CPM Ref: DR043992

CITIC PACIFIC MINING

8 June 2017

Attention: Anthony Sutton, Director Assessment and Compliance Division
Anthony.Sutton@epa.wa.gov.au

Office of the Environmental Protection Authority
The Atrium, Level 8
168 St Georges Terrace
PERTH WA 6000

Dear Mr Sutton,

SINO IRON MINE CONTINUATION PROPOSAL – SUPPLEMENTARY INFORMATION – ENVIRONMENTAL PROTECTION ACT 1986

CITIC Pacific Mining Management Pty Ltd (CPM) referred the Sino Iron Mine Continuation Proposal (the Proposal) to the EPA on 15 February 2017. The referral included a supporting Environmental Review Document (ERD). Following consultation with the Office of the Environmental Protection Authority (OEPA) Strategen prepared a 'Summary of Key Issues' paper dated 23 May 2017 (Summary).

Following a review of the Summary, the OEPA has sought further clarification on the following three points in relation to the Proposal:

- potential groundwater drawdown impacts on Groundwater Dependent Vegetation (GDV);
- management of fibrous minerals; and
- scope and timing of vegetation surveys and scale of vegetation mapping.

This letter has been prepared to provide the additional information sought by the OEPA to facilitate the assessment of the Proposal.

Potential Groundwater Drawdown Impacts on Groundwater Dependent Vegetation

OEPA comment:

> *"With respect to the potential for groundwater drawdown induced by mine dewatering to affect GDV, the data provided in the second-last paragraph on page five about the extent of drawdown across areas of vegetation with high, moderate and low dependence on groundwater are useful. To set these data in context, we also need to know what the extent (in hectares) of vegetation with high, moderate and low dependence on groundwater is across the Fortescue River floodplain. In that way, the areas that may be affected by the proposal can be understood in the context of the extent of similar vegetation that is not likely to be affected."*

CPM Response:

Table 1 has been prepared to provide additional context on the effect of the groundwater drawdown on the Fortescue River floodplain as shown in Figure 1 of the Summary. Astron (2008) determined the total mapped extent of GDV in the Fortescue River floodplain is approximately 22 000 ha. As shown in Table 1, the majority of the mapped extent of the GDV is considered moderately dependent.

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Within the extent of the 0.5 m drawdown contour there is approximately 5155 ha of GDV, which equates to approximately 23% of the total mapped extent. Although this includes 100% of the high dependent GDV, as identified in the Summary, a drawdown in this area is not expected to result in a measurable change.

The area of GDV within the 5.0 m drawdown (which is located entirely within the 0.5 m contour) is substantially less than the 0.5 m contour and is approximately 370 ha (or less than 2% of the total mapped extent). While this includes 28.3 ha (or 16.5%) of the high dependent GDV, this impact is not expected to have a significant impact as the high dependent vegetation occurs on major watercourses which will continue to flow in response to regional rainfall events. The area of GDV within the 10.0 m drawdown (which is located entirely within the 0.5 m and 5.0 m contours) is approximately 164 ha or less than 1% of the total extent.

Overall the groundwater drawdown will not significantly affect the extent of GDV in the area.

Table 1: Area of groundwater dependent vegetation in the Fortescue River Floodplain affected by groundwater drawdown

GDV Dependency	Total mapped extent (ha)	Extent within 0.5 m drawdown		Extent within 5.0 m drawdown		Extent within 10.0 m drawdown	
		ha	%	ha	%	ha	%
High	171.1	171.1	100.0	28.3	16.5	0.0	0.0
Moderate	21 984.0	4984.0	22.7	342.3	1.6	164.2	0.7
Low	93.3	0.0	0.0	0.0	0.0	0.0	0.0
Total	22 248.5	5155.1	23.2	370.6	1.7	164.2	0.7

Fibrous Minerals

OEPA comment:

> *The OEPA notes the quotations on pages 16 and 17 of the 'Summary', cited from Brian Bell's peer review of air quality. In particular we note the reviewer's remarks that the significant increase in the area of disturbance will result in an increased risk to air quality (dust and fibrous minerals). We also note the conclusion that changes to the relevant management plans and procedures should be discussed to provide increased confidence in air quality outcomes.*
>
> *In view of these recommendations from the peer reviewer, what process of review has been undertaken for the FMMP and other relevant documents and what changes are proposed to ensure that the increased risks to air quality from dust and fibrous minerals posed by the current proposal are properly managed? It is important for the EPA to have an understanding of the changes proposed to ensure these increased risks could be managed before it finalises its report and recommendations on the current proposal.*

CPM Response:

For the following reasons, CPM is confident that it will continue to meet the EPA objective for air quality. It is worth noting the peer reviewer concluded:

> *CPM has demonstrated its ability to comply with the EPA's objective for air quality for the existing Sino Iron Operations and the reviewer considers that this can continue to be achieved with the Continuation Proposal.*

The Peer Review identified that although the risks associated with the additional disturbance will increase, the site is currently being well managed. Specifically, Brian Bell identifies the following:

Dust and fibrous mineral emissions are currently being well managed based on the monitoring results and the low number of exceedances of the triggers and guidelines that are occurring. With regards to the Continuation Proposal, the reviewer considers that the significant increase in the area of disturbance will result in an increased risk to air quality (dust and fibrous minerals) as a result of fugitive emissions.

CPM will continue to manage the Proposal to meet air quality objectives and targets. Its processes have continual improvement as a structural requirement. Further, the proposed increase in the area of disturbance will be incremental and any increased risk to air quality will be identified and managed as it arises.

To effect the above, CPM has established and implemented an Environmental Management System (EMS) to ensure CPM proactively manages its environmental risk, objectives and targets and meets statutory obligations during the operations phase. The key instruments to achieving the ongoing management performance are the Operational Environmental Management Plan (OEMP) and the Fibrous Minerals Management Plan (FMMP). The OEMP and FMMP included in Appendix 3 of the ERD are both considered live documents throughout the life of the Proposal and (particularly in the context of the continuous improvement embedded in them) meet the necessary requirements to continue to manage dust and fibrous minerals associated with the Proposal.

The EMS includes a requirement for ongoing performance evaluation and improvement. The intent of this standard is to ensure environmental performance is monitored, measured, audited and reviewed to determine progress, assess compliance, identify trends and drive continuous improvement. Both the OEMP and FMMP identify the need for evaluation of results, review of performance and ongoing adaptive management to provide ongoing continuous improvement. The onsite dust monitoring program will also continue to be reported on in the annual environmental report. The objective, management actions, monitoring targets and reporting requirements are summarised in Table 2.

Table 2: Summary of dust management outlined in the OEMP

Element	Details
Objective	Dust – Manage increased dust as a result of the mine, ore storage and transfer facilities to avoid significant environmental impacts.
Management Actions	Manage dust emissions across the Project site through implementation of the following actions: • maximise efficiency of loads when transporting ore or concentrate (including haul trucks and conveyers) • use dust covers on machinery and water suppressants on exposed areas wherever required • minimise open area footprint and rehabilitate or cover (using vegetation, rock, water and/or dust suppressant) exposed areas as soon as practicable • implement good housekeeping practices including ensuring that product spills are cleaned up as soon as possible, and water sprays and emissions control equipment is properly maintained • reduce vehicle traffic on unsealed roads and other exposed areas, where practicable • use real time ambient monitoring to respond to elevated dust emissions associated with the project • ensure that the Project's workforce is aware of the importance of appropriate dust management controls and reporting/actions required when elevated dust emissions are observed.
Monitoring Targets	Monitor PM10 dust level and utilise an internal dust trigger limit of 250µg/m3 over a 1 hour period to facilitate managing the average daily PM10 dust guideline of 70µg/m3
Reporting	The following will be reported to OEPA as defined in the reporting schedule of Section 6 of the OEMP: • ambient dust, as PM10 dust level monitoring results

Fibrous Minerals Management

The ongoing review and continuous improvement of fibrous minerals management is an organisation priority, led by the Chief Executive Officer, and delivered through a transparent process where roles, responsibilities and accountabilities are clearly defined. Responsibility for the development, improvement and oversight of the FMMP rests with the CEO and Board. The CEO and Board will satisfy themselves of the ongoing effectiveness of all aspects of fibrous minerals management through reporting mechanisms from the fibrous minerals management committee (every second month), steering committee (monthly) and departmental fibre matters meetings (monthly). This management review is outlined in the FMMP.

Progressive rehabilitation

Progressive rehabilitation will also assist in reducing dust emission sources and CPM is committed to progressive rehabilitation. Trials on the waste rock landforms have already commenced and some examples were provided in Appendix E of the Conceptual Closure Plan submitted with the ERD. The trials have been based on results of soil characterisation studies and landform modelling completed for CPM by Landloch. Progressive rehabilitation trials will continue with plans for further work on the TSF once the TSF landform is at a point where trials can commence, likely after 2021.

Vegetation Surveys

OEPA comment [section references are to the Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment, EPA 2016]:

> *I note that the Maunsell 2008 vegetation survey does not appear to meet EPA guidance and provide the following comments relating to this.*
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> *5.0 sampling, 6.2 survey effort and 6.3 site selection – locations of quadrats should be provided with the vegetation mapping to show adequate sampling regime of "at least" 3 quadrats per vegetation unit, where the vegetation unit is small and restricted. If a vegetation unit is widespread, sampling should be undertaken throughout its extent. No quadrat data was provided outside of the PATN analysis. Currently, it is not possible from the mapping provided to determine if there was a sufficient sampling effort within each vegetation unit.*
>
> *6.4 survey timing –, there is no evidence provided that survey(s) were undertaken during optimal timing for the Pilbara.*
>
> *8.0 vegetation – the vegetation mapping does not follow the guidance, using land systems instead of NVIS to describe vegetation. Additionally it is not possible to determine if the scale of the mapping is suitable to describe vegetation units at a local scale. As stated previously however, the historical vegetation mapping does appear to describe the vegetation well at a broad-scale.*

CPM Response:

Maunsell 2008 Report

The flora and vegetation assessment was based on a number of flora and vegetation reports, not just the Maunsell 2008 report. A number of reports concerning the area already exist and these were considered to provide a comprehensive assessment of the potential impacts of the Proposal in the Cape Preston area. Given the extent of the Cape Preston area and the lead time required to undertake surveys, the existing surveys were used to assess the potential impacts of the Proposal. This approach was endorsed by the Peer Reviewer (refer below for detail).

The Maunsell 2008 Report is a historical report, which was the basis for the Public Environmental Review for the Balmoral South Project. The report was prepared to meet the requirements of a 'Level 2' detailed vegetation and flora survey in accordance with EPA *Guidance Statement 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (GS51). The Minister approved the Balmoral South Project in Statement 823. The EPA report for that Project did not identify any issues regarding the validity of any of the flora and vegetation reports. This report was accessed from the EPA website *http://www.epa.wa.gov.au/proposals/balmoral-south-iron-ore-project-cape-preston-wa*.

As the impacts to flora and vegetation associated with the Balmoral South Project were approved on the basis of the Maunsell Report, the Report was considered to be an appropriate reference, particularly given that it is only one of a number of reports to which reference is made.

Consultation with the OEPA on the Proposal began in November. At this meeting CPM identified its intention to have existing flora and vegetation reports peer reviewed to confirm that they were satisfactory. Preparation of the ERD began in 2016, with the peer review of the previous reports concluding on 7 December 2016.

Subsequent to the consultation with the OEPA and the finalisation of the peer review of flora and vegetation reports, the EPA released *Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment (December 2016)* (Revised Guidance) on 13 December 2016. The EPA memo *Questions and Answers - The EPA's Guidelines and Procedures Framework introduction of the new guidelines* identifies that new guidelines:

> *"will also apply to proposals currently being assessed, to the extent that it is appropriate and practicable to do so. If application of these procedures is neither appropriate nor practicable, the administrative procedures applying at the time the decision was made on the level of assessment for the proposal will apply to that proposal."*

As identified earlier, the Proposal was referred to the EPA on 15 February 2017 (with the EPA determined the level of assessment on 10 April 2017 to be 'Assess- Referral information'). Based on the timing of the referral (two months from the introduction of the Revised Guidance – and after the peer review had been completed) CPM considers that the Proposal should be assessed in consideration of the transition between the two guidelines. The work done to categorise the flora and vegetation values of the area involved multiple surveys, which collectively meet the previous guidelines and have been previously accepted.

Quadrat sampling, survey effort and site selection

Collectively, a total of 155 quadrats were established and recorded as part of the Maunsell 2008 report. Location of quadrats are provided in Figures 5.01 to 5.14 of that report. The sampling intensity was consistent with the requirements of a Level 2 Survey under GS51. Subsequent to the report additional surveys (i.e. Aecom 2009 and Astron 2009) contributed additional quadrats within the vegetation units already identified, such that the subsequent assessments supplemented the previous sampling effort of the Maunsell report. Accordingly, the Maunsell report is useful in this context for providing more aggregate information.

The objective of the Revised Guidance remains the same as GS51. That objective is to ensure the adequate characterisation of flora and vegetation in an environmental impact assessment. As confirmed by the peer review, this objective has been achieved for the Proposal. Thus, although the Revised Guidance prescribes a higher survey intensity than was previously required for the Maunsell survey, subsequent surveys of the area were conducted that expanded the mapped extent of flora and vegetation values over approximately 53 000 ha. On the basis of the extensive additional surveys the flora and vegetation values across the area are considered to be adequately described.

Survey timing

The Survey was undertaken in July 2006. In this year there was substantial late rain recorded at Mardie Station, including 124.6 mm recorded in April before the survey. The report has a flora and vegetation survey limits section (4.1) that does not identify any limits as a result of the timing or lack of rainfall. The Peer Review (Mattiske 2016) of the work identified that the timing of the survey was not an issue, as identified below:

> *Despite some variations in scope and coverage by the different specialists it is apparent that a substantial amount of flora and vegetation studies have been undertaken over a range of seasons (both following the rainfall cyclonic months and the drier months). The specialists involved with the work have had many years of experience in botanical and ecological studies in the Pilbara and therefore this has not been a limitation on the efforts at various times in this project area. The unreliability of seasonal rains in the Pilbara region is an ongoing issue. In this instance any concerns related to the timing are minimized by a few favorable rainfall events prior to several of the assessments (Maunsell 2008; Astron 2009b) and through the experience level of the specialists undertaking the studies at Cape Preston.*

Vegetation mapping

While the vegetation assessment was labelled and grouped according to landform within the Land System, the vegetation communities were defined on the basis of PATN analysis. Section 2.3 of GS51 only specifies the requirement for surveys to demonstrate, where possible, that information has been collected so that it is compatible with NVIS protocols. The Revised Guidance identifies that "vegetation units should be described at NVIS Level III – Broad Floristic Formation for regional scale and cumulative impact assessment."

The NVIS structural / floristic components required in Table 4 of the Revised Guidance identifies the following description requirements "Dominant growth form, cover, height and dominant land cover genus for the uppermost or dominant stratum." Section 6.2 of the Maunsell report describes vegetation code and the structural and floristic details (i.e. Ld2 *Acacia coriacea, A. bivenosa* open shrubland to shrubland over scattered grasses).

By using vegetation communities defined on the basis of PATN analysis the assessment is consistent with the NVIS requirements. Specifically, the report identifies in Section 3.1.3:

> *"All raw site data from the 2006 flora assessment was submitted for analysis to Mr Ted Griffin, a local PATN expert. Data was entered into an Access database containing the entire suite of the Western Australian Flora. The database permits corrections to spelling mistakes and other nomenclature and then accurate data is statistically analysed using PATN (Belbein, 1987) Analysis. The PATN Analysis was used to determine which quadrats (and therefore vegetation communities) are floristically similar. The comparisons were run twice, using presence / absence data and percentage cover / dominance data. The presence/absence data was found to be most appropriate for assessing the regional nature of the variation in site composition of quadrat data in earlier analysis of the Pilbara bioregion (Ted Griffin pers. comm.).*
>
> *Several modules of the numerical classification package PATN (Belbein, 1987) were used for the analysis. The Griffin (2006) report explains these methods and discusses some of the results of the analysis (Appendix A). The quadrat data used for the PATN analysis is included as Appendix B. The qualitative results of PATN analysis were used to refine the classification and distribution of vegetation communities identified in the field."*

Accordingly, the Maunsell 2008 report is useful for its cumulative value and for the data contained within it. It is not relied upon as a stand-alone document and the information contained within it, in the context of the other material referred to, provides EPA with a broader basis of information upon which to make an assessment.

In the context of the above, the minor inconsistency between the survey as recorded in Maunsell 2008 and the Revised Guidance does not in any way undermine the objective of the Guidance or give rise to any risk that a significant environmental value will be overlooked in the assessment of the Proposal. We draw the EPA attention to the peer reviewer's statement that:

> *"Based on the extent of the surveys, the multiple seasons in which surveys were conducted and the highly experienced personnel conducting the surveys it is unlikely that any additional species of Threatened or Priority Flora would be recorded by additional survey."*

Further, the Peer reviewer has subsequently addressed the potential for changes to the vegetation and considers any changes to be unlikely. Specifically, the peer reviewer provided the following (pers. comms. E. Mattiske 8/06/2017):

> *"Based on the extensive history of grazing and continued grazing pressures and existing weed infestations, the overall condition of the vegetation is unlikely to be substantially different from the previous surveys as these impacts have occurred for many years in this project area. Consequently, the vegetation condition is unlikely to have changed a great deal; although seasonal conditions may influence the variety of species in some areas."*

If you would like to discuss any aspect of our response further, please don't hesitate to contact me on (08) 9226 8316 or email Bruce.Watson@citicpacificmining.com .

Yours sincerely
CITIC Pacific Mining Management Pty Ltd

Bruce Watson
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