BHP Mitsubishi Alliance

Appendix Q

Request for Information Addendum

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1 Introduction

This addendum document provides the Proponent's response to the Independent Expert Scientific Committee's (IESC) feedback, on behalf of the administering authority. Additional comments were also received from DCCEEW, however these comments have since been addressed in the latest version of the Preliminary Documentation Report.

2 Responses to IESC Request for Information

2.1 BMA Response to Requested Action 1

Requested Action 1: *The project proposes controlled releases of mine-affected water to Cherwell Creek, with uncontrolled spills possible from multiple sediment dams and mine-affected water dams to Horse, Caval, Cherwell and Nine Mile creeks (SLR 2021b, Figure 3-2, p. 42). Releases of mine-affected and/or sediment-laden water will alter the water quality of these creeks. The scale and extent of these impacts, and the potential to affect water quality within the Isaac River, remain unclear from the information provided. Controlled releases are likely to average approximately 50 ML/year but may be over 1,000 ML/year under unusually wet conditions. Uncontrolled releases are only expected under unusually wet conditions and may also be over 1,000 ML/ year (SLR 2021b, Figures 5-4 and 5-5, p. 59). The proportional impacts that these event releases may have on the receiving environment have not been discussed, nor have their expected duration and potential impacts on the downstream flow regime. This information is needed to assess the likely scale and extent of impacts from the proposed releases on water resources.*

Section 5.2.3.1 of the Preliminary Documentation has been updated to address this action.

2.2 BMA Response to Requested Action 2

Requested Action 2: *Aquatic biota, stygofauna in the saturated alluvial sediments of Isaac River, terrestrial GDEs and EPBC Act-listed fish (Silver perch) and turtle species (White-throated snapping turtle and Fitzroy River turtle) could potentially be affected by altered water quality and/or flow regimes due to the controlled and uncontrolled releases. Further information and assessment are needed to understand the likely scale and extent of downstream impacts from releases of mine-affected and/or sediment-laden water as detailed below in Paragraphs 3-5, 8-10, 14, 16-18 and 24.*

Section 4.4.5.4 of the Preliminary Documentation has been updated to address this action.

2.3 BMA Response to Requested Action 3

Requested Action 3:*The proponent's water management system pumps all water, both mine-affected and clean water, into separate dams situated together to be released at the same location (SLR 2021b, Figure 3-2, p. 42). Information about the volume and frequency of predicted releases, past release events, and emergency releases is limited. The proponent should provide more detailed information on all potential release types as this is needed to understand the likely scale of potential impacts from releases on water levels, flow and quality and the possible extent of impacts downstream. For example, runoff from the out-of-pit waste rock dump may potentially carry contaminated sediments to sediment dams N3H and N3G that may have uncontrolled releases into Horse Creek.*

Sections 4.3.2.3, 4.4.5.4 and **5.2.3.6** of the Preliminary Documentation has been updated to address this action.

2.4 BMA Response to Requested Action 4

Requested Action 4: *The proponent has provided water quality data for sampling undertaken in December 2019 and April 2020 (ESP 2021, Table 4-1, p. 43), noting that the water quality frequently exceeded the WQOs (ESP 2021, p. 42). The EA specifies a flow trigger of >0.5 m3/s to commence release of mine-affected water. However, it is unclear whether this dilution is sufficient to prevent exceedances of all WQOs. The IESC notes that these exceedances could have adverse impacts on aquatic biota, GDEs and EPBC Act-listed species downstream. The proponent should derive and adopt appropriate site-specific WQOs (Huynh and Hobbs 2019) or adopt the ANZG (2018) default guideline values for 95% species protection level (or 99% species protection level for toxicants that bioaccumulate).*

Section 5.2.3.6 of the Preliminary Documentation has been updated to address this action.

2.5 BMA Response to Requested Action 5

Requested Action 5: *Table F4 of the current EA states that "Low flow releases provide for releases on the tail end of a natural flow event. The low flow release window commences the moment the natural flow recedes below the flow trigger and spans a period of 28 days only." The proponent does not provide any analysis of event-release conditions, including typical durations of flow and durations of recession limbs needed to assess whether these releases may result in contamination of downstream water and sediments during low-flow conditions. The IESC is concerned that the greater risks of contamination during low or receding flows in the receiving creek are not adequately addressed.*

Section 5.2.3.1 of the Preliminary Documentation has been updated to address this action.

2.6 BMA Response to Requested Action 6

Requested Action 6: *The current WQOs for toxicants based on the laboratory LOR (see Table F3 of the current EA) require revision given the presence or likely presence of EPBC Act-listed species in receiving waters and classification of the site as 'moderately disturbed' by the Queensland Government in the applicable water plan (Queensland Government 2013). For some analytes, these WQOs are equivalent to (or less protective than) the 80% species protection level (representing 'highly disturbed' ecosystems) and the higher level (95%) of species protection is needed. Adopting these more stringent WQOs will mean that the sensitivity of some of the analytical techniques used in water quality analysis will need to be improved.*

Section 5.2.3.6 of the Preliminary Documentation has been updated to address this action.

2.7 BMA Response to Requested Action 7

Requested Action 7: *All water management dams have emergency releases into different creeks around the project area (SLR 2021b, Figure 3-2, p. 42). However, the water quality monitoring points specified in the EA (which is currently under review at the time of this advice) do not provide adequate coverage of all potentially impacted creeks (BMA 2022, Figure 4-4, p. 86).*

a. The scale and extent of the impacts to downstream water resources will not be able to be measured due to limited water quality monitoring along Horse Creek, Cherwell Creek, Nine Mile Creek and Caval Creek.

b. The proponent should expand the monitoring network to include all creeks where emergency releases from the water management system can occur.

c. The expansion of the network to monitor potential impacts from uncontrolled releases should include suitable reference sites on each creek, a site at the point of spill, a site within 500 m downstream, and a site further downstream within each creek. These should be sampled during and immediately following uncontrolled releases.

d. For controlled releases, the monitoring program should be revised to include monitoring:

i. within 500 m downstream of the release point identified in the EA (RP1), and further downstream within Cherwell Creek (i.e., more monitoring is needed upstream of the confluence with the Isaac River);

ii. within Isaac River, but upstream of the current monitoring point (DMP1) identified in the EA. DMP1 is over 30 km downstream of the Cherwell Creek confluence with Isaac River which may mean that a significant length of waterway could be impacted before detection. DMP3 and DMP4 should be core monitoring sites and not used only at times when access to DMP1 is limited; and

iii. within the dam containing mine-affected water (12N) and at the release point.

e. All surface water monitoring needs to include analysis of metal concentrations, with the WQOs derived as per Paragraphs 4 and 6 used to trigger mitigation and management actions under a TARP.

f. The TARP needs to enable timely action should any WQOs be exceeded to ensure that potential impacts are prevented or rectified.

Section 5.2.3.6 of the Preliminary Documentation has been updated to address this action.

2.8 BMA Response to Requested Action 8

Requested Action 8: *Further analysis and assessment are needed of the potential cumulative impacts to surface water quality and downstream biota. As several mines discharge into the Isaac River (e.g., Norwich Park Mine, Peak Downs Mine, Saraji Mine (BHP 2019, p. 23)), there is potential for cumulative impacts to water quality and flow regimes in the Isaac River catchment. The IESC notes that Caval Ridge Mine has an agreement with a number of other mines in the region to share water-related information and thus are well placed to undertake such collaborative work with the partners of the agreement.*

Potential cumulative surface water impacts at the catchment scale are not clearly understood or managed across multiple mine sites currently which increases the risk of cumulative impacts to water resources and EPBC Act-listed species within the catchment.

Section 4.3.2.5 of the Preliminary Documentation has been updated to address this action.

2.9 BMA Response to Requested Action 9

Requested Action 9: *Caval Ridge Mine is party to a water-transfer agreement including Norwich Park Mine, Peak Downs Mine and Saraji Mine (BHP 2019, p. 23). These mines transfer water between mine sites, and although they commit to meeting the requirements of their respective EAs, information is limited on how the system operates. While it is commendable to manage water across multiple sites to minimise potential impacts, it can also increase risks or allow opportunistic release of*

water if there are sites with less stringent EA requirements and approval conditions which could potentially worsen environmental outcomes. Further information is needed about the operationalisation of the transfer agreement, and the requirements of the EAs for each mine included in the arrangement, to understand potential risks. The proponent should also assess potential downstream impacts of a 'worst-case' scenario where a large release from the least-stringently conditioned site occurs, especially given the likely cumulative impacts.

Section 2.5.6.3 of the Preliminary Documentation has been updated to address this action.

2.10 BMA Response to Requested Action 10

Requested Action 10: *The proposed out-of-pit waste dump has the potential to influence surface water and groundwater quality through run-off and leachate generation. It is unclear what material will be placed in the out-of-pit waste dump and whether this may include coal rejects which have a much greater potential for generating potentially acid-forming (PAF) leachate and run-off (Terrenus Earth Sciences 2021, p. 35). Further information is needed on the placement of PAF material, both within the pit and in the out-of-pit waste dump, and any selective handling of material to be placed in the out-of-pit waste dump to understand the potential risks to surface water and groundwater water quality.*

Section 4.3.2.3 of the Preliminary Documentation has been updated accordingly.

2.11 BMA Response to Requested Action 11

Requested Action 11: *Given the predominance of sandy bed material in the creeks and rivers onsite and downstream, it is less likely that contaminants in the water releases will accumulate in sediments compared with, for example, finer silts and clays. However, the IESC notes that some sites that were sampled for sediment quality (including upstream of the project) where silty and/or clayey materials were recorded had high levels of chromium and nickel (ESP 2021, Table 4-2, pp. 48-50 and Table 4-3, pp. 50-52). Regular sediment sampling downstream of release points is suggested, targeting sites with silty and/or clayey materials to monitor for potential accumulation of contaminants in the sediments. The proponent should also develop a TARP so that if excessive sediment contamination is detected, timely action can occur to limit and rectify impacts.*

REMPs for CVM will continue to include sediment sampling. The REMP reporting will continue to be used to identify any concerns associated with contaminants in the sediments and identify recommendations for further investigation or remedial action as appropriate

2.12 BMA Response to Requested Action 12

Requested Action 12: *The proponent is considering two alternative locations for the relocation of the blasting compound. The IESC considers that Option A would pose lower environmental risks to nearby surface waters and require less vegetation clearance than Option B.*

Section 2.5.3.2 of the Preliminary Documentation has been updated accordingly.

2.13 BMA Response to Requested Action 13

Requested Action 13: *The IESC notes that the proponent's assessment of the likely scale and extent of potential impacts to GDEs is limited. Stygofauna were not identified in the immediate vicinity in local alluvial aquifers, although acknowledged as likely to occur in the Isaac River alluvium (SLR 2021a, p. 117). Aquatic GDEs were considered to not occur but this was based on very limited assessment (SLR 2021a, p. 116). Potential terrestrial GDEs were identified in the project area and downstream. However, the inferred area of potential impact was based on groundwater model predictions with no apparent consideration of the uncertainty associated with the model predictions (App. B in SLR 2021a, p. 23). Additionally, the area of potential impact and the scale of the impacts to terrestrial GDEs were further discounted on the assumption that the key species in these ecosystems were likely to be facultative users of groundwater (e2m 2021, p. 30). This process did not consider that groundwater is usually the last available water source for such ecosystems during drought, and therefore loss of access to groundwater can have serious adverse effects at these times of considerable stress on the biota. Furthermore, facultative GDEs are a water resource under the 'water trigger.' Further work is outlined below for the proponent to better address these limitations in assessing the likely scale and extent of impacts to downstream GDEs as a result of changes to the hydrological regime and water quality associated with the proposed water releases.*

Section 4.4 of the Preliminary Documentation has been updated accordingly.

2.14 BMA Response to Requested Action 14

Requested Action 14: *Decreased surface water quality during and soon after releases is likely to directly impact aquatic biota at the release point and downstream, although the likely spatial extent for downstream potential impacts is unclear, especially for connected GDEs (e.g., alluvial sediments, bankside vegetation accessing alluvial and stream water). Impacts to GDEs will arise where there is surface water-groundwater connectivity, even transiently. One likely pathway is if contaminated surface water recharges the alluvial aquifers associated with Horse, Caval, Cherwell and Nine Mile creeks. This pathway is likely given that losing conditions dominate in these ephemeral streams and the larger Isaac River (SLR 2021a, pp. 75, 77 and 97). The proponent should evaluate the likelihood of each possible impact pathway and the potential impacts on GDEs, and may find it useful to portray these pathways and their interactions on an ecohydrological conceptual model. This conceptual model could be used as the basis for an impact pathway diagram and subsequent formal risk analysis. It would also illustrate where knowledge gaps exist for some of the inferred pathways and their possible consequences for GDEs and other water resources.*

Section 4.4.5 of the Preliminary Documentation has been updated accordingly.

2.15 BMA Response to Requested Action 15

Requested Action 15: *Due to the dilution of the mine-affected and/or sediment-laden water being unknown, contaminant concentrations may occur at levels that could potentially affect aquatic biota, GDEs and EPBC Act-listed species. The provided water quality data (ESP 2021, p. 43, Table 4-1) showed frequent exceedances of the ANZG (2018) default guideline values for 95% species protection ('slightly and moderate disturbed' ecosystems). Appropriately derived local site-specific values (Huynh and Hobbs 2019) or default values for 95% species protection should be adopted (Paragraphs 4 and 6) to mitigate and manage potential impacts to downstream GDEs and other water resources.*

REMP monitoring (Gauge, 2021) indicates concentrations above guideline values generally occur both upstream and downstream of mining, and regionally downstream on the Isaac River, and are likely a function of background and associated land use influences outside of mining. The purpose of the REMP is to monitor and record effects of contaminant release on the receiving environment. The study monitors water quality, stream flow, sediments and bio-indicators to 2021 and historically since 2011. Monitoring sites include control or references sites upstream of mining and test sites downstream. The CVM EA requires REMP reporting to present the findings of monitoring, and include an assessment of background conditions and the applicability of the current discharge limits in protecting the environment. Historical water quality data obtained during stream flows for Cherwell Creek dating back to 2015 was statistically analysed to determine if changes downstream of mining were within acceptable limits as defined by the QWQG (2000) and whether the current trigger values in the EA are applicable. The results of the 2020-2021 Annual REMP report concluded that 'local environmental values are not be adversely or unacceptable affected downstream on mining' (Gauge, 2021).

2.16 BMA Response to Requested Action 16

Requested Action 16: *The proponent states that there could potentially be stygofauna within the unconsolidated Quaternary alluvial sediments of the Isaac River (ESP 2021, p. 87). Further investigations are needed to confirm whether stygofauna are present in the Isaac River alluvium downstream of Cherwell Creek and possibly the lower reaches of Cherwell Creek. Although the proponent sampled 13 bores in April 2020 and 10 bores in November 2020 (ESP 2021, pp. 32-34), there were no bores sampled near the confluence of Cherwell Creek and Isaac River or in the saturated sediments of the Isaac River downstream. If stygofauna are detected, the proponent should assess the potential for water quality-driven changes from the project or its cumulative impacts to adversely affect this GDE.*

Section 4.4.1.1 of the Preliminary Documentation has been updated accordingly.

2.17 BMA Response to Requested Action 17

Requested Action 17: *In addition to the changes that may arise from the water releases, some GDEs at the project may be impacted by groundwater drawdown. As noted in Paragraph 13, this impact pathway has not been fully explored and there has been inadequate consideration of the uncertainties associated with the groundwater modelling predictions. While some areas of potential GDEs are predicted to experience only small amounts of drawdown, or a level of drawdown hypothesised to keep the water table within the vegetation rooting depth (e2m 2021, Table 9, pp. 35-36), overestimation of water levels (i.e., underestimation of drawdown) by only a few metres could considerably alter the total area of GDEs adversely impacted. This could result in impacts being greater than predicted by the proponent to terrestrial GDEs or groundwater-dependent riparian vegetation that provides habitat for EPBC Act-listed species. Further consideration of the uncertainty in the groundwater model predictions, field verification of the existing depth to the water table and assessment of the 'worst-case' scenario of the impacts of drawdown on terrestrial GDEs are needed to fully understand the potential scale and extent of impacts to these GDEs and the EPBC Act-listed species that they support at the project site and downstream.*

Section 4.4.3 of the Preliminary Documentation has been updated accordingly.

2.18 BMA Response to Requested Action 18

Requested Action 18: *From the information provided, it is unclear whether there will be direct impacts to terrestrial GDEs at the project site through vegetation clearance. The proponent simply states that terrestrial GDEs will be largely avoided (e2m 2021, p. 37). More information is required on what terrestrial GDEs, if any, will be directly cleared and how this, in addition to any loss or impairment from drawdown, might have repercussions for dependent wildlife, some of which is likely to be EPBC Act-listed.*

Section 4.4.5.1 of the Preliminary Documentation has been updated accordingly.

2.19 BMA Response to Requested Action 19

Requested Action 19: *The proponent has estimated that the project will require offsets for significant residual impacts (from vegetation clearing) to Matters of National Environmental Significance (MNES – 191.24 ha) and Matters of State Environmental Significance (MSES – 107.59 ha) (e2m 2022, Table 23, p. 54). Offsets are proposed on two properties (Inderi and Croydon Station) to acquit the impacts (based on area cleared) to Ornamental snake habitat (MNES/MSES), King bluegrass habitat (Dichanthium queenslandicum, MNES/MSES), Regulated Vegetation containing an Of Concern Regional Ecosystem (MSES) and Connectivity Areas (MSES) (e2m 2022, p. 53). Given concerns that evidence for the effectiveness of offsets is lacking (e.g., Sophus et al. 2019), the IESC recommends that further consideration be given to reducing the extent of clearing to avoid direct impacts on the four prescribed environmental matters, especially where they relate to associated water resources.*

Section 5.1.1 and Section 7.1 of the Preliminary Documentation has been updated accordingly.

2.20 BMA Response to Requested Action 20

Requested Action 20: *Impacts of the proposed releases to the alluvial aquifers underlying Horse, Caval, Cherwell and Nine Mile creeks are likely because losing conditions dominate in these surface water systems and within the larger Isaac River catchment (SLR 2021a, pp. 75, 77 and 97). However, the likely extent and scale of potential changes to groundwater quality caused by interactions with surface water during and after releases are not clear from the information provided. These potential impacts and their consequences will depend on the adopted water management practices and WQOs as discussed in Paragraphs 4, 6 and 15.*

Section 4.4.5.4 of the Preliminary Documentation has been updated accordingly.

2.21 BMA Response to Requested Action 21

Requested Action 21: *Additional groundwater monitoring is needed to allow the scale and extent of potential impacts on shallow groundwater quality to be accurately monitored, and suitable mitigation and management to be implemented if impacts are detected. The extent of the proposed monitoring network differs between the figures presented (cf. BMA 2022, Figure 4-1, p. 76 and SLR2021a, Figure 8-1, p. 168) and has limited coverage, with several existing monitoring bores likely to be lost as the project progresses, and no clear commitment for these bores to be replaced. Monitoring bores that will be lost as the mine progresses should be replaced, with the new bores installed at least two years prior to loss of the original bore (or longer if monitoring frequency is less than quarterly and/or data are highly variable) to collect sufficient data to enable comparison of trends.*

Section 5.2.2.3 of the Preliminary Documentation has been updated accordingly.

2.22 BMA Response to Requested Action 22

Requested Action 22: *As discussed in Paragraph 10, the out-of-pit waste dump could be a source of contamination to groundwater either directly or via surface water recharge of shallow alluvial aquifers. Several monitoring bores should be installed around the out-of-pit waste dump to identify whether groundwater contamination is occurring and, if so, trigger suitable management actions to prevent further contamination or its mobilisation.*

Section 4.3.2.3 and Table 5-1 of the Preliminary Documentation has been updated accordingly.

2.23 BMA Response to Requested Action 23

Requested Action 23: *Further to expanding the monitoring network, appropriately derived local WQOs or the ANZG (2018) default guideline values for 95% species protection levels should be adopted to protect water resources including GDEs (Paragraphs 4, 6 and 15). A TARP should be developed to complement the groundwater monitoring program and guide the timely identification of exceedances of WQOs and suitable follow-up actions to limit and rectify impacts.*

Section 5.2.2.3 of the Preliminary Documentation has been updated accordingly.

2.24 BMA Response to Requested Action 24

Requested Action 24: *The management of poor water quality in the post-mining stage is primarily reliant on the final void lake acting as a perpetual groundwater sink and no releases of this accumulated poor-quality water to the surface water or groundwater systems. The following requires clarification.*

a. Numerous mines currently exist in the region, some very close (nearest active 17 km, nearest proposed 5 km (SLR 2021a, Table 3-6, pp. 31-32)) to the project area, and it is likely that many of these mines will leave final voids in the landscape. Further information is needed to understand if there is the potential for interactions between neighbouring voids that may affect groundwater quality by facilitating recharge to the Permian groundwater system from void lakes.

b. There are many uncertainties regarding equilibrated water levels in both the backfill and the final void. For example, recharge to the backfilled spoil has been assumed as approximately 1% of actual rainfall (App. B in SLR 2021a, p. 15). The IESC considers that this recharge estimate appears unrealistically low and requires justification. It is also unclear whether this is appropriate for the particle size of the spoil. If the spoil is of mixed particle size, then a range of plausible parameter values should be explored and the effects of these on predictions of the void lake level post-mining, and groundwater dynamics, discussed.

Section 4.2.6.7 and Section 4.2.6.8 of the Preliminary Documentation has been updated accordingly.