

## Submission on Hillgrove Mine Extension – Biodiversity (Appendix G)

### Summary Position

The Macleay River is a living system already operating close to ecological failure thresholds. In such a context, the river cannot continue to be treated, explicitly or implicitly, as a receiving environment or risk-absorber for mine operations. Approval should therefore be contingent on the proponent demonstrating a closed-loop or functionally closed water and waste management system that prevents the transfer of additional hydrological, chemical, or contaminant risk to the river system.

While Appendix G (Biodiversity) meets procedural requirements for flora and fauna listing, vegetation mapping, and habitat description, it does not provide a decision-ready assessment of biodiversity impacts arising from the proposed extension of the Hillgrove Mine. It does not address the dominant ecological risk drivers operating in the Macleay catchment, namely water quality degradation, episodic hypoxia, contaminant mobilisation, hydrological disturbance, and the amplification of these risks under increasingly intense rainfall regimes associated with climate change. As a result, it materially underestimates risk to aquatic and riparian biodiversity and does not meaningfully engage with the river's existing state of vulnerability.

Appendix G also does not assess impacts on groundwater-dependent ecosystems or subterranean biodiversity, despite the proposal involving groundwater interception and drawdown in a catchment where hyporheic and aquifer systems are integral to river health, baseflows, and ecological refuge during low-oxygen events.

Reassessment of biodiversity impacts within an integrated groundwater–surface water–catchment framework is required not to determine how much further harm the river can absorb, but to verify whether the proposed system genuinely meets the closed-loop standard in light of the river's existing condition, known failure modes, and climate-amplified risk. A biodiversity assessment that does not close the loop between mine operations, water quality, and downstream ecological consequences cannot support an informed approval decision.

Independent, publicly available evidence, including the 2025 UNSW Water Research Laboratory analysis of the Clybucca wetlands, already documents recurrent water-quality failures at a scale capable of causing system-wide ecological collapse within the Macleay catchment.

Decisions taken on the basis of assessments that omit known systemic risk drivers create a documentary record of foreseeability. Where harm later materialises along clearly identified pathways, such decisions may expose both proponents and approving authorities to legal,

financial, and reputational consequences.

Environmental approvals bind future generations to the consequences of today's decisions. Where additional avoidable risk is imposed on a river system already operating beyond its capacity to recover, environmental debt is transferred forward in time. Future communities inherit the degraded river, biodiversity loss, and the costs of remediation without having had any voice in the decision that caused the harm.

Responsible environmental governance requires decision-makers to act as trustees of living river systems whose recovery horizons extend well beyond project, commercial, or electoral timeframes. In a river already carrying cumulative harm, further avoidable damage cannot be justified as an acceptable trade-off. The responsibility of current businesses, governments, and communities is to halt decline and initiate recovery, not to normalise ongoing loss.

## **2. Biodiversity is treated as static rather than system-dependent**

Appendix G assesses biodiversity primarily through mapped vegetation communities, species presence or likelihood, and discrete disturbance footprints. This approach treats biodiversity values as spatially static and largely independent of hydrological and chemical processes.

In the Macleay River system, biodiversity outcomes are directly dependent on water quality, dissolved oxygen availability, contaminant exposure, groundwater–surface water interaction, and flood-driven episodic events whose frequency and severity are increasing under climate-amplified rainfall patterns. These processes are the primary determinants of ecological function and collapse in an already highly stressed river system.

## **3. Disconnection from water quality assessments is a critical flaw**

Appendix G is effectively siloed from the groundwater assessment (Appendix E), the surface water assessment (Appendix F), and known arsenic and antimony mobilisation pathways. Aquatic and riparian species are assessed as if water quality were stable and predictable, which is inconsistent with the documented behaviour of the Macleay River.

This omission is untenable given the findings of the 2025 UNSW Water Research Laboratory report on the Clybucca wetlands, which documents severe episodic acid discharge, blackwater events, and system-wide water quality failures within the Macleay catchment.

A biodiversity assessment that does not incorporate contaminant exposure pathways, episodic hypoxia, groundwater drawdown effects, and flood-driven toxicity cannot reliably predict ecological outcomes and is therefore incomplete.

#### **4. Degraded baseline is misused to downplay risk**

Appendix G frequently references historic disturbance and existing degradation to frame biodiversity values as already compromised. This risks implying reduced sensitivity to further impact.

Degraded systems are typically less resilient and more vulnerable to additional stress. Degradation lowers ecological thresholds and increases the likelihood that additional pressure, particularly during extreme climatic events, will result in system-wide failure.

#### **5. Cumulative and episodic impacts are not assessed**

Appendix G does not assess cumulative impacts arising from the interaction of mine-related activities with existing catchment stressors, including acid sulfate soil mobilisation, blackwater events, agricultural drainage, gravel extraction, and altered hydrology.

Independent monitoring of drainage from the Clybucca wetlands has recorded discharge events with pH values around 3, a level known to cause acute aquatic toxicity and system-wide biodiversity loss. Appendix G does not assess how additional hydrological disturbance or contaminant mobilisation associated with the proposed extension could interact with or compound this existing acidification risk.

Nor does Appendix G adequately address episodic events such as prolonged wet periods or flood sequences, despite evidence that ecological collapse in the Macleay is driven by threshold exceedance rather than gradual change, and that such events are likely to become more frequent and severe under climate change.

#### **6. Offsets and rehabilitation are not substitutes for protection**

Proposed offsets and rehabilitation measures focus primarily on vegetation structure and future terrestrial habitat condition. They do not address loss of aquatic life and function during contamination events, repeated episodic mortality, or bioaccumulation of arsenic and antimony.

Offsets cannot compensate for ongoing or recurrent water-quality-driven biodiversity loss.

#### **7. Minimum information required for a lawful and informed approval**

Before any approval is considered, Appendix G must be revised to include:

- Integration with groundwater and surface water assessments;
- Explicit consideration of contaminant exposure pathways;
- Assessment of episodic ecological collapse risk, including climate-amplified rainfall scenarios;
- A cumulative impact framework at the river system scale; and
- Biodiversity monitoring linked to clearly identified trigger points and mandatory management responses.

Monitoring alone is insufficient where thresholds of harm are known. Without enforceable response obligations, monitoring risks functioning as a record of decline rather than a mechanism for protection.

These are minimum conditions necessary to assess biodiversity impacts in a catchment where independent evidence already demonstrates recurrent, system-level ecological failure.

## 8. Conclusion

Appendix G provides a procedural biodiversity assessment but does not provide a reliable basis for decision-making in the Macleay catchment.

Approval of the Hillgrove Mine extension should not proceed unless biodiversity impacts are reassessed within an integrated, river-scale framework that treats water quality, hydrological interaction, cumulative stress, and climate-amplified risk as primary determinants of ecological integrity. This ought not to be a sacrificial river.

### References cited

Tucker, T. (2025). Clybucca Wetlands – Water Quality Analysis. WRL Technical Report TR 2025/04. Water Research Laboratory, UNSW Sydney.

Talau, J. (2020). Floodplain Drainage, Acid Sulfate Soils and Estuarine Water Quality in the Macleay River Catchment. PhD Thesis, University of New South Wales.

NSW Government. (2016). Macleay Catchment Ecohealth Report Card. Kempsey Shire Council / NSW Department of Primary Industries.