

7 September 2018

NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Lauren Evans,
Senior Planning Officer, Resource Assessments

Dear Lauren,

RE: MOUNT PLEASANT OPERATION MODIFICATION 4 – REQUEST FOR ADDITIONAL INFORMATION

Further to your email on 21 August 2018 requesting some additional information regarding the supplementary cumulative PM₁₀ assessment prepared by Todoroski Air Sciences (2018) (the Supplementary Assessment) in relation to the Mount Pleasant Operation Rail Modification (Modification 4), please find below and attached MACH Energy Australia (MACH Energy) responses.

Should Modification 4 be favourably determined, MACH Energy does not anticipate construction commencing before Q3 2019 (i.e. following conduct of detailed engineering design and procurement), and the duration of rail construction is anticipated to be over 12 months.

It therefore follows that the operation of the proposed Modification 4 infrastructure cannot coincide with the approved Mount Pleasant Operation Mine Optimisation Modification (Modification 3) air quality and noise modelling Scenario 1 (i.e. the 2018 scenario).

Comment:

Please provide a basic comparison (preferably in table format) of assumptions utilised in the Mod 4 AQIA and the supplementary assessment (particularly as they relate to dust emissions at Bengalla).

Response:

A tabular comparison of the assumptions utilised in the Modification 3 AQIA and the Bengalla Mod 4 AQIA (i.e. a comparison of how the Bengalla Mine has been modelled by Todoroski Air Sciences on behalf of MACH Energy in comparison to modelling for Bengalla Mining Company [BMC]) is provided in Table 1 of Enclosure 1.

Comment:

Figures 2 to 7 of the supplementary assessment provide incremental annual average PM₁₀ contours showing the respective contributions of Mount Pleasant and Bengalla operations. Please also provide cumulative annual average PM₁₀ contours, including an enlarged figure which focuses on the area surrounding Receivers 4, 6, 20 and 21.

Response:

As described in the Supplementary Assessment, a semi-quantitative assessment was completed to remove some of the conservatism inherent in the Modification 3 AQIA with regard to the modelled emissions of the Bengalla Mine at individual receivers.

Due to the differences in the modelling (e.g. modelled meteorological year), it is not readily feasible to provide suitably reliable cumulative PM₁₀ contours at this time.

Notwithstanding, it is understood BMC has commissioned Todoroski Air Sciences to undertake some further air quality assessment, including updated cumulative modelling of the Mount Pleasant Operation and the Bengalla Mine, in response to the Department of Planning and Environment letter dated 19 June 2018.

MACH Energy has provided consent for BMC to utilise meteorological and air quality monitoring data recorded at the Mount Pleasant Operation and MACH Energy modelling information for the assessment.

As the Modification 3 AQIA is the most recently approved AQIA in the area, it is expected the additional modelling would be undertaken consistent with that assessment. If this is the case, the Mount Pleasant Operation incremental emissions will be unchanged. The assessment would, however, contemporise the meteorological modelling used for the incremental modelling for the Bengalla Mine.

Comment:

Neither the AQIA, nor the supplementary assessment provide modelling data for individual receivers with respect to Mod 4 operations (similar to Appendix F of the Mod 3 AQIA). While the AQIA indicates that there is little discernible change between modelled impacts for Mods 3 and 4, this data should still be provided.

Response:

Todoroski Air Sciences has prepared tabular results in accordance with the Department's request (Tables 2 and 3 in Enclosure 1).

Table 3 in Enclosure 1 presents the difference in incremental modelling predictions for Modification 3 vs Modification 4. The results show that Modification 4 would not materially change the incremental, and hence cumulative, dust levels at any off-site receptor.

Comment:

The supplementary assessment does not address PM_{2.5}. The Department's previous correspondence requested a coordinated assessment of cumulative air quality impacts. This was not limited to just PM₁₀.

Response:

Todoroski Air Sciences has prepared summary tables of predicted cumulative PM_{2.5} levels in the same format as Tables 2 to 4 of the Supplementary Assessment. These are included as Tables 4 to 6 in Enclosure 1.

In addition, incremental PM_{2.5} data for Modification 4 is included in Tables 2 and 3 of Enclosure 1. These data demonstrate negligible predicted changes in incremental ground level concentrations associated with Modification 4, and hence negligible changes in predicted cumulative PM_{2.5} levels.

Comment:

The column headings in Tables 2 to 4 are confusing. Please clarify.

Response:

The first column of results in Tables 2 to 4 of the Supplementary Assessment presents the incremental contribution of the Mount Pleasant Operation as modelled by MACH Energy in the relevant AQIA prepared for Modification 3 (2018 and 2025) or Modification 4 (2021).

The second column of results presents the incremental contribution of the Bengalla Mine, as modelled by MACH Energy in the Modification 3 AQIA.

The third column of results presents the incremental contribution of the Bengalla Mine (considered to be the most comparable with the second column), as modelled by BMC in the relevant BMC AQIAs.

The last two columns present the cumulative total level using the incremental contribution of the Bengalla Mine as shown in the second and third columns of results (i.e. the cumulative levels using MACH Energy's conservative assumptions regarding the Bengalla Mine [columns 1 and 2 combined], and the cumulative levels calculated when directly adopting the incremental contribution from the Bengalla Mine predictions by BMC [columns 1 and 3 combined]).

Comment:

The emissions from Bengalla Mod 4 have not been included in the supplementary assessment. The assessment indicates that any increase would be minor and would not affect the net result. However, it is unclear why these impacts were not factored into the assessment, particularly given the Department's request for a coordinated approach to the assessment of Mount Pleasant Mod 4 and Bengalla Mod 4.

Response:

The Supplementary Assessment uses the emissions from the BMC Mod 4 AQIA (i.e. the predicted incremental contribution from the Bengalla Mine uses the BMC modelled results for Bengalla MOD 4 in ‘the third column of results’ in Table 2 (i.e. 2018), and these results are also part of the cumulative total).

However, given the negligible change in incremental emissions from the Bengalla Mine described in the BMC Mod 4 AQIA, Tables 3 and 4 (i.e. 2021 and 2025) of the Supplementary Assessment used the predicted incremental emissions from the Bengalla Mine in the absence of BMC Mod 4.

Similarly, Table 4 (i.e. 2025) of the Supplementary Assessment did not incorporate the predicted negligible change in incremental emissions from the Mount Pleasant Operation described in the Modification 4 AQIA.

Todoroski Air Sciences has therefore prepared revised cumulative PM₁₀ level summary tables in accordance with the Department’s request (Tables 7 and 8 in Enclosure 1). The estimated contributions from the Mount Pleasant Operation and Bengalla Mine have been adjusted based on the estimated worst case net increase in total TSP levels described in the Modification 4 AQIA and BMC Mod 4 AQIA, respectively for 2021 and 2025.

Note during preparation of Tables 7 and 8 in Enclosure 1 Todoroski Air Science identified some transcription errors in the first column of Tables 3 and 4 of the Supplementary Assessment. Notwithstanding, the Department will note that if a comparison is made between Tables 7 and 8 of Enclosure 1 and Tables 3 and 4 of the Supplementary Assessment, no material changes are evident in the individual receptor cumulative PM₁₀ results.

Please do not hesitate to contact the undersigned if the Department requires further information.

Yours faithfully



Chris Lauritzen
General Manager, Resource Development
Mount Pleasant Operation

Enclosure 1

Mount Pleasant and Bengalla Cumulative PM₁₀ Assessment – Additional Information

Table 1: Comparison of MACH Energy and BMC modelling of Bengalla Mine

Assumption	MACH Energy	BMC
Modelled meteorological year	2015	2010
TSP emissions (nearest year comparison)	7,289,184 Year 2018	7,332,934 BMC Mod 4 – Year 4
	7,812,619 Year 2021	8,007,483 BMC Mod 2 – Year 8 8,080,351 Estimated BMC Mod 4 – Year 8 (assumes potential 0.91% increase in emissions associated with MOD4)
	8,336,736 Year 2025	8,729,823 BMC AQIA – Year 15 8,809,264 Estimated BMC Mod 4 – Year 15 (assumes potential 0.91% increase in emissions associated with MOD4)
Number of dust sources	9 – all years	32 – Year 4 24 – Year 8 20 – Year 15
Source allocation	Dust emissions distributed equally across sources	Dust emissions distributed to specific sources according to type and location of activity
Mine terrain + mine plans	No	Yes

Table 2: Incremental modelling predictions for Scenario 2 (approx. 2021) – Modification 4

Receptor ID	PM _{2.5} (µg/m ³)		PM ₁₀ (µg/m ³)		TSP (µg/m ³)		DD (g/m ² /mth)	
	Mount Pleasant Operation impact							
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.		
	25	-	50	-	-	-	2	
Privately-owned receptors								
4	2	0	9	2	5	0.1		
6	3	1	17	4	8	0.1		
19	3	1	17	4	8	0.2		
20	4	1	19	5	10	0.2		
21	4	1	20	5	10	0.2		
23	4	1	21	5	10	0.2		
35	3	1	17	4	7	0.2		
35b	3	1	17	4	8	0.3		
43	1	0	7	1	1	0.0		
44	1	0	4	0	1	0.0		
45	1	0	3	0	1	0.0		
47	0	0	2	0	1	0.0		
67	4	1	22	4	9	0.3		
68	4	1	20	4	8	0.3		
74	4	1	22	4	8	0.3		
77	5	1	24	3	7	0.3		
79	4	1	22	3	6	0.2		
80	4	1	22	3	6	0.2		
82	4	0	18	2	4	0.2		
83	4	0	19	2	4	0.2		
83b	4	0	20	2	5	0.2		
84	4	0	20	2	5	0.2		
84b	1	0	3	1	1	0.1		
86	5	1	25	3	7	0.3		
86b	1	0	5	1	2	0.1		
96	6	1	30	5	10	0.4		
101	6	1	31	5	10	0.4		
102	6	1	31	5	10	0.4		
108	7	1	33	5	11	0.5		
112	7	1	35	6	13	0.6		
118	7	1	35	6	12	0.5		
120	6	1	31	5	11	0.5		
308	6	1	32	5	12	0.5		
120c	6	1	31	5	11	0.5		
121	6	1	31	5	12	0.5		
136	3	0	14	2	3	0.1		
139	2	0	12	1	2	0.0		
140	2	0	9	1	2	0.0		
205	2	0	8	1	3	0.1		
140c	1	0	7	1	3	0.1		
143	2	0	10	1	2	0.0		
161	3	0	14	2	4	0.1		
153	2	0	8	2	4	0.2		
154	3	1	14	3	5	0.1		
156	3	1	15	3	5	0.1		
267	0	0	1	0	0	0.0		
157	3	1	17	2	5	0.1		
266	0	0	1	0	0	0.0		
159	3	0	16	2	4	0.1		
169	2	0	7	1	2	0.1		
171	1	0	6	1	2	0.0		
172	1	0	5	1	2	0.0		

Receptor ID	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		PM ₁₀ ($\mu\text{g}/\text{m}^3$)		TSP ($\mu\text{g}/\text{m}^3$)	DD ($\text{g}/\text{m}^2/\text{mth}$)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
310	1	0	5	1	2	0.0
173	1	0	5	1	2	0.0
174	1	0	5	1	2	0.0
175	1	0	5	1	2	0.0
176	1	0	5	1	2	0.0
177	1	0	5	1	1	0.0
178	1	0	4	1	1	0.0
179	1	0	4	1	1	0.0
180	1	0	4	1	1	0.0
180b	1	0	3	0	1	0.0
180c	1	0	3	0	1	0.0
181	1	0	3	0	0	0.0
183	1	0	3	0	0	0.0
181c	1	0	4	0	1	0.0
182	1	0	3	0	0	0.0
182b	1	0	3	0	0	0.0
189	1	0	6	1	1	0.0
190	1	0	6	1	1	0.0
191	1	0	5	0	1	0.0
192	1	0	6	1	1	0.0
193	1	0	5	0	1	0.0
311	1	0	5	1	1	0.0
193c	1	0	4	0	1	0.0
194	1	0	6	0	1	0.0
195	1	0	6	0	1	0.0
196	1	0	5	1	1	0.0
197	1	0	5	1	1	0.0
195d	1	0	5	1	1	0.0
195e	1	0	6	1	1	0.0
198	1	0	5	1	1	0.1
199	1	0	5	1	1	0.0
200	1	0	4	1	1	0.0
202	1	0	7	1	2	0.1
204	1	0	6	1	2	0.1
203	1	0	7	1	2	0.1
206	3	1	14	3	7	0.2
207	3	1	15	4	8	0.2
207b	3	1	13	3	7	0.1
208	3	1	17	4	8	0.2
315	3	1	17	4	8	0.2
212	2	1	12	3	6	0.1
212b	2	1	12	3	6	0.1
212c	2	1	11	3	6	0.1
213	3	1	15	4	8	0.2
214	3	1	15	4	8	0.2
215	3	1	15	4	8	0.2
216	3	1	16	4	8	0.2
217	3	1	16	4	8	0.2
218	3	1	16	4	8	0.2
219	3	1	16	4	8	0.2
220	3	1	16	4	8	0.2
221	3	1	16	4	8	0.2
222	3	1	16	4	8	0.2
223	3	1	17	4	8	0.2

Receptor ID	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		PM ₁₀ ($\mu\text{g}/\text{m}^3$)		TSP ($\mu\text{g}/\text{m}^3$)	DD ($\text{g}/\text{m}^2/\text{mth}$)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
224	3	1	17	4	8	0.2
225	3	1	16	4	8	0.2
249	0	0	2	0	0	0.0
252	0	0	2	0	0	0.0
252b	0	0	2	0	0	0.0
257	1	0	4	0	1	0.0
258a	1	0	5	0	0	0.0
258b	1	0	4	0	0	0.0
259	1	0	4	0	0	0.0
260	1	0	4	0	0	0.0
261	1	0	3	0	0	0.0
271	0	0	2	0	1	0.0
272	0	0	2	0	1	0.0
272b	0	0	2	0	1	0.0
273	0	0	2	0	1	0.0
280	2	1	10	3	5	0.1
281	2	1	11	3	5	0.1
282	2	1	11	3	5	0.1
283	2	1	11	3	5	0.1
285	2	1	12	3	5	0.2
285b	3	1	13	3	6	0.2
285c	3	1	13	3	6	0.2
286	2	1	12	3	5	0.2
291	2	1	11	3	5	0.1
286c	2	1	12	3	6	0.1
286d	4	0	19	2	5	0.2
287	2	1	12	2	5	0.2
288	2	0	12	2	5	0.2
288b	2	0	12	2	5	0.2
289	3	1	17	3	6	0.2
292	0	0	1	0	0	0.0
298	0	0	2	0	0	0.0
300	0	0	2	0	0	0.0
296a	0	0	2	0	0	0.0
296b	0	0	2	0	0	0.0
302a	0	0	2	0	0	0.0
302b	0	0	1	0	0	0.0
302c	0	0	1	0	0	0.0
305	3	1	15	4	8	0.1
401	1	0	3	0	1	0.0
402	1	0	3	0	1	0.0
407	1	0	3	1	1	0.1
413a	0	0	2	0	1	0.0
413b	0	0	2	0	1	0.0
415	0	0	2	0	1	0.0
416	0	0	1	0	0	0.0
417	0	0	2	0	1	0.0
418	0	0	1	0	0	0.0
419	0	0	2	0	1	0.0
421	0	0	2	0	1	0.0
422a	1	0	4	1	2	0.0
422b	1	0	4	1	2	0.0
434	1	0	2	0	1	0.0
436	1	0	2	0	0	0.0

Receptor ID	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		PM ₁₀ ($\mu\text{g}/\text{m}^3$)		TSP ($\mu\text{g}/\text{m}^3$)	DD ($\text{g}/\text{m}^2/\text{mth}$)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
437	1	0	2	0	1	0.0
453a	0	0	1	0	0	0.0
453b	0	0	1	0	0	0.0
454	0	0	1	0	0	0.0
456	0	0	1	0	0	0.0
458	0	0	1	0	0	0.0
462a	0	0	1	0	0	0.0
462b	0	0	1	0	0	0.0
463	0	0	1	0	0	0.0
464	0	0	1	0	0	0.0
465	0	0	1	0	0	0.0
466	0	0	1	0	0	0.0
467	0	0	2	0	0	0.0
468a	0	0	1	0	0	0.0
468b	0	0	1	0	0	0.0
468c	0	0	1	0	0	0.0
470	0	0	1	0	0	0.0
471	0	0	1	0	0	0.0
472a	0	0	1	0	0	0.0
472b	0	0	1	0	0	0.0
474	0	0	1	0	0	0.0
475	0	0	2	0	0	0.0
476	0	0	1	0	0	0.0
477a	0	0	1	0	0	0.0
477b	0	0	1	0	0	0.0
481	0	0	1	0	0	0.0
482	0	0	1	0	0	0.0
483	0	0	1	0	0	0.0
484	0	0	1	0	0	0.0
485a	0	0	1	0	0	0.0
485b	0	0	1	0	0	0.0
485c	0	0	1	0	0	0.0
485d	0	0	1	0	0	0.0
485e	0	0	1	0	0	0.0
487a	1	0	2	0	0	0.0
487b	1	0	2	0	1	0.0
488a	1	0	3	0	1	0.0
488b	1	0	3	0	1	0.0
526	5	1	22	3	6	0.2
527	3	1	16	2	5	0.2
528	3	1	15	2	5	0.2
529	3	0	15	2	5	0.2
530	3	0	15	2	5	0.2
531	3	0	15	2	5	0.2
532	3	0	15	2	5	0.2
533	3	0	15	2	5	0.2
534	3	0	15	2	5	0.2
535	3	0	15	2	5	0.2
536	3	0	15	2	5	0.2
537	3	0	15	2	5	0.2
538	2	0	12	2	5	0.2
539	2	0	12	2	5	0.2
540	2	0	12	2	5	0.2
541	2	0	12	2	5	0.2

Receptor ID	PM _{2.5} (µg/m ³)		PM ₁₀ (µg/m ³)		TSP (µg/m ³)	DD (g/m ² /mth)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
542	2	0	12	2	5	0.2
543	2	0	12	2	5	0.2
544	2	0	12	2	5	0.2
545	2	0	12	2	5	0.2
546	2	1	13	3	5	0.2
547	1	0	6	0	1	0.0
147	4	0	18	2	4	0.1
158	3	0	16	2	4	0.1
A	1	0	7	1	2	0.1
B	4	0	18	2	4	0.2
C	3	0	16	2	5	0.2
D	2	1	13	3	6	0.2
E	3	1	13	3	6	0.2
F	3	0	14	2	4	0.2
G	3	0	13	2	5	0.2
H	2	0	10	1	3	0.2
I	1	0	3	0	0	0.0
J	3	0	15	2	4	0.2
K	3	0	15	2	4	0.2
L	3	0	16	2	4	0.2
M	3	0	14	2	4	0.2

Note: DD = dust deposition.

Table 3: Difference in incremental modelling predictions for Scenario 2 (approx. 2021) – Modification 3 vs Modification 4

Receptor ID	PM _{2.5} (µg/m ³)		PM ₁₀ (µg/m ³)		TSP (µg/m ³)		DD (g/m ² /mth)	
	Mount Pleasant Operation impact							
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.		
	Air quality impact criteria							
25		-	50	-	-	-	2	
Privately-owned receptors								
4	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.000	
6	0.000	0.000	0.001	-0.001	-0.001	-0.001	0.000	
19	-0.001	0.000	-0.006	-0.001	-0.002	-0.002	0.000	
20	-0.001	0.000	-0.005	-0.001	-0.002	-0.002	0.000	
21	-0.001	0.000	-0.006	-0.001	-0.002	-0.002	0.000	
23	-0.001	0.000	-0.006	-0.002	-0.002	-0.002	0.000	
35	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.000	
35b	0.000	0.000	0.001	-0.001	-0.001	-0.001	0.000	
43	-0.001	0.002	-0.005	0.010	0.017	0.017	0.001	
44	0.000	0.000	-0.002	0.000	0.000	0.000	0.000	
45	0.000	0.000	0.002	0.000	0.000	0.000	0.000	
47	0.001	0.000	0.000	0.002	0.004	0.004	0.000	
67	0.000	0.000	-0.001	-0.001	-0.001	-0.001	0.000	
68	0.000	0.000	-0.001	-0.001	-0.001	-0.001	0.000	
74	0.000	0.000	-0.001	-0.001	-0.001	-0.001	0.000	
77	0.000	0.000	-0.002	0.000	-0.001	-0.001	0.000	
79	0.000	0.000	-0.001	0.000	-0.001	-0.001	0.000	
80	0.000	0.000	-0.002	0.000	-0.001	-0.001	0.000	
82	0.000	0.000	0.000	0.000	-0.001	-0.001	0.000	
83	0.000	0.000	-0.001	0.000	-0.001	-0.001	0.000	
83b	0.000	0.000	-0.001	0.000	-0.001	-0.001	0.000	
84	0.000	0.000	-0.001	0.000	-0.001	-0.001	0.000	
84b	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.000	
86	0.000	0.000	-0.002	0.000	0.000	0.000	0.000	
86b	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
108	0.000	0.000	0.000	0.000	-0.001	-0.001	0.000	
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
120	0.000	0.000	0.000	0.000	-0.001	-0.001	0.000	
308	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
120c	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
136	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	
139	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
205	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	
140c	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
156	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	
267	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
266	0.000	0.000	0.001	0.000	0.000	0.000	0.000	
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Receptor ID	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		PM ₁₀ ($\mu\text{g}/\text{m}^3$)		TSP ($\mu\text{g}/\text{m}^3$)	DD ($\text{g}/\text{m}^2/\text{mth}$)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
310	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000
180	0.000	0.000	0.000	0.000	0.000	0.000
180b	0.000	0.000	0.000	0.000	0.000	0.000
180c	0.000	0.000	0.000	0.000	0.000	0.000
181	0.000	0.000	0.000	0.000	0.000	0.000
183	0.000	0.000	0.000	0.000	0.000	0.000
181c	0.000	0.000	-0.001	0.000	0.000	0.000
182	0.000	0.000	0.000	0.000	0.000	0.000
182b	0.000	0.000	0.000	0.000	0.000	0.000
189	0.000	0.000	-0.001	0.000	0.000	0.000
190	0.000	0.000	-0.001	0.000	0.000	0.000
191	0.000	0.000	-0.001	0.000	0.000	0.000
192	0.000	0.000	-0.001	0.000	0.000	0.000
193	0.000	0.000	0.000	0.000	0.000	0.000
311	0.000	0.000	0.000	0.000	0.000	0.000
193c	0.000	0.000	-0.001	0.000	0.000	0.000
194	0.000	0.000	-0.001	0.000	0.000	0.000
195	0.000	0.000	-0.001	0.000	0.000	0.000
196	0.000	0.000	-0.001	0.000	0.000	0.000
197	0.000	0.000	-0.001	0.000	0.000	0.000
195d	0.000	0.000	-0.001	0.000	0.000	0.000
195e	0.000	0.000	-0.001	0.000	0.000	0.000
198	0.000	0.000	-0.001	0.000	0.000	0.000
199	0.000	0.000	-0.001	0.000	0.000	0.000
200	0.000	0.000	-0.001	0.000	0.000	0.000
202	0.000	0.000	0.000	0.000	0.000	0.000
204	0.000	0.000	0.000	0.000	0.000	0.000
203	0.000	0.000	-0.001	0.000	0.000	0.000
206	-0.001	0.000	-0.005	-0.001	-0.002	0.000
207	-0.001	0.000	-0.007	-0.001	-0.002	0.000
207b	-0.001	0.000	-0.006	-0.001	-0.002	0.000
208	-0.001	0.000	-0.006	-0.001	-0.002	0.000
315	-0.001	0.000	-0.006	-0.001	-0.002	0.000
212	-0.001	0.000	-0.001	-0.001	-0.002	0.000
212b	-0.001	0.000	-0.002	-0.001	-0.002	0.000
212c	-0.001	0.000	-0.002	-0.001	-0.002	0.000
213	-0.001	0.000	-0.005	-0.001	-0.002	0.000
214	-0.001	0.000	-0.005	-0.001	-0.002	0.000
215	-0.001	0.000	-0.005	-0.001	-0.002	0.000
216	-0.001	0.000	-0.005	-0.001	-0.002	0.000
217	-0.001	0.000	-0.006	-0.001	-0.002	0.000
218	-0.001	0.000	-0.005	-0.001	-0.002	0.000
219	-0.001	0.000	-0.005	-0.001	-0.002	0.000
220	-0.001	0.000	-0.005	-0.001	-0.002	0.000
221	-0.001	0.000	-0.006	-0.001	-0.002	0.000
222	-0.001	0.000	-0.006	-0.001	-0.002	0.000
223	-0.001	0.000	-0.006	-0.001	-0.002	0.000

Receptor ID	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		PM ₁₀ ($\mu\text{g}/\text{m}^3$)		TSP ($\mu\text{g}/\text{m}^3$)	DD ($\text{g}/\text{m}^2/\text{mth}$)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
224	-0.001	0.000	-0.006	-0.001	-0.002	0.000
225	-0.001	0.000	-0.006	-0.001	-0.002	0.000
249	0.000	0.000	0.000	0.000	0.000	0.000
252	0.000	0.000	0.002	0.000	0.000	0.000
252b	0.000	0.000	0.001	0.000	0.000	0.000
257	0.003	0.000	0.016	0.000	0.000	0.000
258a	0.002	0.000	0.013	0.000	0.000	0.000
258b	0.001	0.000	0.003	0.000	0.000	0.000
259	0.002	0.000	0.012	0.000	0.000	0.000
260	0.002	0.000	0.013	0.000	0.000	0.000
261	0.001	0.000	0.008	0.000	0.000	0.000
271	0.000	0.000	0.000	0.000	0.000	0.000
272	-0.001	0.000	-0.007	-0.001	-0.002	0.000
272b	-0.001	0.000	-0.007	-0.001	-0.002	0.000
273	-0.001	0.000	-0.005	-0.001	-0.001	0.000
280	0.000	0.000	0.001	-0.001	-0.001	0.000
281	0.000	0.000	0.001	-0.001	-0.001	0.000
282	0.000	0.000	0.001	-0.001	-0.001	0.000
283	0.000	0.000	0.002	-0.001	-0.001	0.000
285	0.000	0.000	-0.003	-0.001	-0.001	0.000
285b	-0.001	0.000	-0.002	-0.001	-0.001	0.000
285c	0.000	0.000	-0.003	-0.001	-0.001	0.000
286	0.000	0.000	-0.003	-0.001	-0.001	0.000
291	-0.001	0.000	-0.005	-0.001	-0.002	0.000
286c	-0.001	0.000	-0.006	-0.001	-0.002	0.000
286d	0.000	0.000	-0.001	0.000	-0.001	0.000
287	-0.001	0.000	-0.003	-0.001	-0.001	0.000
288	0.000	0.000	-0.003	-0.001	-0.001	0.000
288b	-0.001	0.000	-0.003	-0.001	-0.001	0.000
289	0.000	0.000	0.000	-0.001	-0.001	0.000
292	0.000	0.000	0.000	0.000	0.000	0.000
298	0.000	0.000	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000	0.000	0.000
296a	0.000	0.000	0.000	0.000	0.000	0.000
296b	0.000	0.000	0.000	0.000	0.000	0.000
302a	0.000	0.000	0.000	0.000	0.000	0.000
302b	0.000	0.000	0.000	0.000	0.000	0.000
302c	0.000	0.000	0.000	0.000	0.000	0.000
305	-0.001	0.000	-0.004	-0.001	-0.002	0.000
401	0.000	0.000	0.000	-0.001	-0.001	0.000
402	0.000	0.000	0.000	-0.001	-0.001	0.000
407	0.000	0.000	0.000	-0.001	-0.001	0.000
413a	-0.001	0.000	-0.006	-0.001	-0.001	0.000
413b	-0.001	0.000	-0.006	-0.001	-0.001	0.000
415	-0.001	0.000	-0.004	0.000	-0.001	0.000
416	0.000	0.000	0.002	0.000	0.000	0.000
417	0.000	0.000	-0.001	0.000	0.000	0.000
418	0.000	0.000	0.002	0.000	0.000	0.000
419	-0.001	0.000	-0.007	-0.001	-0.001	0.000
421	-0.001	0.000	-0.005	-0.001	-0.001	0.000
422a	0.000	0.000	0.000	0.000	0.000	0.000
422b	0.000	0.000	0.000	0.000	0.000	0.000
434	0.000	0.000	0.000	0.000	0.000	0.000
436	0.000	0.000	0.000	0.000	0.000	0.000

Receptor ID	PM _{2.5} (µg/m ³)		PM ₁₀ (µg/m ³)		TSP (µg/m ³)	DD (g/m ² /mth)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
437	0.000	0.000	0.000	0.000	0.000	0.000
453a	0.000	0.000	0.002	0.000	0.000	0.000
453b	0.000	0.000	0.002	0.000	0.000	0.000
454	0.000	0.000	0.002	0.000	0.000	0.000
456	0.000	0.000	0.000	0.000	0.000	0.000
458	0.000	0.000	0.000	0.000	0.001	0.000
462a	0.000	0.000	-0.002	0.000	0.000	0.000
462b	0.000	0.000	-0.002	0.000	0.000	0.000
463	0.000	0.000	0.000	0.000	0.000	0.000
464	0.000	0.000	0.001	0.000	0.000	0.000
465	0.000	0.000	0.001	0.000	0.000	0.000
466	0.000	0.000	0.000	0.000	0.000	0.000
467	0.000	0.000	0.000	0.000	0.000	0.000
468a	0.000	0.000	0.000	0.000	0.000	0.000
468b	0.000	0.000	0.000	0.000	0.000	0.000
468c	0.000	0.000	0.000	0.000	0.000	0.000
470	0.000	0.000	0.000	0.000	0.000	0.000
471	0.000	0.000	0.000	0.000	0.000	0.000
472a	0.000	0.000	0.000	0.000	0.000	0.000
472b	0.000	0.000	0.000	0.000	0.000	0.000
474	0.000	0.000	0.000	0.000	0.000	0.000
475	0.000	0.000	0.000	0.000	0.000	0.000
476	0.000	0.000	0.000	0.000	0.000	0.000
477a	0.000	0.000	0.000	0.000	0.000	0.000
477b	0.000	0.000	0.000	0.000	0.000	0.000
481	0.000	0.000	0.000	0.000	0.000	0.000
482	0.000	0.000	0.000	0.000	0.000	0.000
483	0.000	0.000	0.000	0.000	0.000	0.000
484	0.000	0.000	0.000	0.000	0.000	0.000
485a	0.000	0.000	0.000	0.000	0.000	0.000
485b	0.000	0.000	0.000	0.000	0.000	0.000
485c	0.000	0.000	0.000	0.000	0.000	0.000
485d	0.000	0.000	0.000	0.000	0.000	0.000
485e	0.000	0.000	0.000	0.000	0.000	0.000
487a	0.000	0.000	0.000	0.000	0.000	0.000
487b	0.000	0.000	0.000	0.000	0.000	0.000
488a	0.000	0.000	0.000	0.000	0.000	0.000
488b	0.000	0.000	0.000	0.000	0.000	0.000
526	0.000	0.000	-0.002	0.000	-0.001	0.000
527	0.000	0.000	0.001	-0.001	-0.001	0.000
528	0.000	0.000	0.000	-0.001	-0.001	0.000
529	0.000	0.000	0.000	-0.001	-0.001	0.000
530	0.000	0.000	0.000	-0.001	-0.001	0.000
531	0.000	0.000	0.000	-0.001	-0.001	0.000
532	0.000	0.000	0.000	-0.001	-0.001	0.000
533	0.000	0.000	0.000	-0.001	-0.001	0.000
534	0.000	0.000	0.001	-0.001	-0.001	0.000
535	0.000	0.000	0.000	-0.001	-0.001	0.000
536	0.000	0.000	0.000	-0.001	-0.001	0.000
537	0.000	0.000	0.000	-0.001	-0.001	0.000
538	-0.001	0.000	-0.007	-0.001	-0.001	0.000
539	-0.002	0.000	-0.007	-0.001	-0.001	0.000
540	-0.002	0.000	-0.007	-0.001	-0.001	0.000
541	-0.002	0.000	-0.007	-0.001	-0.001	0.000

Receptor ID	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		PM ₁₀ ($\mu\text{g}/\text{m}^3$)		TSP ($\mu\text{g}/\text{m}^3$)	DD ($\text{g}/\text{m}^2/\text{mth}$)
	Mount Pleasant Operation impact					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	25	-	50	-	-	2
542	-0.001	0.000	-0.008	-0.001	-0.001	0.000
543	0.000	0.000	-0.007	-0.001	-0.001	0.000
544	-0.001	0.000	-0.003	-0.001	-0.001	0.000
545	-0.001	0.000	-0.003	-0.001	-0.001	0.000
546	0.000	0.000	-0.003	-0.001	-0.001	0.000
547	0.000	0.000	-0.001	0.000	0.000	0.000
147	0.000	0.000	-0.001	0.000	0.000	0.000
158	0.000	0.000	-0.001	0.000	0.000	0.000
A	0.000	0.000	-0.001	0.000	0.000	0.000
B	0.000	0.000	-0.001	0.000	-0.001	0.000
C	0.000	0.000	0.000	-0.001	-0.001	0.000
D	0.000	0.000	-0.001	-0.001	-0.002	0.000
E	-0.001	0.000	-0.006	-0.001	-0.002	0.000
F	0.000	0.000	0.000	-0.001	-0.001	0.000
G	-0.001	0.000	-0.005	-0.001	-0.001	0.000
H	0.000	0.000	-0.001	0.000	0.000	0.000
I	0.000	0.000	0.000	0.000	0.000	0.000
J	0.000	0.000	-0.002	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	-0.001	0.000
L	0.000	0.000	-0.001	0.000	-0.001	0.000
M	0.000	0.000	0.000	0.000	-0.001	0.000

Table 4: Summary of PM_{2.5} modelling predictions at selected receptors in Scenario 1 (approx. 2018) (µg/m³)

MACH Energy Receptor ID	Incremental level			Cumulative total level (including other mines [e.g. Mt Arthur] and background)	
	Approved Mount Pleasant Operation incorporating Mount Pleasant MOD3 (Mount Pleasant modelled)	Bengalla Mine		Mount Pleasant modelled	Bengalla contribution adjusted to match Bengalla modelled*
		Mount Pleasant modelled	Bengalla modelled*		
4	1	1	1	5.3	5.3
6	1	1	1	5.7	5.7
20	1	1	1	5.5	5.5
21	1	1	1	5.5	5.5
43	0	1	2	4.9	6.0
487a	0	0	0	4.3	4.4
487b	0	0	0	4.2	4.4
488a	0	0	1	4.9	5.2
488b	0	0	1	4.6	4.9

Table 5: Summary of PM_{2.5} modelling predictions at selected receptors in Scenario 2 (approx. 2021) (µg/m³)

MACH Energy Receptor ID	Incremental level			Cumulative total level (including other mines [e.g. Mt Arthur] and background)	
	Approved Mount Pleasant Operation incorporating Mount Pleasant MOD4 (Mount Pleasant modelled)	Bengalla Mine		Mount Pleasant modelled	Bengalla contribution adjusted to match Bengalla modelled*
		Mount Pleasant modelled	Bengalla modelled*		
4	0	1	1	4.8	4.6
6	1	1	1	5.1	4.9
20	1	1	1	4.9	4.8
21	1	1	1	5.0	4.8
43	0	1	3	5.0	6.7
487a	0	0	0	4.6	4.7
487b	0	0	0	4.5	4.7
488a	0	0	1	5.6	5.8
488b	0	0	1	5.2	5.5

*Adjusted to account for potential increase of 0.91% for total dust emissions due to BMC Mod 4.

Table 6: Summary of PM_{2.5} modelling predictions at selected receptors in Scenario 3 (approx. 2025) (µg/m³)

MACH Energy Receptor ID	Incremental level			Cumulative total level (including other mines [e.g. Mt Arthur] and background)	
	Approved Mount Pleasant Operation incorporating Mount Pleasant MOD3 (Mount Pleasant modelled)**	Bengalla Mine		Mount Pleasant modelled**	Bengalla contribution adjusted to match Bengalla modelled*
		Mount Pleasant modelled	Bengalla modelled*		
4	1	1	1	4.6	4.4
6	1	1	1	5.0	4.7
20	1	1	1	4.9	4.6
21	1	1	1	5.0	4.6
43	0	1	3	5.6	7.4
487a	0	0	1	5.0	5.4
487b	0	0	1	4.9	5.4
488a	0	0	1	6.3	6.9
488b	0	0	1	5.6	6.5

* Adjusted to account for potential increase of 0.91% for total dust emissions due to BMC Mod 4.

** Adjusted to account for potential increase of 0.03% for total dust emissions due to Modification 4.

Table 7: Revised summary of PM₁₀ predictions at selected receptors in Scenario 2 (approx. 2021) – Incorporating BMC Mod 4 ($\mu\text{g}/\text{m}^3$)

MACH Energy Receptor ID	Incremental level		Cumulative total level (including other mines [e.g. Mt Arthur] and background)		
	Approved Mount Pleasant Operation incorporating Mount Pleasant MOD4 (Mount Pleasant modelled)	Bengalla Mine		Mount Pleasant modelled	Bengalla contribution adjusted to match Bengalla modelled*
		Mount Pleasant modelled	Bengalla modelled*		
4	2	10	6	20	16
6	4	11	7	23	19
20	5	8	5	22	19
21	5	9	6	22	19
43	1	14	21	26	33
487a	0	4	3	22	21
487b	0	5	3	22	21
488a	0	6	4	34	32
488b	0	7	5	29	27

* Adjusted to account for potential increase of 0.91% for total dust emissions due to BMC Mod 4.

Table 8: Revised summary of PM₁₀ predictions at selected receptors in Scenario 3 (approx. 2025) – Incorporating BMC Mod 4 and Modification 4 ($\mu\text{g}/\text{m}^3$)

MACH Energy Receptor ID	Incremental level		Cumulative total level (including other mines [e.g. Mt Arthur] and background)		
	Approved Mount Pleasant Operation incorporating Mount Pleasant MOD3 (Mount Pleasant modelled)**	Bengalla Mine		Mount Pleasant modelled**	Bengalla contribution adjusted to match Bengalla modelled*
		Mount Pleasant modelled	Bengalla modelled*		
4	3	8	5	17	14
6	5	10	5	21	17
20	6	7	4	21	18
21	6	8	4	21	18
43	1	22	22	32	32
487a	0	5	5	27	27
487b	0	6	6	26	26
488a	0	7	7	42	42
488b	0	8	9	34	35

* Adjusted to account for potential increase of 0.91% for total dust emissions due to BMC Mod 4.

** Adjusted to account for potential increase of 0.03% for total dust emissions due to Modification 4.