BARALABA SOUTH

Baralaba South Project
Environmental Impact Statement

ATTACHMENT 6

Peer Review Surface Water Impact Assessment

arc ENVIRONMENTAL SOLUTIONS

WRM
WATER +
ENVIRONMENT

wrm@wrmwater.com.au
wrmwater.com.au

ABN 96 107 404 544

MEMORANDUM

Date	7 December 2023
Attention	Graeme Sherlock
Company	Baralaba Coal Company Pty Ltd
WRM ref.	0876-17-F1
Subject	Independent Peer Review of the Baralaba South Surface Water Impact Assessment

Dear Graeme,

1 INTRODUCTION

The purpose of this peer review is to assess the proposed surface water management strategy developed by Engeny (2023) for the Baralaba South Project. The key questions explored as part of the review are:

1. Have the potential surface water risks and contaminant sources been appropriately identified and assessed?
2. Has the surface water management strategy been developed in accordance with best practice?
3. Is the methodology used to assess the potential surface water impacts accordance with best practice?

These questions have been answered from a review of the report entitled “Baralaba South Pty Ltd, Baralaba South Project, Surface Water Impact Assessment” by Engeny dated 7 December 2023. The models developed as part of this study have not been obtained for the review.

2 SURFACE WATER RISKS

The surface water assessment has addressed the surface water components of the Water Quality, Water Resources and Regulated Dams components of the Terms of Reference. The flooding component has been addressed in a separate report, which has not been reviewed here.

The Dawson River (and Banana Creek) have been identified as the key receiving waters that could be impacted by the Project. The surface water management strategy has been developed and assessed to define the impacts on these receiving waters. The key water quality contaminant sources for the project have been defined adequately and strategies have been developed to manage the potential impacts of those contaminants.

The stream flow and surface water impact assessment sections of the report would appear to have identified and assessed the key risks to the receiving waters.

3 SURFACE WATER MANAGEMENT STRATEGY REVIEW

The proposed surface water management strategy has a clear objective to preserve the environmental values of the receiving environment. The strategy is consistent with the Queensland Government guideline "Model water conditions for coal mines in the Fitzroy Basin" (guideline) and other coal mining projects across Australia. Surface water generated on the site has been separated into categories defined using the guideline and strategies have been developed to manage each source. In essence the strategy involves:

- the diversion of clean water (not impacted my mining)
- the capture, containment and use of mine affected water or release the captured water in accordance with the guideline conditions (mine affected water is defined in the guideline)
- the capture, containment and use of sediment affected water (storm water runoff from unrehabilitated overburden dumps) in accordance with an erosion and sediment control plan.
- The monitoring of the downstream environment to assess the performance of the adopted strategy at protecting the environmental values.

3.1 CLEAN WATER

The proposed clean water strategy involves the construction of drainage channels along the eastern boundary to divert the upslope runoff around the mine. The drains effectively minimise the capture of water that would potentially mix with mine affected water and require treatment.

Further work will be required during detailed design to ensure the drains remain sustainable in the long term and do not cause offsite erosion or ponding.

3.2 MINE AFFECTED WATER

Mine affected water, including water captured in the open cut pit (including groundwater), recycled water from the coal wash plant, runoff from the mine infrastructure area and excess water from the tailings drying cells potentially contains the highest contaminant loads with dewatered groundwater particularly containing high total dissolved solids (salts). Mine affected water will be pumped to two dams for storage and reuse. The two dams are not predicted to overflow with releases only made in accordance with the proposed release conditions developed in accordance with the guideline.

The releases are proposed only when the Dawson River flows exceed 100 m^3/s and can only be released at a maximum rate of 0.5 m^3/s, a dilution ratio of 1 in 200 as a minimum. For assessment purpose, the upper the upper end of the end of pipe EC range recommended in the Model Mining Conditions was selected to provide a conservative estimate of the Project's potential impacts on Dawson River water quality. There will obviously be no impact for flows less than 100m^3/s and the modelling showed that the low flow water quality objective for TDS would not be exceeded during a release day. The change would be imperceptible for flows significantly in excess of 100m^3/s.

Uncontrolled spills from the Mine water Dam were not predicted and are not expected given that it is effectively a turkeys Nest type construction with no external catchment. When the Mine Water Dam is at its operating capacity, pumping into the dam would cease with excess water stored in the pit and sediment dams. The pit offers substantial additional storage capacity to prevent an uncontrolled discharge. Given this, the mine water management system is considered robust and sufficient to protect the environmental values of the receiving waters from any potential contaminated releases.

3.3 STORMWATER

The primary method to manage stormwater runoff from the overburden dumps during the operational phase is sediment dams operated in accordance with an erosion and sediment control plan (ESC Plan). Geochemical advice is that the spoil is expected to be non-acid forming and have a negligible risk of developing acidic conditions. Spoil is also expected to generate relatively low saline rainfall runoff and seepage with low metal/metalloid concentrations, however, may be susceptible to erosion due to being sodic. Therefore, the primary water quality constituent of concern is suspended sediment and turbidity and as such it is appropriate to manage this runoff under an ESC Plan.

The sediment dams have been appropriately located with drains to capture stormwater runoff from the overburden dumps. Stormwater captured in the dams will be primarily pumped back to the mine water management system for reuse, rather than released to the downstream environment, which reduces the potential for downstream water quality impacts. The modelling predicted the sediment dams would overflow in 28% of years, which is a significantly higher standard than would normally be adopted for an ESC Plan.

4 WATER BALANCE MODEL REVIEW

4.1 OVERVIEW

The Goldsim model has been used to assess the performance of the water management system. The Goldsim model undertakes a mass balance for both volume and salinity on a daily basis and has been run for a period of 23 years with seven mine plan phases used to represent the operational life of the project.

The model was run as a probabilistic simulation whereby the seven mine plan phases were simulated for 111 realisations of 23 year sequences of available climate data. Given the changes in catchment area, groundwater inflows site demands over the project life, the probabilistic method is appropriate with 111 realisations providing a good representation of wet and dry sequences that could be encountered at the site.

The modelling found that, on average, the primary source of water supply is captured rainfall and runoff followed by external sources. Groundwater inflows provide a smaller percentage of the overall inflows. The greatest use of water is for dust suppression followed by process water in the coal handling and preparation plant. External water is required to supply the water supply deficit most years. These results are consistent with similar mining projects across Queensland.

4.2 MODEL DEVELOPMENT AND CALIBRATION REVIEW

With respect to the model development and calibration:

- The model includes conceptual sizings of all proposed dams within the mine water management and stormwater management systems. The dam locations and sizings appear appropriate but will require confirmation of their constructability during detailed design.
- Maximum operating volumes and pump rates have been determined to minimise spills for the mine water dams and the sediment dams, with a larger freeboard provided to the mine water dams to account for the expected poorer water quality, which is appropriate.
- Catchment runoff has been estimated using the widely use Australian Water Balance Model (AWBM). AWBM parameters have been estimated from the nearby Baralaba Central and Baralaba North mines, which is appropriate given this is a greenfields site.

- The calculated average annual runoff coefficient for each landuse type appear reasonable with 5.1% for the waste dump and 26.7% for the mining pit. These parameters produce a reasonable fit to the total site inventory recorded at Baralaba Coal Mine.
- The adopted catchment landuse salinity generation rates are stated to be based on recorded water quality in existing storages at Baralaba North Mine. Data has not been provided to confirm this.
- Groundwater inputs to the model have been obtained from the groundwater consultant. The groundwater report has not formed part of this peer review.
- Dawson River flows have been obtained from IQQM supplemented with recorded data post 2007, which is appropriate.
- Dawson River salinity values have been taken from an analysis of recorded data at the Beckers Gauge. The adopted relationship provides a reasonable representation of the historical data to establish release opportunities.

Overall, it would appear that the water balance model has used all available data from the Dawson River and the nearby Baralaba Mine to assist with the development of the model. Notwithstanding the conceptual nature of the model for a greenfields project, the model would provide a reasonable representation of the water management system and its potential impact on the downstream environment.

5 SUMMARY OF FINDINGS

In response to the key questions explored as part of the review

1. The potential surface water risks and contaminant sources have been appropriately identified and assessed.
2. The surface water management strategy has been developed in accordance with best practice.
3. The methodology used to assess the potential surface water impacts is accordance with best practice.

Regards,

Greg Roads
Senior Principal Engineer
RPEQ 06403