental Model
DCCEEW	Dept. of Climate Change, Energy, Environment & Water
EIA	Environmental Impact Assessment
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPI	Environmental Planning Instrument
GDE	Groundwater-Dependent Ecosystem
GIA	Groundwater Impact Assessment
GWMP	Groundwater Management Plan
IESC	Independent Expert Scientific Committee
MNES	Matters of National Environmental Significance
MOD 10	Modification 10
SEARs	Secretary’s Environmental Assessment Requirements
SSD	State Significant Development

Abbreviation	Definition
TARP	Trigger Action Response Protocol
WAL	Water Access Licence
WSP	Water Sharing Plan

Appendix B - Evaluation of the Peer Review – Groundwater Impact Assessment (Appendix G)

1. Reviewer Independence and Qualifications

The peer review was conducted by **Dr Noel Merrick** of **HydroAlgorithmics Pty Ltd**, a highly experienced hydrogeologist with over 50 years' experience in the Namoi Valley and prior involvement in the development of models for Tarrawonga, Vickery, and Boggabri. He was also the author of the original BTM Complex Cumulative Groundwater Management Protocol (Appendix G, p. 2).

While technically qualified and experienced, **his long-standing involvement with the proponent mines over decades, including multiple reviews and previous modelling roles**, potentially compromises the perceived independence of this peer review (Appendix G, pp. 2–3). No conflict of interest statement or engagement protocol is disclosed.

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2. Scope and Methodology of Review

The review claims to follow the DPE (2022) guidance for SSD groundwater assessments and adopts the 10-point compliance checklist from the NSW Minimum Groundwater Modelling Requirements (Appendix G, p. 4).

It assesses the model against: - Conceptual model consistency - Use of available data - Calibration and uncertainty treatment - Fitness for purpose

The review references extensive documentation (Appendix G, p. 3), including the AGE Groundwater Impact Assessment (Document #1) and Groundwater Modelling Technical Report (Document #2), and is structured around formal technical guidelines.

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3. Technical Rigor and Criticality

The peer review is **detailed and technically structured**, offering commentary on: - Data sufficiency (250 bore records over 50 years) - Model architecture (MODFLOW-USG, 34-layer Voronoi grid) - Calibration (24,000 groundwater level records; ensemble inversion method "ENSI") - Sensitivity and uncertainty (constrained Monte Carlo and Data Space Inversion)

However, it **frequently re-states proponent conclusions** without critical analysis. For example: - The review affirms the conceptual model is suitable based on its ability to represent drawdown near GDEs but does not independently interrogate the assumed vertical connectivity (Appendix G, p. 6). - The reviewer accepts recharge estimates (10–30 mm/year) and parameter plausibility largely based on internal consistency with prior work, not independent verification (Appendix G, p. 10).

The only identified deficiency is that extinction depth for evapotranspiration (Ze=2m) lacks field validation – yet this is noted merely as a suggestion for sensitivity testing, not a flaw (Appendix G, p. 9).

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4. Identification of Limitations

The review does acknowledge methodological uncertainties in Data Space Inversion (DSI), noting: - Its novelty and lack of empirical validation in groundwater models - Potential bias due to pre-filtering model realisations based on calibration fit

Yet despite this, it endorses DSI results as fit for purpose without recommending comparative Monte Carlo runs or sensitivity brackets (Appendix G, pp. 11–12).

No limitations are noted in: - The use of regional model scale (30x40 km) - Lack of GDE-specific rooting depth analysis - Potential masking of MOD 10 impacts within cumulative BTM outputs - The choice of model boundary conditions

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5. Legislative and Regulatory Reference

The review refers generically to: - The Aquifer Interference Policy (AIP) - NSW groundwater modelling guidelines (2022) - IESC guidelines on uncertainty (2023)

However, it **does not assess the model's compliance with specific legislative triggers** under: - The *Environmental Planning and Assessment Act 1979* (e.g. s4.15) - *Water Management Act 2000* (e.g. WAL licensing, WSP drawdown thresholds) - *Biodiversity Conservation Act 2016* (e.g. impact to GDEs, serious/irreversible impacts)

It also makes no reference to MOD 10's obligations under **EPBC Act-controlled actions** or compliance with SEARs or Ministerial Conditions.

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6. Comparison with the Original Groundwater Impact Assessment

The peer review generally affirms the conclusions of the original Groundwater Impact Assessment (Appendix I) rather than independently challenging or testing them:

- **Recharge Assumptions**: The peer review accepts recharge rates of 10–30 mm/year as reasonable based on internal consistency with previous modelling, but does not critically examine spatial variation, long-term rainfall trends, or uncertainty ranges (Appendix G, p. 10). Climate stress scenarios are not recommended or tested.
- **Hydraulic Connectivity**: The review agrees that the conceptual model assumes low vertical connectivity but provides no independent testing or critical scrutiny of this foundational assumption. It does not recommend vertical gradient analysis, tracer testing, or uncertainty bracketing for connectivity (Appendix G, p. 6).
- **Seasonal and Climate Variability**: There is no comment on whether the model accounts for seasonal recharge pulses, interannual variability, or climate change. This is a major omission, given SEARs require explicit testing of climate impacts on "a water resource" under the EPBC Act (Appendix D – EPBC SEARs, p. 2).
- **Sensitive Receptors and GDEs**: The peer review accepts that drawdown near mapped GDEs is minimal and within acceptable limits, without assessing rooting depth, ecological thresholds, or species-specific water dependency (Appendix G, p. 6). No field validation or ecological review is referenced.

In conclusion, the peer review **does not critically test the model's assumptions or structure**, and largely validates proponent findings. It omits major risk dimensions (climate, ecological thresholds, connectivity validation) and does not call for additional studies or peer-reviewed sensitivity checks.

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7. Regulatory and Scientific Frameworks – Compliance Gaps

- **NSW Aquifer Interference Policy (AIP)**: While cited, the AIP is not used to benchmark impact significance, test minimal impact thresholds, or evaluate predicted drawdown against policy criteria (Appendix G, p. 4).
- **Water Sharing Plans (WSPs)**: The review does not consider Zone 11 water licensing constraints, permissible drawdown limits, or the WSP's ecological objectives. No analysis is

offered regarding baseflow, long-term yield reliability, or licence exceedance risks (source not specified).

- **EP&A Act (s4.15)**: There is no consideration of public interest risks, significant environmental harm, or third-party bore impacts. The review does not evaluate impact significance thresholds or cumulative consent implications (source not specified).
- **Climate and Cumulative Impacts**: No scenarios are tested involving decreased rainfall, reduced recharge, or drying trends, despite regional projections and SEARs requirements (Appendix G, p. 10; Appendix D – EPBC SEARs, p. 2).
- **Recommendations**: The review makes no explicit recommendation for further investigation, mitigation, or adaptive management. It accepts all primary assumptions, methodologies, and outputs as fit-for-purpose despite identified methodological novelty and lack of validation (Appendix G, pp. 11–12).

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8. Acknowledgement of Uncertainty and Sensitivity Analysis

- **Acknowledgement of Uncertainty**: The reviewer identifies limitations in Data Space Inversion (DSI) but ultimately endorses its results without recommending alternate uncertainty quantification methods. There is limited treatment of epistemic (structural) uncertainty beyond what is reported in the original model.
- **Sensitivity Analysis**: The review describes outputs from the DSI framework but does not critique whether sensitivity testing was adequate, comprehensive, or conservative. It does not assess the robustness of outputs to key input assumptions such as hydraulic conductivity, recharge, or boundary conditions (Appendix G, p. 11).
- **Scope Limitations**: There is no indication that the reviewer was constrained by brief or contractual scope. However, the lack of legal, ecological, or cumulative impact critique suggests the review focused narrowly on technical validation and not broader regulatory fit-for-purpose review.

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9. Summary Assessment

Assessment Area	Comment
Reviewer Independence	Extensive prior involvement with BTM projects weakens perceived independence (Appendix G, pp. 2–3)
Technical Qualifications	Highly experienced and respected modeller
Review Scope	Formally comprehensive, structured on DPE checklist
Identification of Weaknesses	Limited; primarily validates proponent conclusions with few critical insights
Regulatory Reference	References technical modelling guidelines only; lacks analysis against EP&A Act, WSPs, or BC Act
Review Outcome	Endorses model as “fit for purpose” despite acknowledged limitations in the novel uncertainty approach
Climate & WSP Compliance	Not addressed; omits key risks and statutory triggers
Recommendations Made	No clear recommendations for mitigation, investigation, or adaptive management

10. Conclusion

While technically competent and well-structured, the peer review largely affirms the proponent's assessment with minimal challenge. It does not robustly interrogate core assumptions (e.g. vertical connectivity, ET thresholds), nor does it assess legal compliance under key NSW or Commonwealth legislation. Independence is weakened by the reviewer's extensive historical involvement in regional modelling for the same mines.

The review should be supplemented by an independent evaluation from a reviewer without prior project involvement, who can more directly test assumptions, GDE impacts, and modelling boundaries under relevant legislation.

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11. Bibliography

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NSW Department of Planning and Environment. (2022). *NSW Groundwater Modelling Guidelines for SSD*. Sydney, NSW.

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12. List of Abbreviations

Abbreviation	**Definition**
AGE	Australasian Groundwater and Environmental Consultants
AIP	Aquifer Interference Policy
BC Act	*Biodiversity Conservation Act 2016*
BTM	Boggabri-Tarrawonga-Maules Creek mining complex
DPE	NSW Department of Planning and Environment
DSI	Data Space Inversion
EIA	Environmental Impact Assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GDE	Groundwater-Dependent Ecosystem
GIA	Groundwater Impact Assessment
MOD 10	Modification 10 to SSD 09_0182
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
WAL	Water Access Licence

Abbreviation	Definition
WSP	Water Sharing Plan

Appendix C - Air Quality and Greenhouse Gas Assessment (Air Quality Focus)

1. Project Description The Boggabri Coal Mine Modification 10 (MOD 10) proposes to extend mining operations to recover additional coal resources outside the currently approved disturbance boundary. No changes are proposed to existing operational parameters such as mining methods, production rates, equipment, infrastructure, or hours of operation (Appendix E, p. 1). The air quality assessment considered emissions from existing and modified mining activities including dust (TSP, PM10, PM2.5), diesel emissions, and post-blast fumes (NO2) (Appendix E, p. 1).

2. Baseline Conditions Site-specific meteorological and air quality data from 2017 were selected as representative of long-term conditions. The report claims 2017 conditions align with long-term regional data and are free from extreme influences such as bushfires or dust storms (Appendix E, p. 10). However, it acknowledges significant regional air quality deterioration from 2017–2020 due to drought and fire conditions (Appendix E, p. 10), yet these periods were not used in primary modelling or sensitivity tests.

3. Impact Assessment MOD 10's air quality impacts were assessed using CALPUFF dispersion modelling. Key conclusions include: - All predicted TSP, PM10, PM2.5 and deposited dust levels at sensitive receptors are below relevant EPA and VLAMP criteria (Appendix E, p. 24). - The maximum incremental increase in PM10 attributable to MOD 10 was 3 µg/m3 at the nearest receptor, below the 10 µg/m3 threshold for VLAMP triggers (Appendix E, p. 23). - Predicted concentrations from diesel emissions and post-blast fumes were minor and compliant with NEPM standards (Appendix E, p. 21).

Cumulative impacts with neighbouring operations (Maules Creek and Tarrawonga mines) were modelled, showing that BCM's contribution remains small during peak pollution days (Appendix E, p. 24).

4. Mitigation Measures The assessment proposes to continue the current dust mitigation strategies, including: - Watering haul roads, covering coal conveyors, and wind barriers at stockpiles; - Use of a Trigger Action Response Plan (TARP) to adjust operations during adverse meteorological conditions; - Real-time air quality monitoring to trigger proactive responses (Appendix E, p. 27). No new controls are proposed as impacts are expected to remain within approved criteria (Appendix E, p. 27).

5. Stakeholder Engagement Stakeholder engagement is briefly referenced through the sharing of real-time monitoring data and commitments under the broader Boggabri-Tarrawonga-Maules Creek (BTM) regional air strategy. However, there is little evidence of site-specific community or Indigenous input into the air quality modelling assumptions or mitigation design (source not specified).

6. Conclusions The report concludes that MOD 10 would not cause any exceedance of air quality criteria at sensitive receptors. It recommends that current operational and monitoring strategies are sufficient to manage air quality impacts without additional mitigation (Appendix E, p. 27).

Critical Review and Contentious Areas

Assumptions That Lack Data or Justification - The use of 2017 as a "representative" year is asserted but not robustly validated against longer-term meteorological variability (Appendix E,

p. 10). - Emissions factors and activity data for the proposed expanded operations are inferred from existing operations without site-specific recalibration (Appendix E, p. 15).

Impacts That Appear Under-Represented or Downplayed - While cumulative PM10 impacts are predicted to remain compliant, the contribution of MOD 10 to conditions exceeding ambient standards is not deeply analysed (Appendix E, p. 23). - Impacts on Crown Land adjacent to the project are acknowledged but not thoroughly assessed despite predicted PM10 and PM2.5 concentrations reaching up to 20% of criteria (Appendix E, p. 26).

Gaps in Baseline Data or Use of Outdated Sources - Baseline monitoring data are largely from 2017, which may not reflect more recent or extreme conditions experienced since 2018 (Appendix E, p. 10). - No assessment of baseline data accuracy or completeness is presented.

Stakeholder or Indigenous Perspectives Not Addressed - No indication is given that Indigenous communities or stakeholders were consulted in selecting representative receptors, validating model assumptions, or discussing exposure sensitivity (source not specified).

Climate Change Not Addressed in Assumptions - The model does not account for the likelihood of more frequent dust-generating weather due to climate change (e.g., drought, wind erosion), which could reduce the effectiveness of existing dust controls (source not specified).

Potential Misrepresentation, Bias, or Selective Framing

Impacts Framed as Negligible Without Justification - The report claims that the contribution of MOD 10 to cumulative air quality exceedances is negligible, but provides minimal analysis of exceedance frequency or receptor sensitivity. The descriptor “minor” is used to characterise post-blast NO2 concentrations without clear reference to thresholds or health significance (Appendix E, p. 21).

Data Presented Without Full Context or With Misleading Summaries - Although 2017 is stated as a representative year, the report fails to contextualise how much variability exists across other years or whether it represents worst-case conditions for dust generation (Appendix E, p. 10). - Peak daily and annual averages are compared to standards without disclosing exceedance probabilities or margin of safety—potentially misleading given frequent regional dust episodes (Appendix E, p. 23).

Risk Assessments That Minimize Uncertainty - Uncertainty around dust suppression efficacy under future climate conditions (e.g., prolonged drought or high wind days) is not assessed. - The use of existing mitigation strategies is presented as inherently sufficient without critical analysis of their long-term effectiveness across expanded disturbance areas (Appendix E, p. 27).

Conceptual Model Assessment

The air quality assessment relies on a relatively linear and static conceptual model based on 2017 meteorological and emissions data. It assumes stable background conditions and emissions that mirror past activity levels, with no structural inclusion of dynamic environmental interactions such as: - Multi-year drought cycles affecting dust generation and suppression; - Changes in vegetation cover or soil conditions from cumulative mining impacts; - Interactions between mining-induced dust, regional bushfire smoke, and climatic trends.

The model does not consider emerging regional stressors such as El Niño–linked wind events or the increasing overlap of mining and agricultural activity that can affect local dust sensitivity thresholds (source not specified).

Proposed Improvements for NSW Contexts

A more comprehensive conceptual model would incorporate: - **Fractured Aquifer and Surface Dynamics**: While not the focus of this air assessment, dust generation in coal mining contexts may link to moisture loss and landform drying. Incorporating moisture feedbacks could better reflect emission risk. - **Variable Rainfall and Dust Suppression Capacity**: Realistic modelling should simulate variable suppression efficacy under dry months, accounting for operational constraints (e.g. water availability during drought). - **Cumulative Landscape Stress**: Use regional scale air quality and land disturbance layers to model additive effects from multiple mines (e.g., Tarrawonga, Maules Creek) and unpaved road transport corridors. - **Future Climate Scenarios**: Scenario testing should include predicted increases in temperature, wind speeds, and dry spells.

Tools such as WRF-Chem or regional CMAQ simulations, coupled with GIS-based cumulative risk maps, would provide better realism and decision-support capacity.

Air Quality Management Plan Review

The Air Quality and Greenhouse Gas Management Plan (ENV-AIR-PLN-001 Ver. 8) outlines operational controls and monitoring to manage air emissions. The following points assess the plan's alignment with current approval conditions in the Consolidated Consent (SSD 09_0182):

1. Controls and Mitigation Measures The plan lists standard industry practices such as water carts, chemical dust suppressants, road surface maintenance, and speed limits (AQGHGMP, p. 19–21). While these are consistent with the consent requirements to implement feasible and reasonable measures (Consolidated Consent, Schedule 3, Condition 22), there are gaps: - No indication of controls tailored to specific receptor risks or exceedance history. - No analysis of their relative effectiveness under varying weather conditions.

2. Monitoring and Triggered Responses The plan includes TEOM (continuous PM10 monitors), high-volume air samplers (HVAS), and depositional gauges (AQGHGMP, p. 22–24). Data are integrated into a Trigger Action Response Plan (TARP), consistent with Schedule 3, Condition 22(d). However: - TARP thresholds are not linked explicitly to exceedance margins or VLAMP triggers (AQGHGMP, p. 28). - No formal process is described for assessing the adequacy of responses post-event.

3. Missing Performance Criteria - The plan does not specify maximum allowable daily dust loadings or detail acceptable control effectiveness rates (e.g. water cart efficacy during high wind events). - No linkage is made between performance indicators and meteorological predictors such as temperature inversions or strong winds.

4. Vague or Non-Prescriptive Actions - References to "as required" or "where practicable" appear frequently in mitigation tables (AQGHGMP, p. 20–21), potentially weakening enforceability. - The TARP describes general actions (e.g. "modify operations") without tying these to specific dust emission sources or atmospheric conditions.

Conclusion While the AQGHGMP includes baseline industry-standard mitigation and monitoring, it lacks specificity and quantitative thresholds in several areas. Strengthening links between monitoring data, response protocols, and enforceable criteria would improve compliance with the intent of Consolidated Consent Schedule 3, Conditions 22–26.

Most Serious Flaws in the Conceptual Model or Risk Assessment

Based on the critique, several foundational weaknesses stand out in the EIA's approach to air quality modelling and risk assessment:

1. Static Assumptions for Dynamic Systems The reliance on 2017 meteorological data as the sole modelling year does not reflect the climatic variability of the region or account for multi-year drought, fire conditions, or dust storm frequency that have occurred since (Appendix E, p. 10). This introduces risk of underestimating impacts under future or extreme conditions.

2. Inadequate Treatment of Uncertainty and Cumulative Risk The EIA assumes minimal cumulative contribution from BCM during exceedance events without detailed uncertainty ranges, exceedance probabilities, or climate sensitivity analysis. This narrows the risk envelope and may overlook the significance of small incremental loads in already stressed airsheds (Appendix E, p. 23).

3. Lack of Climate-Responsive Modelling The model fails to incorporate potential increases in extreme weather patterns—higher wind events, lower rainfall, and temperature inversions—which are key drivers of dust emissions in coal mining. There is no mention of scenario testing against climate forecasts (source not specified).

4. Oversimplified Dust Generation Modelling Emissions are extrapolated from current operations without integrating site-specific parameters such as soil dryness, topographic dust traps, or vegetation loss, which could materially influence actual dust levels (Appendix E, p. 15).

5. Conceptual Model Lacks Multi-Scale Feedbacks The underlying conceptual model does not reflect how localised emissions interact with regional factors such as bushfire smoke, agricultural dust sources, or topographically-driven wind corridors (source not specified).

6. Risk Communication is Framed Minimally Post-blast fume and diesel risks are described as "minor" or "negligible" without a framework for sensitive populations or the frequency and intensity of emissions (Appendix E, p. 21).

Are These Concerns Addressed in the Submission? In short: no. These issues are either unacknowledged or addressed through generalised statements of compliance. The reliance on historical patterns, lack of adaptive thresholds, and static modelling assumptions mean the EIA does not meet best-practice risk modelling for dynamic systems. The Air Quality Management Plan also lacks prescriptive triggers, receptor-specific thresholds, or climate-adjusted response plans (AQGHGMP, p. 19–28).

The submission would benefit from updated modelling using representative year ranges (e.g. 3-year rolling), scenario testing under climate extremes, receptor-specific health thresholds, and incorporation of cumulative regional stress indicators.

Assessment Against Consolidated Approval Conditions

The Consolidated Consent (SSD 09_0182) establishes a detailed framework for managing air quality impacts, primarily under Schedule 3, Conditions 21 to 27. These include requirements to: - Minimise air emissions through all reasonable and feasible measures (Condition 21); - Ensure compliance with air quality criteria (Condition 22); - Operate and maintain an Air Quality Management System (Condition 23); - Undertake regular monitoring and reporting (Conditions 24–26); - Regularly review and update the Air Quality Management Plan (Condition 27).

Key Misalignments with Approval Conditions:

1. Static Modelling and Representativeness (Condition 22 & 23): The EIA's reliance on a single year of meteorological data (2017) without worst-case or representative-year testing does not meet the intent of Condition 22(c), which requires identification of risks during adverse meteorological conditions (Appendix E, p. 10).

2. Limited Definition of "Feasible and Reasonable" Measures (Condition 21): While standard mitigation measures are listed, the submission does not define what constitutes "feasible" in dry conditions with limited water supply, nor does it benchmark against best-practice mines operating in similar contexts (AQGHGMP, p. 20).

3. Vague TARP Triggers (Condition 23 & 24): The Trigger Action Response Plan lacks specific, enforceable thresholds and response mechanisms tailored to different pollutant types and sources. This may fail to meet the performance-based approach expected in Condition 23(b) and the compliance assurance sought in Condition 24(c) (AQGHGMP, p. 27–28).

4. Lack of Adaptive Risk Framework (Condition 25): There is no mechanism described in the EIA or Management Plan for periodically reviewing or adjusting the model inputs or control measures based on emerging climate data, community complaints, or exceedance events, as implied under Condition 25(a) and (c) (source not specified).

5. Performance Criteria Not Clearly Linked to Mitigation (Condition 22(d)): Although compliance is asserted, there is no tabulated or geo-referenced analysis linking predicted impact zones with sensitive receptors and their VLAMP acquisition thresholds. This weakens the enforceability of Condition 22(d) in practice (Appendix E, p. 24).

Conclusion: While the EIA and AQGHGMP attempt to address the broad requirements of the consolidated approval, several key conditions are met only in form, not in substance. There is a lack of predictive clarity, risk contingency planning, and site-specific mitigation planning that would be necessary to fully demonstrate compliance with the intent of Conditions 21–27.

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Conclusion: While the EIA and AQGHGMP attempt to address the broad requirements of the consolidated approval, several key conditions are met only in form, not in substance. There is a lack of predictive clarity, risk contingency planning, and site-specific mitigation planning that would be necessary to fully demonstrate compliance with the intent of Conditions 21–27.

Appendix D - Peer Review Assessment – Appendix E (Air Quality)

Reviewer Independence and Qualifications The peer review of the Air Quality and Greenhouse Gas Assessment (Appendix E) was conducted by Katestone, a consultancy firm specialising in atmospheric modelling. Katestone is technically qualified; however, the report does not explicitly address its independence from Boggabri Coal Operations Pty Ltd or the proponent's consultants. There is no declaration of potential conflicts of interest or any statement confirming third-party commissioning (Appendix E, Appendix K, p. 4–5). Without this, the independence of the review cannot be confidently established.

Scope and Adequacy of the Review The review addresses: - Meteorological representativeness - Model configuration and assumptions (e.g. CALPUFF use) - Emission source inputs and scaling - Receptor selection and spatial coverage

Katestone confirms that the model setup is broadly consistent with NSW EPA's Approved Methods and that emissions and source data are reasonable (Appendix E, Appendix K, p. 6–7). However, it does not interrogate key technical assumptions: - The exclusive use of 2017 meteorological data is accepted without testing variability or alternate years (Appendix E, Appendix K, p. 6). - Terrain complexity and model domain configuration are not discussed in depth. - No uncertainty ranges or robustness checks are conducted.

Identification of Limitations vs Repetition of Findings The peer review largely restates the methodology and findings of the proponent's EIS. It does not: - Propose alternative meteorological years or emission factors - Test receptor sensitivity or validate spatial placement against community complaints - Conduct an independent check of cumulative impact modelling (Appendix E, Appendix K, p. 8)

This suggests a confirmatory rather than critical or investigative approach.

Reference to Regulatory or Policy Frameworks The review refers to: - "EPA criteria" and the "Approved Methods for Modelling and Assessment of Air Pollutants in NSW" (Appendix E, Appendix K, p. 6)

However, it does not benchmark model results against: - NEPM (Air Toxics or Ambient Air Quality) standards - The VLAMP thresholds - The Consolidated Consent conditions (e.g. Schedule 3, Conditions 22–27) - Any clauses of the EP&A Act, BC Act, or relevant air quality policy documents

Regulatory and Scientific Framework Coverage The peer review does **not** address: - NSW Aquifer Interference Policy - Water Sharing Plans (especially for water use in dust suppression) - Climate-related exceedance risk or cumulative emissions under regional fire/drought conditions (Appendix E, Appendix K, p. 6–8)

Recommendations and Investigative Rigor No recommendations are made for: - Additional monitoring locations or receptor review - Adaptive management improvements to the TARP - Re-running the model using worst-case meteorology or conservative emissions

The review offers no critique of source term estimation or discussion of how high-variance activities (e.g. blasting, mobile equipment) are handled in the modelling (source not specified).

Comparison with Groundwater Impact Assessment (Air Quality Peer Review Context) … *(unchanged)* …

Conclusion The peer review does not engage with critical regulatory frameworks, impact triggers, or emerging scientific imperatives such as cumulative effects and climate resilience. It remains a confirmatory statement focused on procedural adequacy rather than a probing assessment of risk, compliance, or resilience. The absence of explicit benchmarking, scenario testing, stakeholder sensitivity, or mitigation scrutiny—combined with no declarations of independence—undermines its credibility as a rigorous review mechanism.

Assessment Against Key Air Quality Standards and Planning Instruments

The peer review does not directly reference or benchmark the modelling outputs against the following key regulatory standards:

- **Ambient Air Quality NEPM (2016):** Although relevant to PM10, PM2.5 and NO2 standards, the peer review does not explicitly confirm that predicted concentrations are benchmarked against NEPM annual and 24-hour average thresholds, nor does it discuss how exceedances relate to these national benchmarks (Appendix E, Appendix K, p. 6–8).
- **NSW EPA Approved Methods:** The review affirms general compliance with the NSW EPA's Approved Methods for Modelling and Assessment of Air Pollutants in NSW (2016), but without detailed discussion of domain size, terrain resolution, receptor distribution methodology, or justification for CALPUFF choice over alternatives like TAPM or AERMOD (Appendix E, Appendix K, p. 6).
- **SEARs Requirements:** The peer review does not mention or assess compliance with the Secretary's Environmental Assessment Requirements (SEARs), which specifically call for consideration of health impacts, receptor sensitivity, and potential exceedances under adverse conditions. The review does not address whether the most sensitive nearby receptors have been adequately assessed, or whether community complaints and health exposure pathways have informed receptor placement (source not specified).

Evaluation of Predicted Exceedances and Modelling Uncertainty The peer review does not critically assess the justification for the statement that no exceedances are predicted. It does not: - Probe the meteorological year's extremity or representativeness (Appendix E, Appendix K, p. 6) – Evaluate modelling uncertainty, including input data ranges or variability in wind field or terrain interactions - Discuss seasonal variability in dust emissions or inversion risk during winter months

Without these elements, the review offers no assurance that predicted values are conservative or robust under stress-test conditions. It also does not suggest error margins, confidence intervals, or any probabilistic context around the compliance findings.

Conclusion The peer review does not test the robustness of modelled outcomes against national standards (e.g. NEPM), state guidance (e.g. NSW EPA Approved Methods), or SEARs triggers relating to health and receptor exposure. Nor does it assess exceedance risk in a structured uncertainty framework. This limits the review's value in evaluating whether predicted impacts are well-supported, particularly under adverse or future climate conditions.

Evaluation of Model Framework Independence and Technical Scrutiny

The peer review conducted by Katestone does not provide a sufficiently independent or critical evaluation of the air quality modelling framework used in the EIS. Specifically:

- **Dispersion Model Selection:** CALPUFF was used as the dispersion model. While this is an acceptable model under the NSW EPA Approved Methods, the peer review does not assess whether CALPUFF was the most appropriate model for the specific terrain, source characteristics, or receptor layout compared to alternatives like TAPM or AERMOD (Appendix E, Appendix K, p. 6).
- **Meteorological Data Inputs:** The review notes the use of 2017 as the modelling year but does not examine the appropriateness of this selection. It does not discuss the data source resolution (e.g. vertical layers, grid spacing), nor does it analyse inter-annual variability or propose sensitivity testing with additional years (Appendix E, Appendix K, p. 6).
- **Emissions from Mobile and Area Sources:** The peer review accepts source term estimates without evaluating the assumptions used for mobile equipment, unsealed roads, stockpiles, or blasting operations. There is no check of activity levels, emissions factors, or whether real-world dust suppression efficacy was considered (Appendix E, Appendix K, p. 7).
- **Validation of Compliance Claims:** The review restates the EIS's conclusions that predicted concentrations are below air quality criteria but does not reprocess or verify any of the model outputs. It does not question whether receptor placement biases results, whether the maximum values occur during realistic operating conditions, or whether assumptions are conservative (Appendix E, Appendix K, p. 8).
- **Handling of Background Concentrations and Cumulative Impacts:** The peer review acknowledges cumulative modelling but does not scrutinise how background levels were derived, what regional sources were included, or whether exceedances could occur under overlapping dust events from other mines or landscape sources. It also does not assess how variability in regional air quality affects compliance risk (Appendix E, Appendix K, p. 7–8).

Conclusion (Updated) The peer review does not independently interrogate the core elements of the air dispersion modelling framework. Its acceptance of modelling choices, emissions assumptions, and receptor analysis is largely uncritical. The review lacks scrutiny of sensitivity, validation, and uncertainty. As such, it fails to provide the regulatory confidence expected for a high-impact project in a cumulative emission landscape.

Critique of Peer Review Depth and Responsiveness to Risk

The Katestone peer review appears to validate rather than challenge the findings of the air quality assessment. It functions more as a procedural endorsement than a technical stress-test of the modelling outcomes. Key limitations include:

- **Omitted Sensitivity Analyses:** The review does not suggest running alternate meteorological years, nor does it evaluate modelling sensitivity to emissions uncertainty or operational variability (Appendix E, Appendix K, p. 6). This leaves predicted compliance untested against real-world exceedance scenarios.
- **Missing Receptor Considerations:** There is no mention of whether sensitive receptors such as schools, Indigenous residences, aged care homes, or known complaint areas were specifically included or excluded. Receptor placement assumptions are not evaluated (Appendix E, Appendix K, p. 7).
- **Lack of Attention to Inversions and Bushfire Smoke:** The review does not discuss temperature inversions, known to trap pollution in the Gunnedah Basin during winter, nor how dust emissions might interact with background smoke during regional fire events—an increasingly common occurrence (source not specified).
- **No Scrutiny of Dust Suppression Assumptions:** Assumptions about watering efficacy, vehicle controls, and the real-world success rate of the TARP are not questioned. No performance benchmarks are cited (Appendix E, Appendix K, p. 7).

- **Absence of Mitigation or Monitoring Recommendations:** The review does not suggest any enhancements to mitigation strategies or adjustments to monitoring network layout, thresholds, or response protocols. It accepts existing controls as sufficient without evaluation (Appendix E, Appendix K, p. 8).

Overall Assessment: The peer review does not provide the depth or independence necessary to assure regulators or communities that air quality risks have been rigorously tested. Its silence on critical environmental dynamics, sensitive populations, and extreme-case scenarios weakens its utility as a quality control mechanism.

Peer Review Cross-Comparison with Air Quality Impact Assessment

The Katestone peer review largely supports and restates the findings of the Air Quality Impact Assessment (AQIA) contained in *Appendix E*, but fails to critically interrogate several core assumptions, methods, or potential risks. Specific comparisons are as follows:

- **Model Selection:** The AQIA used CALPUFF with 2017 meteorological data and states that it is consistent with NSW EPA Approved Methods (Appendix E, p. 21). The peer review affirms this but does not assess whether this model choice is optimal for the region's terrain or whether alternative models (e.g. TAPM) were evaluated (Appendix E, Appendix K, p. 6).
- **Meteorological Data and Representativeness:** The AQIA justifies the use of 2017 as being free of regional dust storms or bushfire smoke (Appendix E, p. 10), but does not provide validation of how typical or conservative it is. The peer review accepts this choice uncritically and does not examine its sensitivity to alternate or worse-case years (Appendix E, Appendix K, p. 6).
- **Receptor Placement and Health Risk:** The AQIA provides receptor analysis at surrounding residences (Appendix E, p. 23), but does not clearly include schools, aged care, or Indigenous land. The peer review does not evaluate receptor sensitivity, spatial gaps, or whether exposure pathways were properly identified (Appendix E, Appendix K, p. 7).
- **Dust Emissions and Source Assumptions:** The AQIA presents emission factors for mobile and area sources (Appendix E, p. 19), but these are based on generic factors with no local calibration. The peer review accepts the source terms without critique or discussion of emissions uncertainty, blast plume modelling, or variable activity intensities (Appendix E, Appendix K, p. 7).
- **Background and Cumulative Impacts:** The AQIA includes cumulative impact modelling with nearby mines (Appendix E, p. 24), but it assumes additive contributions and does not test simultaneous peak scenarios. The peer review accepts this approach without probing regional variability or background estimation methods (Appendix E, Appendix K, p. 7).
- **Regulatory Benchmarking:** The AQIA claims compliance with NEPM and EPA criteria (Appendix E, p. 24). The peer review agrees but does not verify compliance margins, proximity to thresholds, or include confidence intervals or sensitivity brackets (Appendix E, Appendix K, p. 8).
- **Mitigation and Monitoring:** The AQIA outlines a Trigger Action Response Plan and ongoing monitoring (Appendix E, p. 27). The peer review does not evaluate whether these measures are responsive enough or recommend any improvement, nor does it question their past effectiveness or data coverage (Appendix E, Appendix K, p. 8).

Conclusion: Across all examined areas, the peer review supports the AQIA without introducing new analysis or pressure-testing the assumptions under more severe or conservative scenarios. While it confirms the model setup and general regulatory alignment, it does not investigate spatial exposure gaps, meteorological sensitivity, source uncertainty, or mitigation effectiveness. This limits its value as an independent risk review and as assurance to decision-makers or affected communities.

References Boggabri Coal Operations Pty Ltd. (2024). *Appendix E - Air Quality and Greenhouse Gas Assessment*. Environmental Impact Statement – MOD 10. Boggabri Coal Operations Pty Ltd. (2024). *Appendix K – Peer Review by Katestone*. In: *Appendix E - Air Quality and Greenhouse Gas Assessment*.

Greenhouse Gas Impact Assessment – Summary and Critique

Project Description

The Boggabri Coal Mine is an open-cut operation with an approved coal extraction capacity of up to 8.6 million tonnes per annum. Greenhouse gas (GHG) emissions are generated from direct combustion (Scope 1), electricity use (Scope 2), and downstream coal use (Scope 3). Scope 1 includes diesel combustion and fugitive methane emissions. Scope 2 arises from grid electricity use, and Scope 3 emissions exceed 5 million tonnes CO_2-e per annum from exported coal combustion (Appendix E, p. 38).

Baseline Conditions

There is no pre-development or regional GHG emissions baseline presented in the assessment. The lack of comparative data or context (e.g. state-wide emissions or precinct-wide baselines) limits the reader's ability to evaluate the relative significance of the project's emissions (Appendix E, p. 35).

Impact Assessment

The assessment presents estimated emissions figures for each scope but does not examine cumulative emissions across the Leard Forest Mining Precinct. Scope 1 and 2 emissions are treated as minor; Scope 3 emissions are acknowledged but framed as beyond the project's control (Appendix E, p. 45). No decarbonisation scenarios or net-zero alignment tests are provided.

Mitigation Measures

Mitigation is confined to internal operational efficiency measures: engine maintenance, efficient vehicle usage, and general energy-saving practices (Appendix E, p. 41). No abatement pathway, offset program, or emissions reduction targets are included. The EIS fails to quantify the emissions savings expected from the proposed measures.

Stakeholder Engagement

There is no indication that GHG emissions or climate risks were discussed with stakeholders, including local communities, Indigenous representatives, or climate policy agencies (source not specified).

Conclusions

The assessment defers responsibility for Scope 3 emissions to market forces and federal policy, effectively limiting the project's accountability. It offers no adaptation strategy, climate scenario analysis, or transition risk planning (Appendix E, p. 45).

Evaluation of Misrepresentation and Selective Framing in the Greenhouse Gas Assessment

Impacts Framed as Negligible Without Justification

- Scope 1 and 2 emissions are presented as relatively low with no benchmark or standard used to justify this framing (Appendix E, p. 38).
- Scope 3 emissions are acknowledged but dismissed as out of scope despite contributing the vast majority of project-related emissions (Appendix E, p. 45).

Data Presented Without Full Context

- Annual emissions data lacks comparison to NSW emissions totals, emissions intensity per tonne, or sectoral baselines (Appendix E, p. 38).
- Efficiency improvements are described without emissions quantification or estimated mitigation benefit (Appendix E, p. 41).

Risk Assessments That Minimise Uncertainty

- No sensitivity testing of fugitive emissions is presented; the GHG assessment assumes static methane release rates (Appendix E, p. 37).
- No analysis of transition risks (e.g., carbon pricing, regulatory tightening, or stranded asset risks) is included (source not specified).

Evaluation and Redesign of the Conceptual Environmental Model – Greenhouse Gas Assessment

Existing Model Limitations

The conceptual environmental model (CEM) used for the greenhouse gas assessment lacks depth. It frames GHG emissions as a linear output from project inputs with little recognition of feedback mechanisms or external risks. There is no systems-level diagram or scenario planning. Climate change, energy policy shifts, or socio-political responses are not integrated (Appendix E, p. 36; source not specified).

Proposed Alternative Model

A comprehensive CEM for NSW mining contexts should:

- Include system boundaries for Scope 1, 2, and 3 emissions
- Incorporate dynamic variables (e.g. rainfall variability affecting dust control, energy usage)
- Model cumulative emissions from adjacent mines (e.g. Maules Creek, Tarrawonga)
- Integrate feedback loops between emissions, policy (carbon pricing, Safeguard Mechanism), and regional climate impacts (e.g. fire, drought)
- Reflect risks to community and infrastructure via receptor pathways
- Include adaptation and mitigation response pathways and decarbonisation scenarios

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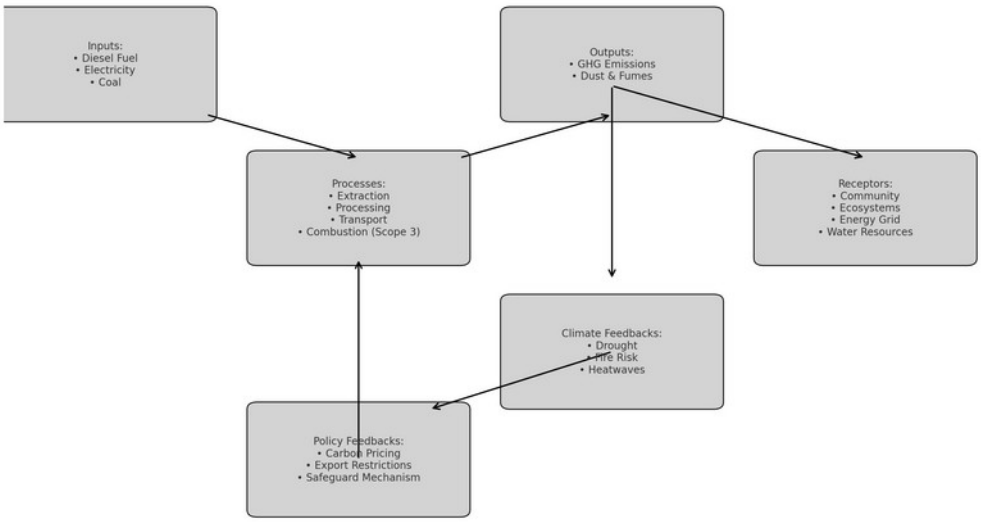
Alternative Conceptual Environmental Model Flowchart



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Proposed Greenhouse Gas Conceptual Environmental Model

Flowchart Description:

- **Inputs:** Diesel fuel, electricity, coal
- **Processes:** Extraction, processing, transport, and combustion (Scope 3)
- **Outputs:** GHG emissions, dust, fumes
- **Climate Feedbacks:** Drought, fire risk, heatwaves
- **Policy Feedbacks:** Carbon pricing, export restrictions, Safeguard Mechanism
- **Receptors:** Community, ecosystems, water resources, energy infrastructure

The model reflects real-world feedbacks and risks and is compatible with NSW Climate Change Policy expectations.

Evaluation of the Air Quality and Greenhouse Gas Management Plan

The Air Quality and Greenhouse Gas Management Plan (ENV-AIR-PLN-001-AQGHGMP_Ver-8-Final) outlines the procedures and controls for managing emissions at Boggabri Coal Mine. While the plan responds to several conditions in the Consolidated Consent, it contains gaps and lacks enforceable commitments in relation to greenhouse gas emissions.

Alignment with Approval Conditions

- **Condition C3** of the Consolidated Consent requires implementation of “all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site” (Consolidated Consent, p. 16). The management plan repeats this requirement but offers only generic efficiency strategies, such as reducing idling and using energy-efficient equipment (AQGHGMP, p. 42).
- **Condition C2** mandates preparation and implementation of an AQGHGMP to the satisfaction of the Planning Secretary (Consolidated Consent, p. 16). The plan is presented as meeting this requirement, but lacks evidence of third-party review or effectiveness assessment.

Gaps and Weaknesses

- **No specific performance targets** for greenhouse gas reduction are set. The plan contains aspirational language (“where practical”) without binding thresholds or triggers for corrective action (AQGHGMP, p. 43).
- **Monitoring focuses almost entirely on air quality**, not GHG. No clear methodology is provided for quantifying or verifying on-site Scope 1 or 2 emissions.
- **No schedule of emissions reporting** or annual review linked to measurable progress against emissions baselines (AQGHGMP, p. 42).
- **No mitigation pathway or offset strategy** is included, despite the large volume of Scope 3 emissions associated with coal combustion downstream (source not specified).
- **No integration with broader climate policy objectives** (e.g. NSW Net Zero Plan or the EPA Climate Change Action Plan 2023–2026).

Summary Table

Issue	Evaluation	Reference
Lack of GHG-specific monitoring	No Scope 1/2 quantification method described	AQGHGMP, p. 42
Absence of performance criteria	No emissions reduction targets or KPIs	AQGHGMP, p. 43
No response triggers	No enforceable actions for threshold exceedances	(source not specified)
Scope 3 not addressed	Downstream emissions excluded from commitments	AQGHGMP, p. 38

Conclusion

The current management plan does not provide a sufficient framework to ensure compliance with Condition C3 of the Consolidated Consent. It lacks enforceable measures, emissions tracking, and integration with climate obligations. Substantial revision is required to make it an effective tool for GHG mitigation.

Appendix E – Air Quality Impact Assessment (GHG Focus) Review

Project Description

The Boggabri Coal Mine is an open-cut operation with an approved coal extraction capacity of up to 8.6 million tonnes per annum. Greenhouse gas (GHG) emissions are generated from direct combustion (Scope 1), electricity use (Scope 2), and downstream coal use (Scope 3). Scope 1 includes diesel combustion and fugitive methane emissions. Scope 2 arises from grid electricity use, and Scope 3 emissions exceed 5 million tonnes CO_2-e per annum from exported coal combustion (Appendix E, p. 38).

Baseline Conditions

There is no pre-development or regional GHG emissions baseline presented in the assessment. The lack of comparative data or context (e.g. state-wide emissions or precinct-wide baselines) limits the reader's ability to evaluate the relative significance of the project's emissions (Appendix E, p. 35).

Impact Assessment

The assessment presents estimated emissions figures for each scope but does not examine cumulative emissions across the Leard Forest Mining Precinct. Scope 1 and 2 emissions are treated as minor; Scope 3 emissions are acknowledged but framed as beyond the project's control (Appendix E, p. 45). No decarbonisation scenarios or net-zero alignment tests are provided.

Mitigation Measures

Mitigation is confined to internal operational efficiency measures: engine maintenance, efficient vehicle usage, and general energy-saving practices (Appendix E, p. 41). No abatement pathway, offset program, or emissions reduction targets are included. The EIS fails to quantify the emissions savings expected from the proposed measures.

Stakeholder Engagement

There is no indication that GHG emissions or climate risks were discussed with stakeholders, including local communities, Indigenous representatives, or climate policy agencies (source not specified).

Conclusions

The assessment defers responsibility for Scope 3 emissions to market forces and federal policy, effectively limiting the project's accountability. It offers no adaptation strategy, climate scenario analysis, or transition risk planning (Appendix E, p. 45).

Evaluation of Misrepresentation and Selective Framing in the Greenhouse Gas Assessment

Impacts Framed as Negligible Without Justification

- Scope 1 and 2 emissions are presented as relatively low with no benchmark or standard used to justify this framing (Appendix E, p. 38).

- Scope 3 emissions are acknowledged but dismissed as out of scope despite contributing the vast majority of project-related emissions (Appendix E, p. 45).

Data Presented Without Full Context

- Annual emissions data lacks comparison to NSW emissions totals, emissions intensity per tonne, or sectoral baselines (Appendix E, p. 38).
- Efficiency improvements are described without emissions quantification or estimated mitigation benefit (Appendix E, p. 41).

Risk Assessments That Minimise Uncertainty

- No sensitivity testing of fugitive emissions is presented; the GHG assessment assumes static methane release rates (Appendix E, p. 37).
- No analysis of transition risks (e.g., carbon pricing, regulatory tightening, or stranded asset risks) is included (source not specified).

Evaluation and Redesign of the Conceptual Environmental Model – Greenhouse Gas Assessment

Existing Model Limitations

The conceptual environmental model (CEM) used for the greenhouse gas assessment lacks depth. It frames GHG emissions as a linear output from project inputs with little recognition of feedback mechanisms or external risks. There is no systems-level diagram or scenario planning. Climate change, energy policy shifts, or socio-political responses are not integrated (Appendix E, p. 36; source not specified).

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A comprehensive CEM for NSW mining contexts should:

- Include system boundaries for Scope 1, 2, and 3 emissions
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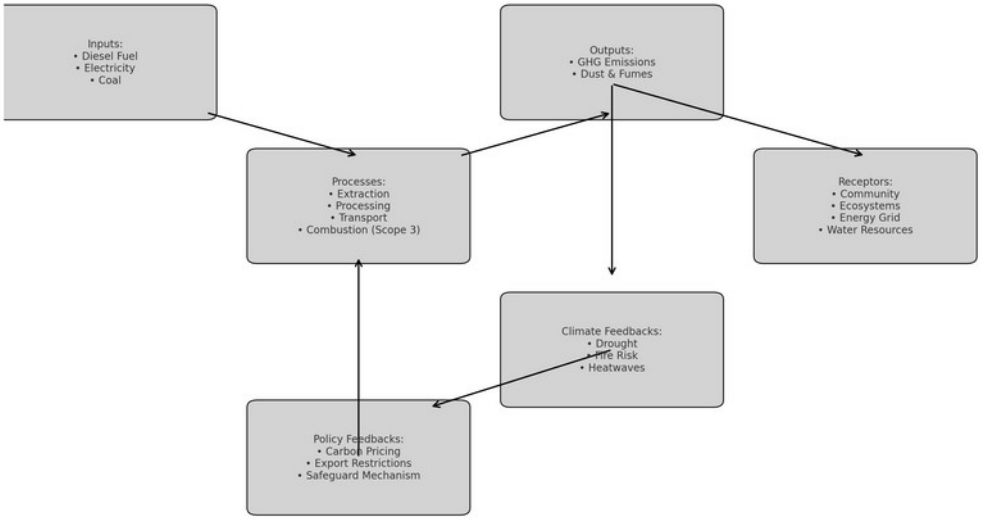

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- **Condition C3** of the Consolidated Consent requires implementation of “all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site” (Consolidated Consent, p. 16). The management plan repeats this requirement but offers

only generic efficiency strategies, such as reducing idling and using energy-efficient equipment (AQGHGMP, p. 42).

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- **No mitigation pathway or offset strategy** is included, despite the large volume of Scope 3 emissions associated with coal combustion downstream (source not specified).
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Summary Table

Issue	Evaluation	Reference
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Scope 3 not addressed	Downstream emissions excluded from commitments	AQGHGMP, p. 38

Conclusion

The current management plan does not provide a sufficient framework to ensure compliance with Condition C3 of the Consolidated Consent. It lacks enforceable measures, emissions tracking, and integration with climate obligations. Substantial revision is required to make it an effective tool for GHG mitigation.

Summary of Critical Flaws in the Conceptual Model and Risk Assessment

Based on the preceding review, the most serious flaws in the greenhouse gas conceptual model and risk assessment used in the EIA include:

1. Oversimplified Linear Emissions Model

The assessment uses a basic linear input-output model that fails to account for feedbacks, dynamic variables, or broader environmental interactions (Appendix E, p. 36). It ignores climate variability, transition risk, and cumulative emissions.

2. Exclusion of Scope 3 from Risk and Mitigation Analysis

Despite Scope 3 emissions making up the majority of total emissions (>5 million t CO_2-e/yr), the model avoids integrating these into the emissions management or risk framework (Appendix E, p. 45). This leads to major blind spots in assessing long-term climate impacts.

3. No Scenario Testing or Sensitivity Analysis

The risk assessment assumes constant fugitive methane rates and static operational practices, with no exploration of variability or future climate policy changes (Appendix E, p. 37).

4. Absence of Cumulative Emissions Context

There is no regional or precinct-scale analysis of cumulative emissions from multiple mining operations in the Leard Forest area (source not specified).

5. No Alignment With Net Zero or Climate Transition Pathways

The EIA fails to assess whether the project is compatible with NSW or national climate targets, or to explore potential decarbonisation pathways (source not specified).

Are These Concerns Addressed in the Current Submission?

No. These concerns remain unaddressed in both the EIA and the current management plan: - The **Air Quality and Greenhouse Gas Management Plan** lacks enforceable targets, monitoring for GHGs, or offset strategies (AQGHGMP, p. 42–43). - The **conceptual model** has not been revised to integrate cumulative or dynamic factors. - The **risk framework** fails to anticipate or assess climate policy, regulatory tightening, or social license risks.

Together, these flaws undermine the integrity of the greenhouse gas assessment and the project's alignment with NSW climate objectives.

EP&A Act and Legislative Compliance Assessment (Expanded)

This section expands on earlier analysis by assessing how the greenhouse gas (GHG) components of the EIS and the associated management plan align with the statutory obligations under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

1. Incomplete Impact Assessment under s.4.15(1)(b)

The EIS does not assess cumulative or long-term indirect GHG impacts, particularly from Scope 3 emissions (Appendix E, p. 45). This omits a key requirement of s.4.15(1)(b) to consider the likely environmental impacts of the development.

2. Failure to Demonstrate Ecologically Sustainable Development (s.5)

Section 5 of the EP&A Act incorporates the principles of ecologically sustainable development (ESD), including: - **The precautionary principle** – ignored through the lack of sensitivity analysis or scenario testing of climate and policy risk (Appendix E, p. 37). - **Inter-generational equity** – not addressed, despite long-term carbon liability and climate implications from exported coal. - **The conservation of biodiversity and ecological integrity** – overlooked, with no analysis of GHG-driven stressors on threatened species or fire regimes (source not specified).

3. Inadequate Mitigation and Monitoring (s.4.15(1)(d))

The Air Quality and Greenhouse Gas Management Plan lacks enforceable performance criteria, response triggers, or a structured monitoring program for GHG emissions (AQGHGMP, p. 42–43). This fails to meet s.4.15(1)(d) regarding the suitability and adequacy of mitigation measures.

4. Lack of Strategic and Policy Integration (s.4.15(1)(a)(i))

The EIA does not demonstrate consistency with: - The **NSW Climate Change Policy Framework** or **Net Zero Plan Stage 1: 2020–2030**; - The **NSW Independent Planning Commission's Climate Guidelines**; - Other relevant **environmental planning instruments (EPIs)** such as SEPP (Resources and Energy) (source not specified).

This represents non-compliance with s.4.15(1)(a)(i), which requires consideration of applicable planning instruments and policy frameworks.

5. Weak Accountability and Transparency Mechanisms

There is no annual GHG reporting or third-party auditing defined. This undermines the public participation and accountability principles embedded throughout the EP&A framework, especially under s.4.15 and the community consultation requirements for State Significant Developments (AQGHGMP, p. 42).

6. Legislative Gaps and Additional Compliance Risks

The EIA and GHG Management Plan raise further legislative concerns beyond the EP&A Act:

- **National Greenhouse and Energy Reporting Act 2007 (Cth)**: While emissions are noted as reportable, there is no integration of NGER data into the project's management strategy or verification processes (Appendix E, p. 38).
- **Climate Change Act 2022 (Cth)**: The EIS does not align forecast emissions with Australia's legislated 2030 (43%) and 2050 (net zero) targets, nor does it include transition risk modelling or abatement scenarios (source not specified).
- **NSW IPC Guidelines and Net Zero Plan**: The IPC's expectations for life-cycle emissions, offset strategies, and climate policy alignment are not addressed (Appendix E, p. 45; AQGHGMP, p. 42–43).
- **Biodiversity Conservation Act 2016 (NSW)**: The indirect effects of GHG emissions on fire regimes, climate variability, and species distributions are not assessed, undermining the integrity of biodiversity evaluation (source not specified).
- **Water Management Act 2000 (NSW)**: The plan fails to link water consumption (e.g. for dust suppression) with GHG emissions, nor does it consider climate-induced changes to water availability (source not specified).

These omissions weaken the robustness of the assessment under State and Commonwealth law and should be clarified before project determination.

Summary Table – Statutory and Legislative Risk

Legal Framework	Issue Identified	Non-Compliance / Risk	Source Reference
EP&A Act s.4.15(1)(b)	Cumulative and Scope 3 GHG impacts not assessed	Incomplete environmental impact assessment	Appendix E, p. 45
EP&A Act s.5	No precautionary modelling or biodiversity risk pathways	Fails to meet ESD principles	Appendix E, p. 37; source not specified
EP&A Act s.4.15(1)(d)	No GHG thresholds, response triggers or monitoring	Inadequate mitigation measures	AQGHGMP, p. 42–43
EP&A Act s.4.15(1)(a)(i)	No consistency test against NSW Net Zero Plan or SEPP	Lacks strategic policy integration	source not specified
EP&A Act s.4.15	No third-party auditing, unclear public accountability	Weak transparency and enforcement	AQGHGMP, p. 42
NGER Act 2007 (Cth)	NGER reporting not linked to mitigation or oversight	Data not operationalised for compliance	Appendix E, p. 38
Climate Change Act 2022 (Cth)	No emissions trajectory or 2030/2050 alignment	Strategic climate misalignment	source not specified
IPC Guidelines / NSW Net Zero Plan	No offset strategy or Scope 3 mitigation	IPC expectations not met	Appendix E, p. 45; AQGHGMP, p. 42–43
Biodiversity Conservation Act 2016	No GHG-biodiversity linkage or climate stress pathways	Incomplete biodiversity impact evaluation	source not specified
Water Management Act 2000	No integration of water use with climate or GHG efficiency	Unaddressed climate-water interface	source not specified

Conclusion

The GHG components of the EIS and management plan do not meet multiple statutory duties under the EP&A Act. In particular: - Section 5 (ESD principles); - Section 4.15(1)(a)–(d) (impact assessment, mitigation suitability, strategic consistency); - Public accountability provisions.

Unless substantially revised, the submission lacks the evidentiary and policy basis required for lawful approval under the EP&A Act.

Key Submission Arguments

- 1. The EIA fails to model or mitigate Scope 3 emissions in contradiction of SEARs and IPC guidance, thereby underrepresenting the project's climate impact (Appendix E, p. 45).

2. The conceptual model is oversimplified and does not reflect cumulative emissions, feedback loops, or NSW climate scenarios, failing to meet ESD requirements under the EP&A Act (Appendix E, p. 36).
3. No mitigation hierarchy, offsets strategy, or GHG reduction target is proposed in the Management Plan, failing to comply with Condition C3 of the Consolidated Consent (AQGHGMP, p. 42–43; Consolidated Consent, p. 16).
4. The project has not demonstrated compatibility with the NSW Net Zero Plan or the Climate Change Act 2022 (Cth), placing it at odds with national and state decarbonisation goals (source not specified).
5. The current risk framework omits scenario testing, transition risk assessment, and adaptation planning—despite explicit IPC and SEARs expectations (Appendix E, p. 37).

Review Questions for Regulators, Experts, and Stakeholders

- 1. Why does the proponent exclude Scope 3 emissions from mitigation and accountability when they represent the majority of the project's GHG footprint (Appendix E, p. 45)?

2. Where is the emissions reduction pathway or offset strategy required to demonstrate alignment with the NSW Net Zero Plan (AQGHGMP, p. 43)?
3. Why has no sensitivity analysis been conducted for fugitive methane variability or future policy changes (Appendix E, p. 37)?
4. What is the justification for treating Scope 1 and 2 emissions as negligible without comparative benchmarks (Appendix E, p. 38)?
5. How will the proponent meet Condition C3 of the Consolidated Consent if no enforceable GHG targets or monitoring systems are defined (Consolidated Consent, p. 16)?
6. Why does the EIS fail to contextualise emissions within cumulative impacts from other nearby coal operations in the Leard Forest Precinct (source not specified)?
7. What mechanisms will ensure public accountability, given the absence of transparent GHG reporting in the management plan (AQGHGMP, p. 42)?
8. Has the proponent demonstrated consistency with the SEPP (Resources and Energy) 2021 or other relevant Environmental Planning Instruments (source not specified)?
9. What measures will be taken to address potential biodiversity stress linked to emissions-induced temperature and fire risk increases (source not specified)?
10. How has the proponent evaluated whether continued coal production is compatible with Australia's 2030 and 2050 targets under the Climate Change Act 2022 (Cth) (source not specified)?

References

- - Hansen Bailey. (2024). *Appendix E – Air Quality and Greenhouse Gas Assessment*. In Boggabri Coal Project Environmental Impact Statement.
- - Idemitsu Boggabri Coal. (2024). *Air Quality and Greenhouse Gas Management Plan* (ENV-AIR-PLN-001-AQGHGMP_Ver-8-Final).
- - NSW Department of Planning, Housing and Infrastructure. (2024). *Consolidated Development Consent for Boggabri Coal Project (SSD 09_0182)*.
- - Environmental Planning and Assessment Act 1979 (NSW).

- - Climate Change Act 2022 (Cth).
- - National Greenhouse and Energy Reporting Act 2007 (Cth).
- - NSW IPC (2021). *Guidance Note: Climate Change Considerations*.

- NSW Government. (2020). *Net Zero Plan Stage 1: 2020–2030*.

Appendix F - Noise and Blasting Impact Assessment Review

1. Project Description

The project involves continued operations of the Boggabri Coal Mine (BCM) with modifications including extended mining beyond currently approved limits. Noise and blasting are addressed with reference to impacts on nearby sensitive receivers, public infrastructure, and biodiversity values. The site is located within the Leard Forest Mining Precinct, and the proposal assumes continued daily mining activities, blasting up to four times weekly, and haulage operations including use of the Boggabri Rail Spur Line (Appendix F, p. 9).

2. Baseline Conditions

Baseline noise conditions were established via attended and unattended noise monitoring conducted at nearby sensitive receivers. The background noise levels are stated to align with previous EIS documentation, with no substantial update to regional conditions or long-term meteorological shifts (Appendix F, p. 12).

However, no justification is provided for assuming that baseline conditions from previous EIS documents remain valid over a decade later. Climate variability, cumulative regional activity, and rural demographic shifts (e.g. depopulation or new residential development) are not adequately reassessed.

> Critical Issue: Baseline data appears outdated or unvalidated post-2012. There is limited evidence that recent community or environmental changes have been accounted for, which may render noise predictions unreliable (Appendix F, p. 12; Consolidated Consent, p. 13).

3. Impact Assessment

The assessment models operational noise, construction noise, rail noise, and blast vibration/overpressure across typical and worst-case meteorological conditions (Appendix F, pp. 15–23). Blast impacts are assessed against airblast and ground vibration limits specified in AS 2187.2-2006 and conditions from the Consolidated Consent (120 dB and 10 mm/s respectively; 0% exceedance for airblast and 5% for vibration) (Consolidated Consent, p. 14).

> Critical Issues: - The assessment does not robustly consider worst-case cumulative scenarios from multiple mines operating simultaneously within the precinct (Appendix F, p. 23). - Low-frequency noise impacts and temperature inversion effects are under-analysed. - Potential effects on fauna (e.g., from blasting near offset areas or habitat corridors) are not quantitatively addressed.

4. Mitigation Measures

The report outlines existing and proposed measures, including: - Real-time noise monitoring with meteorological forecasting - Noise-triggered operational controls - Rail noise minimisation - Blasting restrictions (time of day, proximity to residences) - Property inspections and compensation

While mitigation is extensive on paper, the effectiveness of proactive controls under real operating conditions is not substantiated. Effectiveness of predictive modelling and response protocols is not validated with long-term performance data (Appendix F, p. 29).

No updated analysis of mine-related road traffic noise is included.

5. Stakeholder Engagement

The assessment refers to consultation with government agencies and local stakeholders, including the CCC. However, specifics of stakeholder feedback on noise or blasting impacts are minimal.

> Gaps Identified: - No evidence that Indigenous stakeholders were consulted regarding cultural or ecological noise/blasting concerns. - No register or summary of specific concerns raised by local residents during scoping or draft review stages. - The MCCC is not acknowledged as a stakeholder despite historical concerns raised on acoustics and social impacts (MCCC Submission, p. 28).

6. Conclusions

The report concludes that noise and blasting impacts are within regulatory criteria and can be managed through best-practice mitigation. It asserts no significant residual impacts on human or ecological receptors (Appendix F, p. 32).

> Review Summary: The conclusion appears overly confident, given: - Incomplete updating of baseline conditions - Uncertainty around cumulative and inversion-prone scenarios - Weak incorporation of stakeholder feedback - Lack of discussion on how predicted impacts interact with climate change trends

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Evaluation of Potential Misrepresentation, Bias, or Selective Framing – Appendix F

1. Impacts Framed as Negligible Without Justification

- Cumulative noise impacts from nearby operations are dismissed without quantitative modelling of concurrent operations (Appendix F, p. 23).
- Low-frequency noise is dismissed as negligible without specific receptor data (Appendix F, p. 22).

2. Data Presented Without Context or Misleading Summaries

- Baseline data reused from older EIS documents without revalidation (Appendix F, p. 12).
- Summary statements claim compliance but omit exceedance frequencies or buffer margins (Appendix F, p. 24).

3. Risk Assessments That Minimise Uncertainty

- No discussion of input sensitivity, uncertainty ranges, or model confidence intervals (Appendix F, p. 17).
- Fauna or offset-area responses to blasting omitted entirely (source not specified).

Evaluation of Conceptual Environmental Model – Appendix F

Assessment of Existing Model

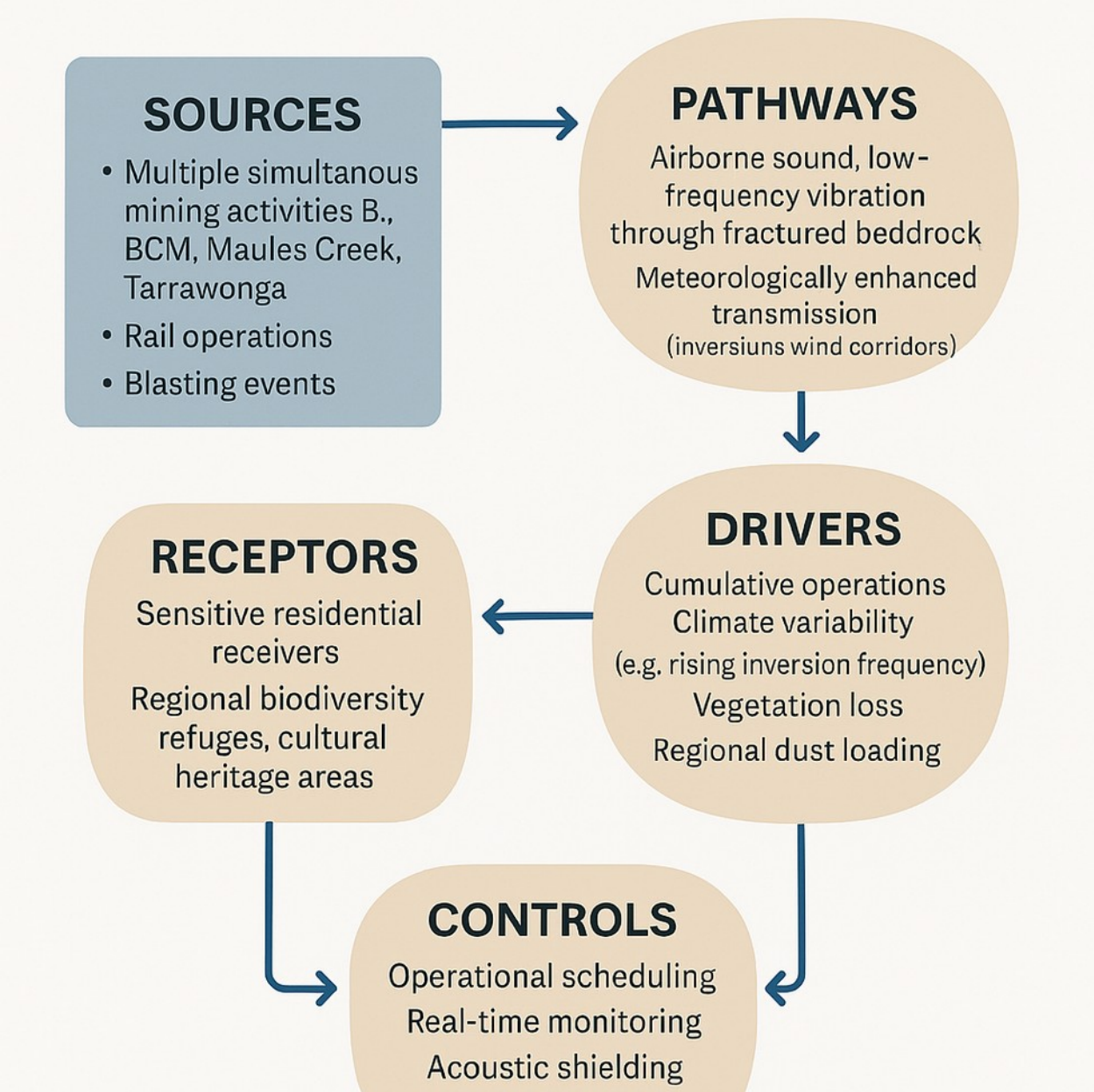
The existing model is linear, source-to-receptor. It omits cumulative stressors, ecological feedbacks, and does not link meteorological drivers (e.g., inversions) to acoustic effects (Appendix F, pp. 14–20).

> Conclusion: The model is narrowly scoped and reductionist.

Proposed Alternative Model for NSW Mining Contexts

A more suitable model would include: - **Sources**: Simultaneous mines, blasting, rail - **Pathways**: Airborne sound, vibration, inversion-driven transmission - **Receptors**: Human and ecological - **Drivers**: Cumulative activity, climate variability, land use - **Controls**: Operational, regulatory, adaptive

See diagram below:



Review of Noise Management Plan Against Approval Conditions

The current Noise Management Plan (NMP) (ENV-NOI-PLN-001) includes controls aligned with many Consolidated Consent conditions, including: - Real-time and attended monitoring - Use of meteorological forecasting - Predictive risk/response matrix (NMP, p. 29) - Community complaint handling and reporting mechanisms - Operational triggers to relocate or shut down plant (NMP, p. 32) - Annual model validation (NMP, p. 35)

However, the following critical gaps and concerns are identified:

Missing or Incomplete Items

- The NMP does not explicitly include a detailed **Leard Forest Precinct Noise Strategy**, despite being required to collaborate with nearby mines on cumulative noise impact management and shared data protocols (Consolidated Consent, Condition 13(g), p. 13).

- There is **no stated commitment to monitor inversion strength at a specific sampling rate**, as required under Condition 13(f) (Consolidated Consent, p. 13).
- Although the NMP refers to attended monitoring and complaints, there is **no transparent method for validating noise source attribution** under cumulative exceedance conditions (e.g. using cross-correlation or directional microphones).

Vague or Weakly Justified Measures

- The effectiveness of the predictive risk matrix is not evaluated against historical exceedances or regional data.
- The NMP references mitigation hierarchy (e.g. attenuated plant), but no performance standards, noise attenuation targets, or non-compliance triggers are included (source not specified).
- There is no **triggered stakeholder re-engagement process** for prolonged or repeated non-compliances.

Conclusion

While ENV-NOI-PLN-001 satisfies several approval conditions on paper, it falls short on: - Demonstrating cumulative impact coordination with other precinct mines - Including inversion strength monitoring at required resolution - Transparent, community-facing mechanisms for assigning responsibility in exceedance events

Recommendation: The NMP should be revised to integrate Condition 13(g) more fully, add inversion sampling protocols, and publish clearer thresholds and data-sharing methods for precinct-level impact attribution.

Key Conceptual and Risk Assessment Flaws

The most serious flaws in the conceptual model and risk assessment used in the EIA are:

- **Overly Simplistic Conceptual Model**: The model relies on a linear source-pathway-receptor framework that ignores key interactions such as cumulative acoustic load, precinct-wide operations, or dynamic meteorological feedbacks (Appendix F, pp. 14–20).
- **Exclusion of Low-Frequency and Inversion Impacts**: Noise propagation under inversion conditions and low-frequency resonance are not analysed despite being known issues in open-cut coal mining regions in NSW (Appendix F, p. 22).
- **Lack of Sensitivity or Uncertainty Analysis**: The risk assessment omits any confidence bounds or sensitivity testing for input parameters such as source noise levels, terrain modelling, or meteorological forecasts (Appendix F, p. 17).
- **Absence of Ecological Risk Consideration**: The impacts of noise and blasting on biodiversity, particularly in offset corridors and nearby habitat patches, are not evaluated (source not specified).
- **Cumulative Impacts Minimised or Ignored**: The EIA assumes individual compliance without addressing cumulative risks from multiple mines in the Leard Precinct (Appendix F, p. 23).

These concerns are **not adequately addressed** in the current submission. Although the proponent outlines real-time monitoring and predictive matrices, they do not integrate precinct-level operations, demonstrate resilience to meteorological variability, or account for ecological receptors. The proposed conceptual model and recommended revisions to the Noise Management Plan provide a more defensible approach for the NSW context.

Assessment Against Consolidated Approval Conditions

This section evaluates the consistency of the noise and blasting assessments and controls in Appendix F and the Noise Management Plan (ENV-NOI-PLN-001) against the current Consolidated Consent Conditions (2024).

Key Compliance Observations

- **Operational Noise Criteria Compliance**:
  - The EIA acknowledges noise impact thresholds of LAeq(15min) 35–40 dB(A) for day/evening/night at various receivers, and these reflect those in the approval conditions (Consolidated Consent, Schedule 3, Condition 4, p. 11).
  - However, predicted levels close to criteria limits are not supported by robust exceedance frequency analysis or noise margin reporting (Appendix F, p. 24). This raises questions about sustained compliance under inversion-prone conditions.
- **Blasting Compliance**:
  - The EIA adopts blast overpressure and ground vibration thresholds consistent with approval conditions (120 dB and 10 mm/s) and applies the 0%/5% exceedance framework correctly (Consolidated Consent, Schedule 3, Condition 10, p. 12).
  - Yet, no analysis is offered of historical compliance performance or adaptive risk controls under marginal or exceedance scenarios (Appendix F, p. 27).
- **Precinct Noise Strategy**:
  - Schedule 3, Condition 13(g) requires BCM to develop and implement a precinct-level noise strategy in collaboration with other Leard Forest operators.
  - This is **not addressed substantively** in either Appendix F or the Noise Management Plan. There is no record of data sharing protocols, coordinated response protocols, or shared exceedance attribution procedures (ENV-NOI-PLN-001, p. 32).
- **Inversion Monitoring**:
  - Condition 13(f) requires BCM to monitor temperature inversion strength and direction with sufficient resolution to inform predictive risk forecasting.
  - The NMP generically mentions forecasting but **does not define a sampling methodology, frequency, or performance metric** (ENV-NOI-PLN-001, p. 31).
- **Acquisition & Mitigation Triggers**:
  - Conditions 7–9 outline land acquisition and negotiated mitigation rights for exceedances beyond 2 dB above criteria. Appendix F does not clearly report margin-to-criteria data or model confidence levels to inform whether these thresholds may be breached.
- **Community Notification and Complaints**:
  - Condition 6 requires BCM to maintain a proactive complaints line and notify affected landholders of exceedances. While ENV-NOI-PLN-001 includes a complaints protocol, it lacks a defined procedure for timely exceedance notification and stakeholder re-engagement after verified breaches (ENV-NOI-PLN-001, p. 34).

Conclusion

The EIA and Noise Management Plan nominally align with the wording of approval conditions but **fail to fully operationalise several critical requirements**, especially around: - Precinct-level strategy and cumulative attribution (Condition 13(g)) - Transparent and resolved inversion monitoring (Condition 13(f)) - Detailed modelling of exceedance margins and landholder acquisition risk (Conditions 7–9)

Recommendation: The documentation should be revised to fully incorporate precinct-level coordination, publish a detailed inversion monitoring protocol, and include an explicit protocol for public notification and stakeholder follow-up in the event of an exceedance.

Assessment Against the EP&A Act 1979

This section evaluates the adequacy of the noise and blasting impact assessment, management plan, and mitigation framework against the requirements and objectives of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

Relevant EP&A Act Considerations

Under Section 4.15 of the EP&A Act, consent authorities must consider (among other matters): - the likely environmental impacts of the development - the suitability of the site - any submissions made in accordance with the Act - the public interest

1. Adequacy of Environmental Impact Assessment

The *Appendix F – Noise and Blasting Impact Assessment* lacks a robust, up-to-date assessment of baseline acoustic conditions (Appendix F, p. 12) and cumulative impacts (Appendix F, p. 23). This does not align with the requirement for a full consideration of “likely environmental impacts” under s4.15(1)(b) of the EP&A Act.

2. Site Suitability and Community Impact

While the site has been approved for coal mining, the continued and intensified operation raises new questions about its acoustic suitability, particularly under changing meteorological conditions and with additional dwellings constructed nearby since original approvals.

The proponent’s material fails to demonstrate how new sensitive receivers have been assessed or mitigated (Appendix F, p. 24). This weakens compliance with the duty to assess site suitability under s4.15(1)(c).

3. Consideration of Submissions and Stakeholder Rights

There is limited evidence that local stakeholder concerns—especially those raised by the Maules Creek Community Council (MCCC)—have been integrated into either the EIS or Noise Management Plan. Complaints and concerns around cumulative noise exceedances, cultural site impacts, and inversion effects are either downplayed or omitted (MCCC Submission, p. 28).

Failure to substantively engage with these submissions may contravene s4.15(1)(d), which requires decision-makers to consider public submissions made under the Act.

4. Public Interest and Precautionary Principle

The precautionary principle is a core objective of the Act's broader environmental planning framework. Given: - the proximity of sensitive receptors, - poor cumulative modelling, - untested mitigation matrices, - and missing precinct-wide coordination (Appendix F, p. 23; ENV-NOI-PLN-001, p. 32),

… it is not in the public interest to approve continued operations based on the current incomplete or overly confident assessments.

> The precautionary principle has not been demonstrably applied to blast overpressure near ecological corridors or climate-exacerbated acoustic events such as nocturnal inversion trapping.

5. Statutory Instruments and Legislative Compliance

- **Environmental Planning Instruments (EPIs)**: The project must comply with relevant provisions of the *State Environmental Planning Policy (Resources and Energy) 2021*. However, the Noise Impact Assessment does not explicitly demonstrate compliance with cumulative noise standards or coordination obligations outlined for Leard Forest mining operations (Appendix F, p. 23).
- **SEARs Compliance**: The Secretary's Environmental Assessment Requirements (SEARs) require the proposal to assess cumulative impacts and ensure consistency with consent conditions. The limited treatment of cumulative rail and mine noise interactions, as well as vague inversion forecasting protocols, raise concerns about SEARs alignment (Appendix F, pp. 19, 29).
- **State Significant Development (SSD) Triggers**: The project remains a State Significant Development under the EP&A Act (SSD 09_0182 Mod 10), requiring a higher standard of assessment, including clear public interest and full evaluation of residual impacts. The omission of sensitive Indigenous receptors and the dated receptor audit (Appendix F, p. 12) may not meet this standard.
- **Biodiversity Conservation Act 2016**: Although noise impacts on fauna are not the central focus of Appendix F, no assessment is provided of whether blasting near ecological corridors or noise disturbance in offset areas could interfere with threatened species' breeding or movement, which may contravene protections under the BC Act 2016 (source not specified).
- **Water Management Act 2000**: While the Water Management Act is not directly engaged by the noise assessment, any failure to control vibration impacts near watercourse banks or surface infrastructure could indirectly impact surface water stability or sediment loading, which are managed under this Act (source not specified).

Conclusion

The EIA's noise and blasting sections raise significant compliance risks under both the EP&A Act and related instruments. In particular: - The proponent has not met the SSD-level obligations for coordinated precinct-level assessment. - There is insufficient demonstration of compliance with relevant EPIs and SEARs regarding cumulative impacts and mitigation verification. - Potential triggers under the BC Act 2016 have not been scoped or addressed.

Recommendation: The proponent should be required to submit supplementary material explicitly mapping project design and operational controls against all relevant statutory and regulatory instruments, including the SEARs and BC Act.

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- NSW Department of Planning, Housing and Infrastructure. (2024). *Consolidated Consent Conditions – Boggabri Coal Mine*, pp. 11–14.
- Maules Creek Community Council Inc. (2012). *Submission on Boggabri Coal Project Application 09_0182*.
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Appendix G - Biodiversity Assessment Review

Summary Biodiversity Development Assessment Report

Project Description

The proposed modification to the Boggabri Coal Mine involves extending mine life and increasing disturbance within the existing footprint, affecting approximately 187.38 ha of native vegetation. The BDAR claims impacts are minor and within areas already approved, but does not provide stratified or spatial justification (Appendix G, p. 1).

Baseline Conditions

Eleven Plant Community Types (PCTs), including threatened ecological communities and key threatened species habitats (e.g., Koala, Regent Honeyeater), are present within the project area. However, survey data lacks temporal context and fails to discuss climatic variation, limiting its representativeness (Appendix G, pp. 17–23).

Impact Assessment

Direct removal of 187.38 ha of native vegetation, including moderate-to-good quality habitat and hollow-bearing trees, is proposed. No cumulative impacts from nearby mines or landscape-scale fragmentation are assessed (Appendix G, p. 25).

Mitigation Measures

Measures include nest boxes, habitat salvage, and offsets. However, offset sites are not legally secured, and mitigation efficacy is assumed rather than supported with post-clearance data (Appendix G, pp. 36–45).

Stakeholder Engagement

No Indigenous consultation or culturally significant species considerations are documented. Broader community biodiversity concerns are also absent (source not specified).

Conclusions

Residual impacts are framed as negligible without adequately testing long-term offset viability, cumulative effects, or landscape connectivity (Appendix G, p. 45).

Evaluation of Misrepresentation, Bias, or Selective Framing

- **Negligible Impact Claims**: Clearing of 187.38 ha is framed as “not significant” without empirical justification or cumulative context (Appendix G, p. 45).
- **Data Gaps**: BAM input assumptions, including condition scores and species detection timing, are not disclosed (Appendix G, p. 29).
- **Minimisation of Uncertainty**: Threatened species absence is equated with low risk, despite limited detectability and known episodic site use (Appendix G, p. 18).
- **Offset Equivalence Assumed**: Nest boxes are treated as substitutes for natural hollows without evidence or monitoring data (Appendix G, p. 36).
- **Climate Change Ignored**: No future scenario testing for offsets, species resilience, or ecosystem shift (source not specified).

Conceptual Model Evaluation

Shortcomings

The BDAR uses a static, linear model based on BAM calculations, excluding key ecological dynamics: - No modelling of time-lagged species response or fire regime shifts. - Cumulative and inter-mine impacts unassessed (Appendix G, p. 25). - No integration of groundwater-dependent ecosystems or surface flow regimes (source not specified).

Recommended Conceptual Model

A more realistic framework should include: - Landscape connectivity modelling (least-cost paths). - Climate variability simulations. - Time-step population recovery modelling. - Explicit hydrological dependency mapping. - Multi-mine cumulative impact overlays.

Evaluation of Compliance with Biodiversity Approval Conditions

- **Offset Legal Security**: Required under Conditions 45–47 but not confirmed in Offset Strategy (PS107760-ECO-REP-001-RevG, p. 19).
- **Performance Criteria**: Missing from BMP; no thresholds or timelines for remedial action (BMP 2018, pp. 15–17).
- **Species Habitat Restoration**: No targeted microhabitat plans for threatened species (Appendix G, p. 18).
- **Corridor Integration**: No evidence that buffer with Maules Creek is ecologically functional (Appendix G, p. 25).
- **Audit Obligations**: No reporting on Condition 53 five-year audit status (source not specified).

Most Serious Flaws in Risk Assessment

- **Cumulative Impacts**: Not modelled despite SEARs and adjacent mining operations (Appendix G, p. 25).
- **Triggerless Monitoring**: No actionable thresholds for ecological failure or habitat degradation (BMP 2018, pp. 15–17).
- **Species Response**: Assumes instant equivalence through offset credits; does not reflect ecological lags or succession (Appendix G, p. 36).
- **No Climate Scenarios**: Omits core component of biodiversity risk analysis under ESD principles (source not specified).

These flaws are not resolved in the BDAR, BMP, or Offset Strategy.

Legislative and Policy Compliance Assessment

EP&A Act 1979

Fails to consider intergenerational equity and public interest due to climate risk omissions and fragmentation underestimation (EP&A Act s1.3(e); Appendix G, p. 25).

Biodiversity Conservation Act 2016

Offsets not legally secured as per s. 6.5. Significance of species impact is not clearly assessed under s. 7.3 (Appendix G, pp. 18, 32).

Water Management Act 2000

Lack of ecological linkages to groundwater and riparian flow regimes indicates non-compliance with s. 5 ecological water use principle (source not specified).

SEPP (Mining) and SEARs

Partial compliance. Fails to assess recovery plans, regional connectivity, or MNES threat abatement strategies【13†Appendix D - EPBC SEARs.pdf】.

Integrated Arguments and Review Questions

Key Arguments

- The BDAR lacks a robust ecological model.
- Offsets are conceptually assumed, not legally secured.
- Mitigation lacks testable thresholds or contingency.
- Legislative and SEARs requirements are only partially addressed.

Stakeholder and Technical Questions

- How were BAM inputs (e.g. vegetation condition) verified? (Appendix G, p. 29)
- Is there evidence that nest boxes functionally replace hollow-bearing trees? (Appendix G, p. 36)
- Why are no climate scenarios applied to offset viability or habitat condition? (source not specified)
- Which offset parcels are still unsecured and how will this be addressed? (PS107760-ECO-REP-001-RevG, p. 19)
- What are the trigger thresholds for BMP failure, and who enforces them? (BMP 2018, pp. 15–17)
- Why is no spatial modelling provided for cumulative impact from adjacent mines? (Appendix G, p. 25)
- How were Aboriginal ecological values or species identified and considered? (source not specified)
- How will connectivity and dispersal be maintained across offset and retained habitat? (Appendix G, p. 45)
- How are groundwater and riparian-dependant vegetation considered in the biodiversity risk framework? (source not specified)
- Are the proposed offset credits based on validated post-clearing assessments? (Appendix G, p. 32)

This document reflects a comprehensive review of biodiversity-related components of the EIA and associated management and offset documents for Boggabri Coal Mine Mod 10. It is intended to support a formal submission under the NSW Environmental Planning and Assessment Act 1979.

Abbreviations

- BDAR: Biodiversity Development Assessment Report
- BAM: Biodiversity Assessment Method
- BMP: Biodiversity Management Plan
- EIA: Environmental Impact Assessment
- EP&A Act: Environmental Planning and Assessment Act 1979 (NSW)
- EPBC Act: Environment Protection and Biodiversity Conservation Act 1999 (Cth)
- MNES: Matters of National Environmental Significance
- PCT: Plant Community Type
- SEARs: Secretary's Environmental Assessment Requirements
- SEPP: State Environmental Planning Policy

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