24 February 2023

NSW Independent Planning Commission
Suite 15.02, 135 King Street
SYDNEY NSW 2000

Dear Commissioners,

Re: Bowdens Silver Project (SSD 5765): Response to Questions on Notice – Public Hearing

The following presents a formal response to the questions received by Bowdens Silver from the Panel (taken to include Commissioners and Counsel Assisting) at the Public Hearing for the Bowdens Silver Project. While the questions were considered to have been largely answered during the Public Hearing, Bowdens Silver has taken the opportunity to provide a written and detailed response in this submission. A brief discussion of some of the matters raised regularly at the Public Hearing is also provided.

The following presents each of the questions provided by the Panel followed by a brief response.

Baseline Modelling / Implications for Management Plans

1. *Throughout the Public Hearing, the Commission has heard from many speakers about potential impacts of contaminants to human health and the environment. Will the baseline monitoring that has been conducted – particularly in relation to water quality and quantity, agricultural and residential soil, and airborne contaminants – be incorporated over the life of the project and how would that influence the management plans you will have in place?*

The Environmental Management Plans for the Project are intended to guide the development and operation of the Mine. The documents would be prepared to be direct reflections of the assessments completed for the Environmental Impact Statement (EIS). They would be prepared to describe the design, controls, management measures and monitoring commitments made in the EIS and technical assessments. In terms of assessment, there would be nothing new in these documents that is not in the EIS and other assessments. The plans would include a description of the existing environment which in turn includes the baseline monitoring information to present what is commonly referred to as the "base case". The technical assessments effectively assess the Project based on the acceptability of predicted changes to the base case. The outcomes of these assessments would also be presented in the plans. The baseline information collected, and the outcomes of modelling and other assessments then form a benchmark against which the environmental and social performance of the Mine would be measured.

The preparation of these plans follows an approval of the Project and their preparation is overseen by the relevant Government agencies, be that the EPA, DPE Water, Heritage NSW or Council. Annual reporting of monitoring outcomes must compare monitoring outcomes to past data and justify any variations. Monitoring data is published monthly in accordance with the requirements of an Environment Protection Licence. This information will also inform trigger action response management which is developed from the proactive and reactive mitigation measures that are proposed.

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In summary, the baseline information and assessment outcomes remain a key aspect of measuring the environmental and social performance of the operation over the Project life. In this manner the information informs ongoing environmental management through reference to the base case.

Water Recycling, Remediation, Final Landform, Exploration of Options

2. *In relation to water recycling, and the proposed final landform including the final open cut pit void, has the Applicant given consideration to alternate water processing methods and remediation options, for example, press-filtration, and filling the final void with material other than water?*

Bowdens Silver considered a range of opportunities to reduce water demand or to reduce water lost to evaporation and improve recycling opportunities. A lot of this work focused on improving water efficiencies in tailings management.

- For the EIS, high-rate thickening was included but this has now been replaced by a paste thickener plant that reduces water demand by 390ML/year.
- Alternative options for refinement of the TSF included a filter press and the dry stacking of tailings. This process involves recycling more of the moisture content of the tailings and then emplacement in a small area managed to limit dust generation. Review of this approach indicated that although it would require less water, there was a higher level of operational complexity including the possible generation of dust and noise. At the time of the assessment it was considered that the proposed down-valley discharge approach was the most appropriate for the Company and the community.
- Bowdens Silver also considered using a central storage dam to enable the movement and storage of water from harvestable rights dams (clean water) and reduce evaporative losses, however, a change in policy has meant that this water cannot be transferred within a landholding at the Mine Site (this policy change was addressed in the Water Supply Submissions Report).
- Opportunities to cover the surface of the TSF decant pond and other dams were also considered but were rejected due to them being untested for a TSF structure and not feasible at smaller dams.
- Another alternative that was incorporated is that Bowdens Silver now proposes to manage the decant pond at a water level of 0.5m above the deposited tailings, which is reduced from the original design water level of 2m. This requires more active pumping and management including the use of a Turkeys Nest Dam. We note that this change, coupled with active monitoring and management of pond levels, allows for real time responses that significantly reduce the risk of discharge from the TSF.

In summary, Bowdens Silver remain confident that the Integrated Water Management and Supply Strategy would provide water security to the Mine while minimising as much as possible impacts to water users.

The Project would require that a final void remain in the landform post-mining. Alternatives to this have been considered including backfilling of the open cut pit. Notwithstanding the high cost of this alternative, the principal reason this has been rejected is that Bowdens Silver did not want to sterilise any potential expansion of the open cut pit or access to significant underground mining opportunities identified below the open cut pit. Bowdens Silver has committed to backfill the satellite pits to the south of the main open cut pit using non-acid forming material temporarily stored in the Southern Barrier.

Bowdens Silver has also committed to constructing the final void as a groundwater sink, and there are options available to ensure this is the case including the construction of a wetland in the final landform; extension of the open cut pit to increase the evaporative surface area of the final pit lake at equilibrium; and the grouting of terminal faces of the void. These options are described in detail in the Uncertainty Analysis reporting. While none of these contingencies are necessary at this stage of the development, they are available in the event of unexpected outcomes at mine closure. These options have been deemed as feasible and appropriate mitigation options by DPE's peer reviewer and accepted by DPE. To be clear, rehabilitation would need to be completed progressively and finally to the satisfaction of DPE and the Resources Regulator. Substantial financial bonds, required under NSW legislation, would be in place to ensure that the funds are available for rehabilitation of the Mine Site in the unlikely event Bowdens Silver does not adequately rehabilitate the site.

High Impact Dust, Rain and Drought Events

3. *Over the course of the Public Hearing the Commission has heard submissions from community members that have described high impact dust, rain and drought events. Can the Applicant clarify how it has taken into consideration the impacts of extreme weather events on dust dispersion, run-off and water shortage and how they will be mitigated.*

Bowdens Silver understands the possible effects of climate change, with an example of the effects of more frequent extreme events witnessed in the recent prolonged drought that was followed by several years of persistent and at times heavy rain. Whilst not a feature of climate change predictions, high winds are often determined by climate pressures and topography on a regional scale.

Modelling assessments undertaken for the Project used historic data to predict future events. For example, the air quality assessment used industry standard software for meteorological modelling to predict the wind's influence on dust dispersion. An hourly-varying model was used to ensure that the modelling reflected variations in wind speed and direction over a typical day as well as fluctuations over months and seasons. High wind events were included in this modelling. In addition, water balance modelling used over 130 years of climate data to assess environmental impacts. This dataset included periods of high rainfall and prolonged drought. The final version of the water balance model was updated in 2022 and included both the recent drought and heavy rains in modelling the water management outcomes.

The worst case outcomes of the water balance and dust dispersion modelling were presented in order to understand the worst predicted level of impact. Therefore, these results do not reflect the day-to-day outcomes of the Project that would be experienced by local residents. Such worst-case outcomes in the modelling predictions are used to inform the development of site-specific environmental management and monitoring programs. Importantly, the Air Quality Assessment predicted no exceedances of air quality criteria at any privately-owned residence while the water balance modelling predicted that no water would be discharged from the Mine under historical rainfall conditions and that the Project would have access to a reliable water supply (99.5% of dust suppression and 94.5% of processing requirements would be met under worst case conditions).

By presenting these worst-case outcomes, Bowdens Silver is committed to plan and manage the Mine for these events. Specific actions for management during extreme events include but are not limited to the following.

- Using metrological forecasting to plan for extreme events. This might lead to limiting operations on a given day, reducing activities at exposed locations or actively managing water storage infrastructure to plan for high rainfall events.
- Using the trigger alarms on continuous (real time) water level, noise and dust monitors to proactively alter operations before exceedances occur.

- Using on-site water balance modelling to manage the water needed for dust suppression and processing so that water use and management is efficient.

High winds are possible at any development and their implications are especially well-understood in mining, with established management approaches available during these periods. High rainfall events are also managed with similarly advanced procedures and technologies to identify and initiate water transfers within the Mine. The key objectives of this water management approach is not only the efficient use of critical water resources but also the maintenance of the design freeboard or minimum storm storage allowance requirements that are in place for contingency during extreme rainfall events. Drought conditions are not something that come as a surprise. Any combination of low rainfall and poor forecasts would trigger management actions within the Mine to limit evaporative losses from storages. Daily operational water balance modelling would be used to inform an on-site water inventory and assist in the forecasting process. Regardless, the environmental management plans would include triggers for reactive management including triggers for the notification of Government and community stakeholders.

In summary, extreme events are taken into account by using historical data that includes past examples of these events. This data is used as an input to the modelling and presentation of worst-case scenarios which informs the planning for such events including clear triggers for management, investigation and notifications.

Acid Mine Drainage

4. *Given the modelling that has been undertaken in relation to Potentially Acid Forming (PAF) material and Non-Acid Forming (NAF) material, can the Applicant provide detail on the contingency measures that would be in place in relation to waste rock handling and placement should there be a change to NAF and PAF ratios and associated volumes?*

Analysis of the ratio of PAF to NAF would not be an everyday management task but would be informed on a continual basis by the outcomes of geochemical analysis of material as it is removed from the open cut pit. Prior to each blast, in-situ material would be analysed to determine the management requirement of the material to be fragmented including its destination (i.e. run-of-mine, WRE or construction material stockpile). The volumes and destination of all material would then be tracked and regularly reconciled to inform management. Conservative assumptions are made in planning to account for minor variations in the ratio. If there are changes identified during reconciliation, blast activities may be moved or re-scheduled to other areas to ensure that suitable material is being generated for the required purpose. This is only relevant when generating NAF material for construction activities such as the construction of a raise on the TSF.

A detailed description of the data that supports Bowdens Silver's understanding of the geology and geochemistry of the Bowdens deposit is presented in the response to the Earth Systems peer review of acid mine drainage risks. However, very simply, detailed analysis undertaken over many years (both prior to, and following Bowdens Silver's purchase of the Project) and which includes academic studies by UNSW and elsewhere, has resulted in a detailed understanding of the deposit's geochemical evolution and mineralisation. This evolution has involved a number of hydrothermal alteration events (fluid pulses) that has resulted in a clear zonation of sulphur. The key outcome of this is a shell within which sulphide minerals are present which may result in this material generating acid when exposed to atmospheric conditions. Bowdens Silver's mineral exploration and analysis program has focused on the boundary of this sulphur shell. Therefore, the transition from PAF to NAF is relatively well understood. The deposit is overlain by Sydney Basin Sediments which are NAF and would be used for initial Mine development. Below this geological unit sits the Rylstone Volcanics and the bulk of the hydrothermal alteration zones. These zones were not limited to sulphur

rich fluids, but also included carbonate rich fluids. The presence of carbonates in the northern section of the open cut pit provide an acid neutralising capacity and therefore although the material in this section contains sulphur, it is not acid forming due to the acid neutralising capacity of the carbonates. The analysis and conclusions relating to the northern section of the open cut pit was the subject of much of the commentary from Earth Systems as they have a preference for a more conservative approach to sampling in this location than was applied by Graeme Campbell and Associates.

The acid generating and neutralising capacity of the material is tested in the laboratory via static testing. However, the actual acid generating behaviour over time must be tested through kinetic testing which uses wetting and drying of material in columns to generate leachate that is then analysed for its elemental concentrations. The Material Classification Verification Program would target static testing to confirm the broad understanding of the deposit is accurate and include kinetic leaching tests to analyse acid generation over time. In summary, there is NAF material within the deposit, in the overlying sandstone geological unit and in the northern section of the open cut pit, with the remaining PAF to be managed.

While the above is a simplified summary, it identifies that there is a detailed understanding of the geological setting that is supported by direct mineralogical observations, geochemical testing and new technologies used to scan elemental distribution. On this basis, the risk that the ratio of NAF to PAF changes substantially is considered to be low. However, should that occur there are contingency measures available to Bowdens Silver such as the following.

- The material in the floor of the open cut pit is PAF and it would be feasible to reduce the depth of the open cut pit and forego resource in order to maintain the necessary ratio of PAF to NAF.
- Bowdens Silver has also proposed to backfill the satellite pits with NAF material prior to closure. It may be possible to use this material for other rehabilitation purposes, if needed.
- There are also options to source NAF material from within the Mine Site at closure. These sources are commonly referred to as borrow pits. Sections of the Mine Site are overlain by Sydney Basin sandstone deposits that is not acid generating and would be a reliable source of material for rehabilitation. Areas previously disturbed for mining may be used for this purpose such as the topsoil stockpile areas and processing areas.
- Another alternative would be to source material from outside of the Mine Site for direct use or for use in neutralising acid generation.
- Finally, a redesign of waste management structures would be an alternative, allowing for refinement of storage and rehabilitation should it be required.

Some of these options would require a modification to the development consent but the need to employ these scenarios is considered unlikely.

Air Quality Management - Lead Monitoring and Management

5. *Condition B30 requires the preparation of an Air Quality Management Plan. Sub-condition E requires the measurement and evaluation against dust particulars as well as metal concentrations and to have trigger response in relation to any elevation relative to those three criteria. In terms of a criterion for lead, for the purposes of the metal concentration, what concentration would be considered to be elevated to trigger a response?*

   A second part to the question was that if particulates and dust was compliant, but metals were not, what would be an example of how, operationally, if dust suppression is operative and effective at the mine, yet there is still a lead exceedance at the monitoring site, what would be an example of a response, operationally, to deal with that type of scenario?

As noted in the response above concerning the use of baseline data, the data used to inform the assessment of air quality impacts and subsequently human health risks would be presented in an Air Quality Management Plan as well as the outcomes of each assessment, where relevant. The plan would include data on background particulate matter and deposited dust monitoring, which also includes the lead content of those samples.

The assessment of health risks has been informed by a range of baseline and material characterisation data which was utilised in the Air Quality Assessment to both inform dust dispersion modelling and assess levels of lead and other metals within particulates. This information was then utilised within the Human Health Risk Assessment to assess multiple potential metal exposure pathways, such as inhalation, deposition on roofs and subsequently water tanks, deposition onto vegetables, etc. A simplified summary of the approach taken to the assessment of lead exposure risks is as follows.

1. Soil samples analysed for the Land and Soil Capability Assessment were used to establish the existing lead concentration in soil. For the Human Health Risk Assessment an assumption of 50mg/kg of lead in soil was assumed based on 388 soil samples. A conservative approach was taken which resulted in the highest lead levels outside of the Mine Site assumed at all sensitive locations.
2. The Air Quality Assessment predicted dust generation from the Project and estimated the lead content of particulates by using the measured baseline soil lead content, together with the lead content within waste rock and ore derived from extensive drilling. As such, this approach takes into account the natural variation in metal content (between soil, waste rock and ore material) and therefore the dust and associated metal emissions from mining activities across varying locations and material type.
3. The Human Health Risk Assessment was highly conservative as it utilised the highest metal concentrations at a private residence and applied these across the entire community. It is also noted that this concentration was applied for a period of 70 years, with the health risk assessed for the concentrations in the soil at the end of the 70 year period. To assess the risks of exposure to lead in locally grown plants, it was assumed that these plants were exposed over a 70-day growing period, which is an average time for growth of plants that grow out of the ground. For foods that are grown in the ground such as potatoes the full 70 years exposure was assumed.

The Air Quality Assessment was subject to peer review and the Human Health Risk Assessment was subject to two peer reviews (one commissioned by Bowdens Silver and one commissioned by DPE). The NSW EPA also reviewed the outcomes of the Air Quality Assessment and detailed responses to its queries were presented in the Submission Report. It is considered that the assessment of air quality and human health risks has been conservative and thorough.

Background monitoring of Total Suspended Particulates (TSP) identified a baseline average annual lead level in particulates of 0.001µg/m^3 with a maximum of 0.002µg/m^3. This information is presented in Section 5.7 of the Air Quality Assessment. Section 7.7 of the Air Quality Assessment presents the impact assessment outcome for lead in particulates noting that the dust generated by the Mine is predicted to peak at 0.001µg/m^3. This may be compared to the criteria established in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016) which references an impact assessment criterion for lead in particulates of 0.5µg/m^3. Therefore, there would not be an exceedance of cumulative emissions criteria established by the NSW EPA. It is noted that the Glencore operations in Mt Isa apply an annual average trigger for lead in TSP of 0.5µg/m^3 and the Perilya Broken Hill North Mine operations (SSD 7538) have this criteria included as a condition of consent. It is not appropriate to compare the risks of lead exposure from the Bowdens Silver Project to the Mt Isa operations which involve mining and smelting of lead or the Broken Hill North Mine due to the historic smelting operations in the region.

In relation to deposited dust, there is no established criteria level for lead in deposited dust in NSW. Baseline monitoring for lead content in deposited dust was presented in Section 5.7 of the Air Quality Assessment with an average lead content of 0.001g/m^2/month. The monitoring has maximum and minimum values at each location monitored, with many of the samples recording lead levels below the limit of reporting available to the laboratory assessing the dust. The baseline data may be used to establish trigger levels for lead in deposited dust. Should monitoring produce results outside of the upper level, it would be reasonable to initiate an investigation of the cause of this change under an Air Quality Management Plan. This notwithstanding, the predicted deposited dust levels at the closest private residence to the Mine Site was 0.15g/m^2/month which may be compared to the incremental deposited dust criteria of 2.0g/m^2/month that is applied as standard. Specifying a criteria in the development consent for lead content in deposited dust is not considered appropriate given that there is no formal guidance in NSW on this. There are a range of trigger levels and indicators of risk that may be applied to guide management of dust and associated metal exposure depending on what is being monitored. Importantly, the conditions of consent require Bowdens Silver to propose and justify a monitoring approach and trigger levels that would satisfy the NSW EPA and DPE. By applying this through a management plan, the approach may be updated to suit best practice, should international or other advice on this change over time, without the need to modify the development consent.

The blood lead level known to result in human health risks was discussed at length in the Human Health Risk Assessment (10µg/dl is an indicator of impact and 5.0µg/dl an indicator of levels consistent with background, noting differences for children and minority groups such as pregnant women). There would therefore be sufficient health-based information to establish triggers for blood lead levels as part of any personal monitoring program. Results above the trigger would prompt referral to a medical professional as well as notifications to DPE and the NSW EPA. A notification procedure for community stakeholders would also be established, respecting the privacy of individuals.

Should air quality monitoring establish that dust levels are being mitigated and remain within criteria and trigger levels but the lead levels recorded in monitoring exceed trigger levels, an investigation of this outcome would be prompted under the Air Quality Management Plan. Given the very low levels of dust expected to be generated and the very low levels of lead exposure predicted, this outcome would indicate a substantial flaw in the soils, air quality and human health risk assessments that was not identified by Bowdens Silver, its consultants, peer reviewers, or the regulators that have reviewed the assessments. Notwithstanding, in the extraordinarily unlikely event this was to occur, it is considered likely that the investigation would focus upon identifying a previously unidentified point source of lead (such as a geological anomaly not identified by the extensive drilling undertaken to date) and applying additional dust mitigation controls in the handling of this material.

Other Matters Raised at the Public Hearing

We note that several assertions made during presentations to the Panel at the Public Hearing are not consistent with the outcomes of assessment. While these matters are not addressed in detail here, Bowdens Silver will respond to any further questions on these matters as requested by the Panel. Some of the matters that we feel have been addressed include the following.

- The satisfaction of the SEARs through the documents provided – Bowdens Silver has focused the scope of assessment and presented reporting that addresses the SEARs for the Project. Appendix 3 of the EIS identifies where the assessment requirements identified in the SEARs have been addressed. We also note the response to this question provided by DPE during the Public Hearing indicated the thorough approach taken in its review of this requirement.

- The use of best practice guidance in the preliminary design and approach to environmental and social management of the Mine – Bowdens Silver has planned and assessed the Project in accordance with best practice as defined in publicly available guideline documents. Each of the documents that presents preliminary design information references the guidelines and standards applied in developing the design. Further to this, each of the technical assessments references the guidance addressed in the assessment or that has informed the development of proposed management practices.
- The approach and outcomes of the Surface Water Assessment – Bowdens Silver remains confident that the approach to assessment of surface water risks is consistent with best practice and that negligible changes to surface water availability and water quality would result from the Project. The Surface Water Assessment was also subject to peer review and the modelling deemed fit for the purpose of predicting and assessing potential surface water risks. The matters raised by the community and Earth Systems in the peer review of the Surface Water Assessment were responded to in detail in the Submissions Report, Water Supply Submissions Report and response to Earth Systems.
- The approach taken in the Groundwater Assessment and justification of assessment methods and the modelling approach – Bowdens Silver remains confident that the groundwater modelling is fit for the purpose of predicting and assessing the outcomes of changes to the groundwater setting as a result of the Project and in accordance with the NSW Aquifer Interference Policy. This has been confirmed in three peer reviews of the modelling. Detailed responses to the matters raised by the community and to the HydroGeoLogic peer review have been provided in the Submissions Report, Water Supply Submissions Report and responses to HydroGeoLogic.
- Risks to Tourism - The Mine would not result in changes to the local setting that would risk tourism in Mudgee or the Mid-Western Region including producer-based tourism. Within Lue, there are some AirBNB style accommodation offerings that may be perceived as less attractive due to the presence of the Mine, however, it is unlikely that the tourists would choose not to come to the region as a result.
- Risks to agricultural production – The results of the Air Quality Assessment and Human Risk Assessment confirm there would be no risks to agricultural production as a result of lead exposure. This includes existing vineyards, olive farms or grazing in the region. The Agricultural Impact Statement indicates that mining could continue to occur alongside agricultural production as it currently does across the region.
- The approach to earthquake risk in the design of the TSF – Although there is a fault indicated in publicly available geological mapping it is not present in the overlying Sydney Basin Sediments. This absence from overlying strata confirms that this fault has been inactive for at least 160 million years. Notwithstanding this, in accordance with industry guidance, the preliminary TSF design has considered earthquake risk including up to a 1 in 10,000 annual exceedance probability event.

We trust the above assists with your deliberation. Please contact myself, or Anthony McClure with any further queries.

Yours sincerely

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