

15 August 2017

Garry Bailey
General Manager of Mining Development
The Bloomfield Group
Via email: gbailey@bloomcoll.com.au

RE: Air Quality Assessment for Rix's Creek South and Rix's Creek North – Proposed overburden emplacement in RCN

Dear Garry,

Todoroski Air Sciences has assessed the potential for air quality impacts associated with the proposed emplacement of Rix's Creek South (RCS) overburden and reject material in Rix's Creek North (RCN) (hereafter referred to as the Modification). This report investigates the potential change in dust emissions associated with the Modification relative to the approved operations.

Overview

Rix's Creek Mine of Rix's Creek Pty Limited, is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield). It is an open cut coal mine approximately 5 kilometres (km) north-west of Singleton in the Hunter Valley Coalfields of New South Wales (NSW) and currently produces approximately 1.5 million tonnes per annum (Mtpa) of product coal from its existing operations.

The Bloomfield Group recently purchased the Camberwell Open Cut Mine (re-named as Rix's Creek North, RCN) in 2015, located on the adjacent mining lease immediately to the north of the Rix's Creek Mine, and plans to fully integrate both operations. The current approval at RCN permits extraction of up to 1.5Mtpa of ROM coal from the northern mining area and 4.5Mtpa of ROM coal in the western mining area.

Modification description

The Modification seeks approval to allow for up to 5 million bank cubic meters (Mbcm) per annum of overburden material (equivalent to approximately 12 million tonnes, assuming conversion factor of 2.4) and up to 0.5Mbcm per annum of rejects (1.2 million tonnes) originating from RCS to be emplaced directly into the approved RCN emplacement area.

An overview of the Project showing the location of the emplacement area in RCN and associated haul roads is shown in **Figure 1**.

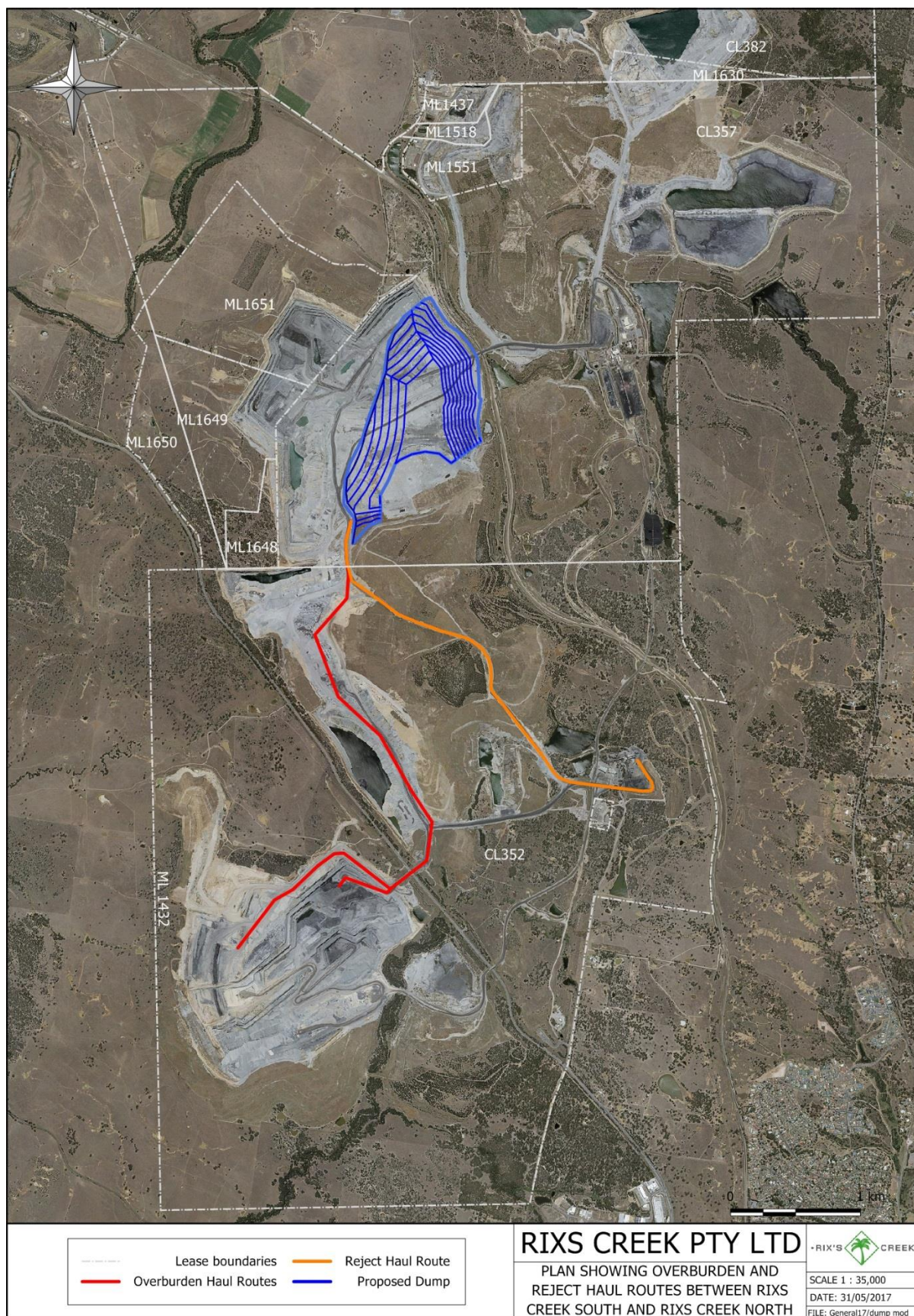


Figure 1: Location of proposed emplacement area and associated haul roads

The overburden and reject material proposed to be emplaced in RCN would otherwise be emplaced within the RCS emplacement areas, therefore there is no additional overburden and reject material handling associated with the Modification.

The proposed haul routes for the Modification would extend a short distance north from the RCS Arties Pit east of the New England Highway and RCS Coal Handling and Preparation Plant (CHPP) along existing haul routes to the RCN emplacement area as shown in **Figure 1**.

As the overburden and reject material handled for the Modification would already have been transported some distance along the proposed haul routes to be emplaced in the RCS Arties Pit, only the additional distance travelled to the RCN emplacement area would result in additional dust being generated relative to the existing activities.

Assessment of potential air quality impacts

To investigate the potential effect that the Modification may have on dust levels in the surrounding environment, a qualitative analysis is made of the proposed change in dust levels associated with the Modification relative to the dust emission estimates in the most recent air quality assessments for RCS (**Todoroski Air Sciences, 2015**) and RCN (**Holmes Air Sciences 2009**).

The rate of dust emission associated with the Modification has been calculated by analysing the various types of dust generating activities taking place at the Modification and applying suitable emission factors. The emission factors applied are considered the most applicable and representative factors available for calculating the dust generation rates for the proposed activities.

A summary of the total dust emissions from all significant dust generating activities for the Project is presented in **Table 1**. A detailed dust emission inventory is presented in **Appendix A**.

As the Modification interacts with two individual dust emissions inventories, this assessment investigates the potential change to RCS and RCN separately and as a combined operation. The activity highlighted in green identifies the activity occurring within the RCS boundary, the remaining activity occurs within the RCN boundary.

Table 1: Summary of estimated TSP emission rate for the Modification

ACTIVITY	TSP emission (kg/y)
Hauling overburden from RCS to boundary	31,907
Hauling overburden from boundary to emplacement area at RCN	61,176
Overburden emplacing at RCN	16,780
Hauling rejects from RCS CHPP to boundary	18,085
Hauling rejects from boundary to emplacement area at RCN	7,050
Rejects emplacing at RCN	176
Total TSP emissions (kg/yr)	135,173
Total TSP emissions – RCS	49,992
Total TSP emissions – RCN	85,181

kg/y = kilograms per year

As the overburden and reject material would already be transported some distance along the proposed haul routes at RCS, only the additional distance travelled to reach the RCN emplacement area would generate additional dust emissions relative to the existing activities (refer to **Figure 2**).

The estimated dust emissions associated with emplacing 5Mbcm of overburden and the hauling and emplacing of reject material included in the dust emission estimates for RCS need to be discounted from the estimates to prevent double counting. The dust emissions associated with these activities are accounted for in the dust emission estimates for the Modification (see **Table 1**).

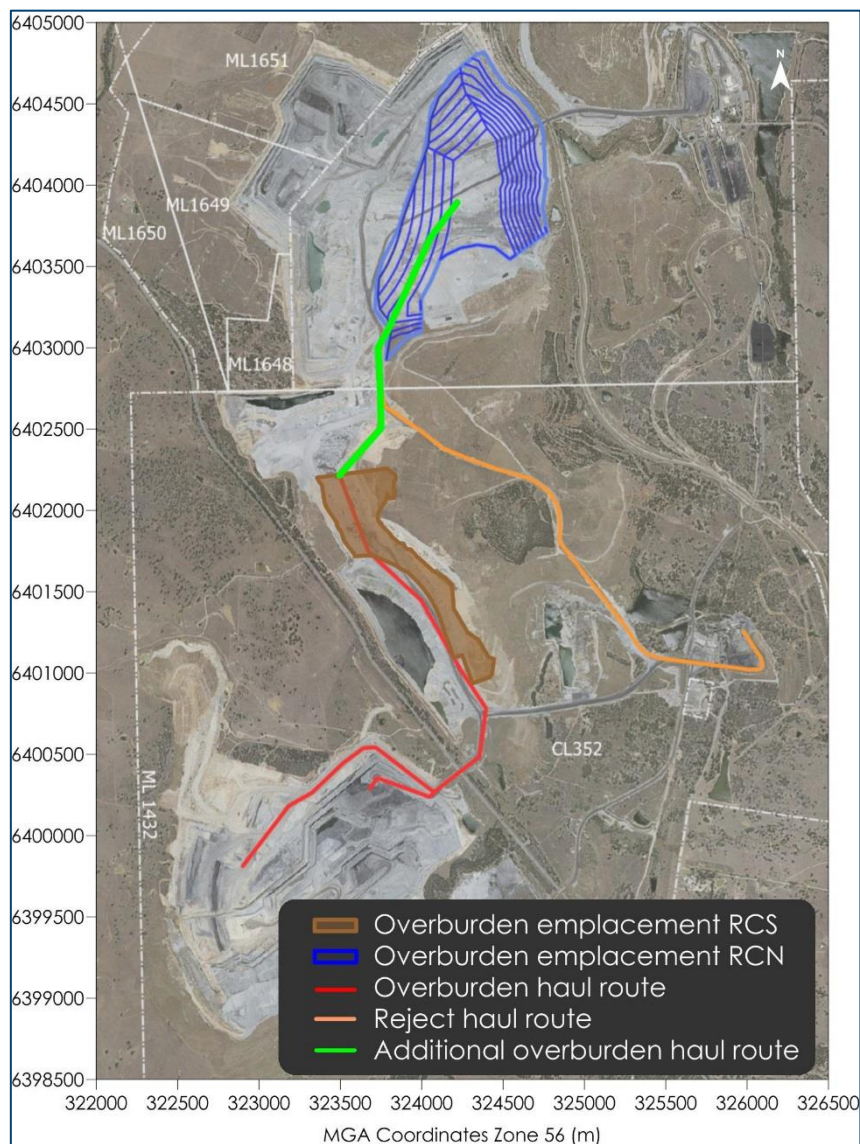


Figure 2: Additional haul distance to reach RCN emplacement area

Also, as the Modification does not seek to change the amount of overburden or reject material handled at RCN, the amount of material handled and transported in RCN would need to be discounted from the dust emission estimates in accordance with the amount of material delivered from RCS to prevent double counting.

That is, 5Mbcm of overburden which would normally be handled and has previously been accounted for in the approved limits of RCN would not occur. 5Mbcm of overburden will however be received from RCS. A summary of the estimated dust emissions from activities in RCN which would not occur due to the Modification is presented in **Table 2**.

The most recent air quality assessment for RCN (**Holmes Air Sciences, 2009**) indicates numerous overburden haul routes for each of the modelled scenarios. To account for the potential reduction in dust emissions due to the haulage of 5Mbcm of overburden at RCN, the weighted average distance of the haul routes in each scenario have been applied to estimate the dust associated with this source (refer to **Table 2**).

Table 2: Summary of estimated TSP emission reductions in RCN due to the Modification

ACTIVITY	TSP Reductions due to Modification					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Loading overburden in RCN	16,780	16,780	16,780	16,780	16,780	16,780
Hauling overburden to emplacement area	174,087	120,292	123,958	136,609	118,873	123,475
Unloading overburden in RCN	16,780	16,780	16,780	16,780	16,780	16,780
Total TSP emissions (kg/yr)	207,646	153,851	157,517	170,168	152,432	157,035

The estimated dust emissions for the Project have been compared against the total dust emission estimates for RCS and RCN in their most recent air quality assessments (**Todoroski Air Sciences, 2015** and **Holmes Air Sciences, 2009**) in **Table 3** and **Table 4** respectively.

The estimated additional dust generated due to the recently approved Satellite ROM pads at RCS (MOD 8) (**Todoroski Air Sciences, 2016**) has also been considered in **Table 3**.

The results indicate that the estimated total dust emissions from the Modification would result in an approximate 1.0 to 1.3% increase in total dust emissions relative to the total dust emission estimates for RCS and an approximate 1.6 to 3.4% decrease in total dust emissions relative to the total dust emission estimates for RCN.

Table 3: Comparison of estimated TSP emission rate for the Modification on the RCS site

Scenario	Total emissions (kg) ⁽¹⁾	Additional TSP emissions due to MOD 8 (kg) ⁽²⁾	Estimated TSP emissions due to the Modification (kg) ⁽³⁾	TSP Reductions due to Modification (kg)	Percent change in total emissions (%)
Year 2017	1,772,038	18,259	49,992	32,588	1.0%
Year 2020	1,572,177	18,259	49,992	28,827	1.3%

⁽¹⁾ **Todoroski Air Sciences (2015)**

⁽²⁾ **Todoroski Air Sciences (2016)**

⁽³⁾ Refer to **Table 1**

Table 4: Comparison of estimated TSP emission rate for the Modification on the RCN site

Scenario	Total emissions (kg) ⁽¹⁾	Estimated TSP emissions due to the Modification (kg) ⁽²⁾	TSP Reductions due to Modification (kg) ⁽³⁾	Percent change in total emissions (%)
Scenario 1	3,602,300	85,181	207,646	-3.4%
Scenario 2	4,242,442	85,181	153,851	-1.6%
Scenario 3	2,921,136	85,181	157,517	-2.5%
Scenario 4	2,989,345	85,181	170,168	-2.8%
Scenario 5	3,705,106	85,181	152,432	-1.8%
Scenario 6	2,992,035	85,181	157,035	-2.4%

⁽¹⁾ **Holmes Air Sciences (2009)**

⁽²⁾ Refer to **Table 1**

⁽³⁾ Refer to **Table 2**



The estimated change in dust emissions arising from the Modification is minor relative to the existing contribution of dust from the RCS and RCN mines. The activities of the Modification would be in a relatively central position for both mines and not close to any off-site receptors. The activities would occur regardless of the Modification albeit that they would occur in a different location (i.e. dumping within RCS as opposed to RCN) and during different staging (i.e. dumping in an already approved RCN emplacement area).

Table 5 presents a comparison of the estimated dust emissions associated with the Modification compared with dust emission estimates for the most aligned assessment years for RCS and RCN combined. The comparison suggests that overall the Modification would result in a 0.8 to 1.1% decrease in the total dust generated from the operations.

Table 5: Comparison of estimated TSP emission rate for the Modification at RCN & RCS

Scenario	Total emissions (kg)*	Estimated TSP emissions due to the Modification (kg)	TSP reductions due to Modification (kg)	Percent change in total emissions (%)
Year 2017 + Scenario 2	6,032,739	135,173	186,439	-0.8%
Year 2020 + Scenario 3	4,511,572	135,173	186,344	-1.1%
Year 2017 + Scenario 5	5,495,403	135,173	185,020	-0.9%
Year 2020 + Scenario 6	4,582,471	135,173	185,861	-1.1%

*Includes TSP emissions associated with MOD 8

Overall, it is considered that the potential change in the dust levels due to the Modification at any receptor would be too small to be noticed or reasonably measurable. Regardless, RCS and RCN will apply the most appropriate operational and physical dust mitigation measures to ensure dust levels are controlled.

Summary and Conclusions

This assessment has examined the likely air quality effects associated with the proposed transport and emplacement of up to 5Mbcm of overburden and 0.5Mbcm of rejects from RCS to RCN.

The assessment estimates that the Modification would reduce the dust relative to the existing operation of the mines by approximately 0.8 to 1.1%. This potential change in the dust generated due to the mines is unlikely to be noticeable at any off-site location.

The Modification would largely operate within the existing approvals as it does not seek to increase the amount of overburden or reject material handled for the operations or require additional material to be emplaced within the approved emplacement areas.

The RCS and RCN mines would continue to operate with appropriate best practice controls and dust mitigation measures to ensure that dust levels are minimised where possible.

Overall, the assessment indicates that no adverse impacts are expected to arise due to the Modification.

Please feel free to contact us if you need to discuss (or require clarification on) any aspect of this report.



Yours faithfully,
Todoroski Air Sciences



Philip Henschke



Aleks Todoroski



References

Holmes Air Sciences (2009)

"Air Quality Impact Assessment – Integra Open Cut Project", prepared for URS Australia Pty Ltd on behalf of Integra Coal by Holmes Air Sciences, June 2009.

Todoroski Air Sciences (2015)

"Air Quality and Greenhouse Gas Assessment Rix's Creek Continuation of Mining Project", prepared for Rix's Creek Mine by Todoroski Air Sciences, August 2015.

Todoroski Air Sciences (2016)

"Air Quality Assessment for Rix's Creek and Rix's Creek North – Proposed satellite ROM pads", prepared for The Bloomfield Group by Todoroski Air Sciences, November 2016.



Appendix A

Emission Inventory



Table A-1: Emissions Inventory

Activity	TSP emission (kg/y)	Intensity	Units	Emission Factor	Units	Var. 1	Units	Var. 2	Units	Var. 3	Units	Var. 4	Units	Var. 5	Units	Var. 6	Units
Hauling from RCS to boundary	31,907	12,000,000	t/yr	0.018	kg/t	224	t/load	1.2	km/return	3.2	kg/VKT	2.1	% S.C.	275	Ave. GMV (t)	85	% Control
Hauling from boundary to emplacement area at RCN	61,176	12,000,000	t/yr	0.034	kg/t	224	t/load	2.4	km/return	3.2	kg/VKT	2.1	% S.C.	275	Ave. GMV (t)	85	% Control
Emplacing overburden at RCN	16,780	12,000,000	t/yr	0.00140	kg/t	1.181	ave. (WS/2.2) ^{1,3}	2	M.C. in %								
Hauling rejects from RCS to boundary	18,085	1,200,000	t/yr	0.100	kg/t	181	t/load	6.1	km/return	3.0	kg/VKT	2.1	% S.C.	234	Ave. GMV (t)	85	% Control
Hauling from boundary to emplacement area at RCN	7,050	1,200,000	t/yr	0.039	kg/t	181	t/load	2.4	km/return	3.0	kg/VKT	2.1	% S.C.	234	Ave. GMV (t)	85	% Control
Unloading rejects at RCN	176	1,200,000	t/yr	0.00015	kg/t	1.181	ave. (WS/2.2) ^{1,3}	10	M.C. in %								
TOTAL (kg of TSP)	135,173																