BOWDENS SILVER

SUBMISSIONS REPORT

State Significant Development No. 5765

June 2021

Prepared by: **R.W. CORKERY & CO. PTY. LIMITED**

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Bowdens Silver Project

Submissions Report

State Significant Development No. 5765

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EnviroKey Pty Ltd	Sherpa Consulting Pty Ltd	Cardno (NSW/ACT) Pty Ltd
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Gillespie Economics	ATC Williams Pty Ltd	Advisian – Worley Parsons Group

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TABLES

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ACRONYMS

A-ACAP	Australian Alternative Covers Assessment Program
ACAP	Alternative Cover Assessment Program
ACARP	Australian Coal Association Research Program
ACHA	Aboriginal Cultural Heritage Assessment
ADWG	Australian Drinking Water Guideline
AEP	annual exceedance probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AIP	Aquifer Interference Policy
AMC	AMC Consultants Pty Ltd
AMD	acid mine drainage
ANCOLD	Australian National Committee on Large Dams
ANE	ammonium nitrate emulsion
ANFO	ammonium nitrate fuel oil
ANZ	Australian and New Zealand
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand guideline
APZ	Asset Protection Zones
AQA	Air Quality Assessment
AREA	AREA Environmental Consultants & Communication Pty Ltd
AS	Australian Standard
ASX	Australian Securities Exchange
AWBM	Australian Water Balance Model
AWS	automatic weather station

BAR	Biodiversity Assessment Report
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BGM	Bituminous Geomembrane
BMP	best management practice
BSAL	Biophysical Strategic Agricultural Land
CCC	Community Consultation Committee
CEO	Chief Executive Officer
CMP	Cyanide Management Plan
CRN	Country Rail Network
DA	Development Application
DAWE	Department of Agriculture, Water and Environment
DECC	Department of Environment Climate Change
DEFRA	UK's Department of Environment, Food & Rural Affairs
DFAT	Department of Foreign Affairs and Trade
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Fields
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ERMP	Emergency Response Management Plan
FIFO	fly-in, fly-out
FMP	Fire Management Plan
FTE	full time equivalent
GAC	Gallanggabang Aboriginal Corporation

GCA	Graeme Campbell and Associates
GCL	geosynthetic clay liner
GDE	groundwater dependant ecosystem
GML	general mass limits
HCN	hydrogen cyanide
HDPE	high-density polyethylene
HHRA	Human Health Risk Assessment
HNSW	Heritage NSW
HVAS	high volume air samplers
ICMC	The International Cyanide Management Code
IPC	Independent Planning Commission
JORC	Joint Ore Reserve Committee
LAG	Lue Action Group
LAS	Lighting, Art & Science Pty Limited
LGA	Local Government Area
LOR	limit of reporting
MDB	Murray Darling Basin
MDL	Mudgee Dolomite & Lime
MEG	Department of Regional NSW Mining, Exploration and Geoscience
MMU	Mobile Manufacturing Unit
MNES	Matters of National Environmental Significance
MWRC	Mid-Western Regional Council
MRT	Mudgee Region Tourism
NAF	non-acid forming
NEPC	National Environment Protection Council
NHMRC	National Health and Medical Research Council

NPfI	Noise Policy for Industry
NOx	nitrous oxide
NPI	National Pollution Inventory
NPV	new present value
NRAR	Natural Resources Access Regulator
NSWLEC	The Land and Environment Court of NSW
NVA	Noise and Vibration Assessment
OEH	Office of Environment and Heritage
OEHHA	California EPA Office for Environmental Health Hazard Assessment
PAF	potentially acid forming
PBS	Performance Based Standard
PHMP	Principal Hazard Management Plan
PIRMP	Pollution Incident Response Management Plan
PM	particulate matter
PMF	probable maximum flood
PRPs	pollution reduction programmes
PSD	particle size distributions
Q&A	questions and answer
RAPs	Registered Aboriginal Parties
RFS	Rural Fire Service
RI	risk index
RLA	Richard Lamb and Associates
RNP	Road Noise Policy
ROM	run-of-mine
RSA	Road Safety Audit
RWC	R.W. Corkery & Co. Pty Limited

SAG	semi-autogenous grinding
SEPP	State Environmental Planning Policies
SIA	Social Impact Assessment
SLR	SLR Consulting Australia Pty Ltd
SSD	State Significant Development
TCEQ	Texas Commission on Environmental Quality
TEOM	tapered element oscillating microbalance
TfNSW	Transport for NSW
TSF	Tailings Storage Facility
TSP	trisodium phosphate
TSS	total suspended solids
TTPP	The Transport Planning Partnership Pty Ltd
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VLAMP	Voluntary Land Acquisition and Mitigation Policy
VPA	Voluntary Planning Agreement
WAD	weak acid dissociable
WAL	Water Access Licence
WMP	Water Management Plan
WRE	waste rock emplacement
XRF	X-Ray Fluorescence

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EXECUTIVE SUMMARY

INTRODUCTION

This *Submissions Report* presents the response from Bowdens Silver Pty Limited (Bowdens Silver) to the submissions received by the Department of Planning, Industry, and Environment (DPIE) regarding the Bowdens Silver Project ("the Project") during and following the public exhibition of the *Environmental Impact Statement* for the Project from 2 June 2020 to 27 July 2020.

Bowdens Silver is seeking approval to develop and operate an open cut mine 2km to 3km northeast of Lue and 26km east of Mudgee to extract almost 30 million tonnes (Mt) of ore from which silver, zinc and lead would be extracted and despatched as concentrates. While the response from public organisations and individuals was overwhelmingly supportive, 387 submissions opposed the Project. As a result, the Project will be assessed by DPIE and a recommendation provided with formal referral to the Independent Planning Commission (IPC) for determination. The IPC will be the consent authority for the Project.

Analysis of Submissions

During and following the formal exhibition period, submissions were provided to DPIE from 16 Government agencies, 70 organisations and 1 839 individuals. Each of these submissions were registered on the DPIE Major Projects website. DPIE provided Bowdens Silver with ten additional supportive submissions which have not been registered. Only those submissions formally registered by DPIE have been analysed here.

Figure ES1 displays charts presenting the proportion of supportive, opposing and commentary submissions from all non-Government agency submitters and those from the State of NSW and from within the Mid-Western Regional LGA. A detailed analysis of the submissions confirmed the following.

- There is overwhelming support for the Project generally (1 504 submissions or 79% of all submissions supported the Project).
- There is overwhelming support for the Project in the Mid-Western Regional LGA (682 submissions or 74% of all submissions from this area supported the Project).
- Within the area described as 'Lue and surrounds' 95 submissions objected to the Project (62%) and 57 submissions supported the Project (37%).
- For those submissions that listed an address as being within Lue, 45 submissions opposed the Project (52%) and 40 supported the Project (46%). This is consistent with feedback in community surveys completed for the SIA for the Project.

In addition to the above, 457 submissions were received from other parts of the State of NSW with 77% of these supporting the Project and 389 submissions were received from other states of Australia, with 9% of these supporting the Project.

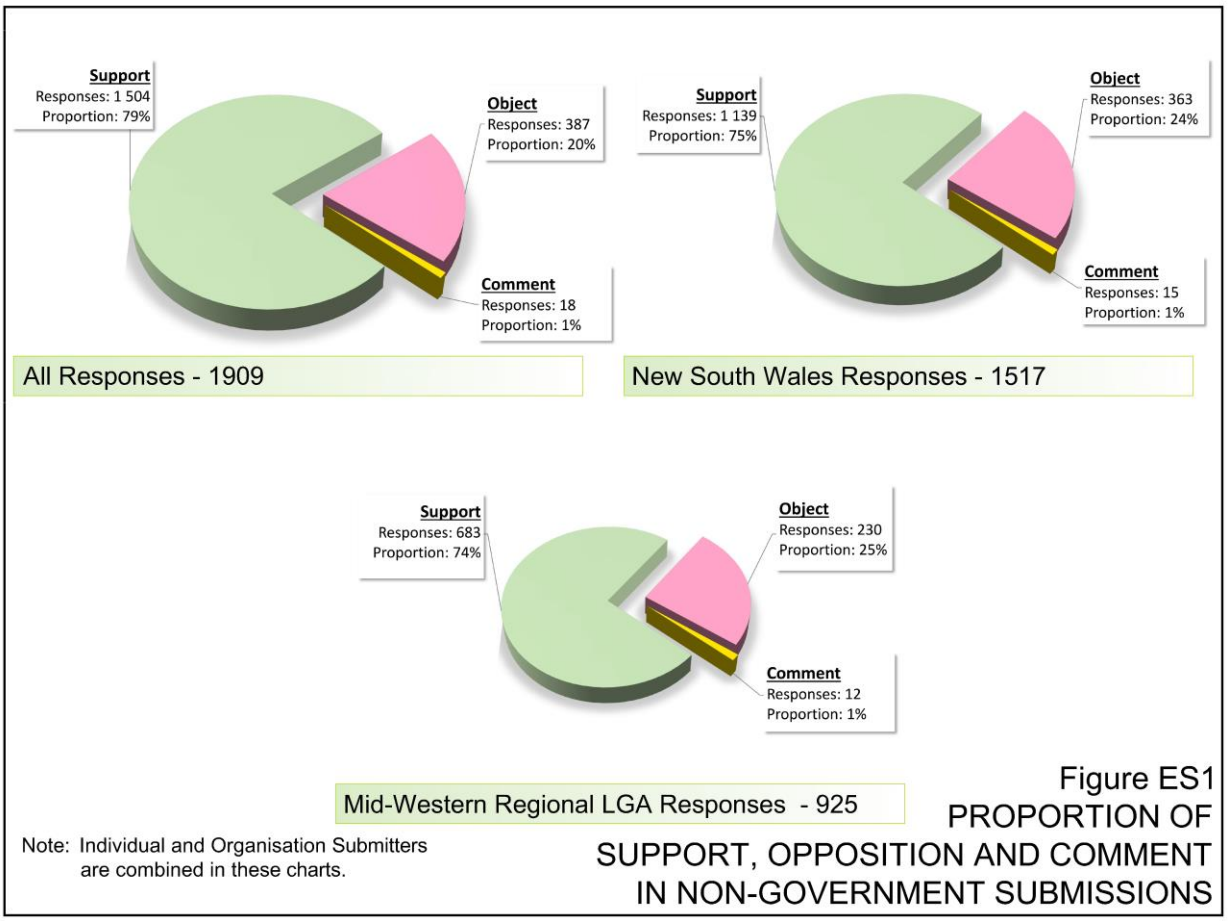


Figure ES1
PROPORTION OF SUPPORT, OPPOSITION AND COMMENT IN NON-GOVERNMENT SUBMISSIONS

The most frequently identified matters in all submissions referred to the benefits of employment and workplace training that the Project would provide (905 submissions) and direct reference to the economic benefit to the local community (342 submissions).

A total of 16 submissions were provided from Government agencies which commented on the outcomes of assessment for matters associated with the regulatory function of that agency.

Figure ES2 displays the frequency with which the listed matters were raised by the organisations and individuals who expressed their support for the Project. There is obvious support for the employment and training opportunities for the Project and well as the benefits for local communities.

Figure ES3 displays the frequency with which the listed matters were raised by the individuals and organisations who expressed their opposition to the Project. Several of the matters raised cross over (for example air quality and health risks) with **Figure ES3** demonstrating the varied nature of concerns in the opposing submissions.

A total of 18 submissions provided comments for consideration but did not express either support or opposition to the Project although some raised matters that they requested by addressed during the assessment of the Project.

Figure ES2 Frequency of Matters Raised in Supportive Submissions

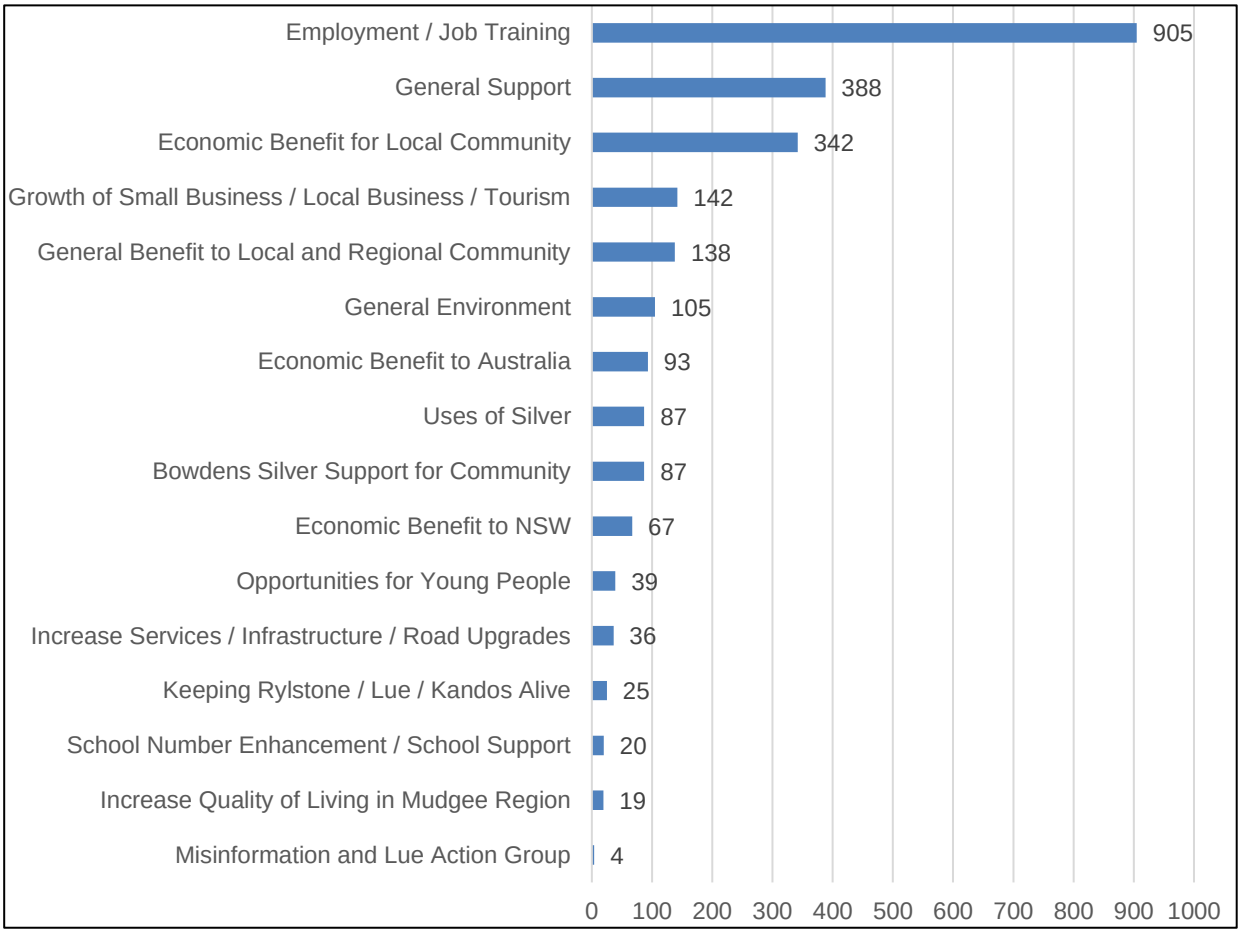
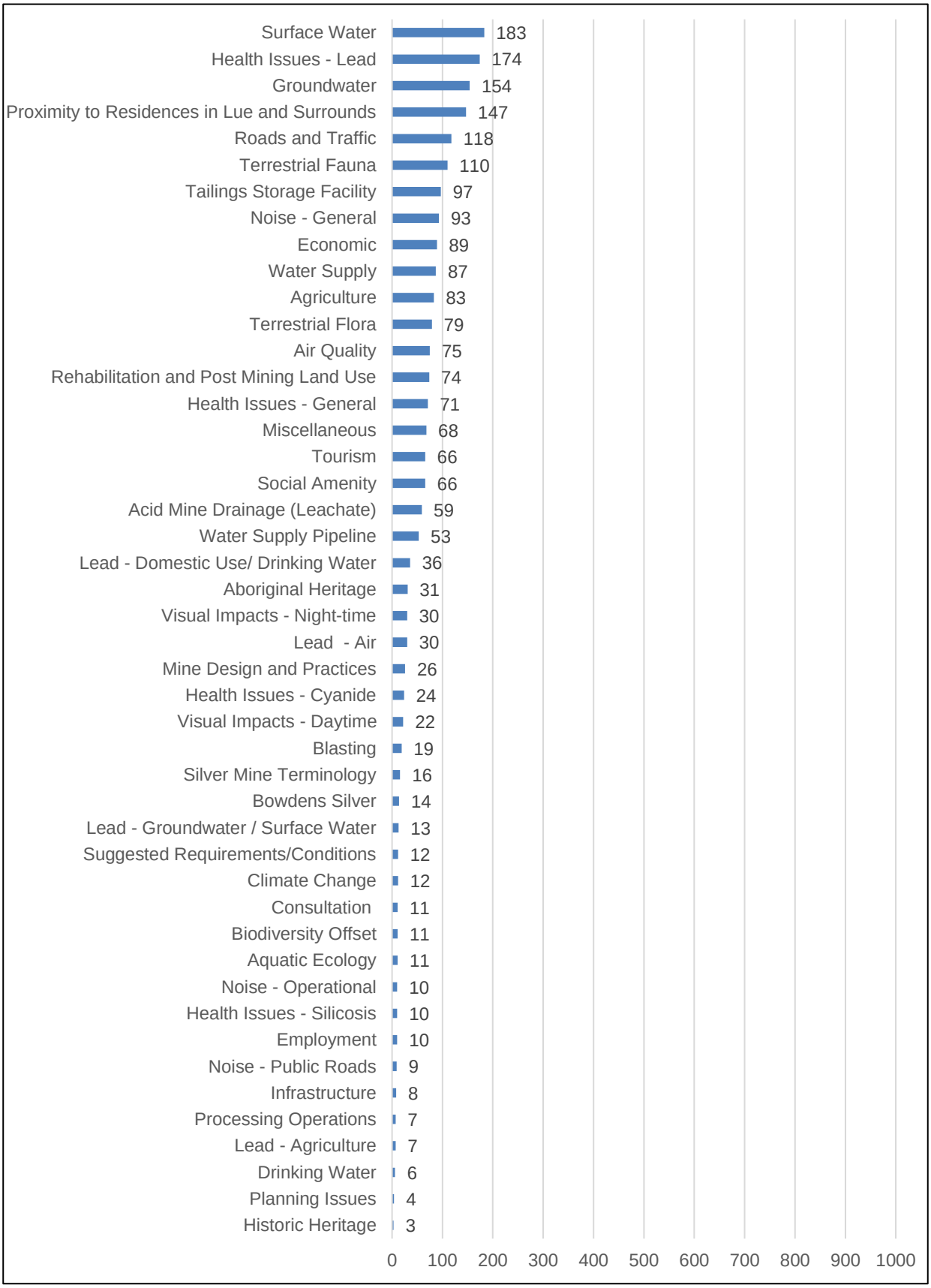


Figure ES3 Frequency of Matters Raised in Submissions Objecting to the Project



ACTIONS TAKEN SINCE EXHIBITION

The realignment of the 500kV transmission line, owned and maintained by TransGrid, that currently traverses the Mine Site on the western edge of the main open cut pit is now proposed to be incorporated into the Project. This amendment to the development application for the Project has been presented in the *Amendment Report for the Bowdens Silver Project*.

Bowdens Silver has consulted with DPIE and TransGrid regarding the proposed amendment to the Project and DPIE (as delegate for the IPC) has agreed to the amendment to the application. It is noted that the inclusion of the proposed realignment of the existing 500kV transmission line in the application does not change the land on which the Project would be developed or the outcomes of assessment as this component (being the transmission line) was comprehensively assessed in the EIS. No additional environmental impacts have been identified.

In order to address the matters expressed in the community submissions objecting to the Project and the requests for clarification or more refined assessment from Government agencies, Bowdens Silver has refined its proposed environmental management approach and commissioned a range of additional supplementary technical assessments to provide additional information and clarification on the various matters. A summary of the actions taken since the exhibition of the EIS and the outcomes of any additional technical assessments is presented below.

Despite the additional assessment to clarify and refine the outcomes of technical assessment of the Project, there have been no changes to the overall conclusions presented in technical assessment as a result of the review of submissions. Changes to the biodiversity offsetting obligations of the Project were triggered by on-site monitoring or native flora and not as a result of matters raised in submissions.

TSF Modelling and Seepage Mitigation

A key matter raised in submissions related to perceived risks to groundwater and surface water resources arising from the construction and development of the Tailings Storage Facility (TSF). Submissions from the EPA and DPIE Water also requested additional assessment of seepage from the TSF and any related potential impacts.

Further consultation with the EPA since the exhibition of the EIS has confirmed that the TSF liner configuration and permeability presented in the TSF conceptual design meets the EPA's criteria, provided any approval was supported by appropriate conditions of consent. The EPA criteria are intended to set best practice design principles for the permeability of clay linings for tailings storage. Regardless of the above, and in response to the submissions and comments, Bowdens Silver has proposed to add further design elements to the TSF that are focused on providing additional seepage mitigation. As Bowdens Silver is focused on demonstrating its commitment to the highest feasible environmental standards, it considers the cost associated with additional seepage mitigation as reasonable, given that it will provide added certainty for the community, relevant Government agencies and for the consent authority when reviewing the merits of the Project.

Two design options were considered that added to the preliminary design presented by ATC Williams (2020) and incorporated different scenarios for the application of additional Bituminous Geomembrane (BGM) liner and the use of underdrainage. Both options were subject to the following additional modelling.

Refined Groundwater and Solute Transport Modelling

Small scale refinements were made to the peer-reviewed regional groundwater model in the vicinity of the TSF. These refinements allowed for improved prediction of seepage and assessment of the effectiveness of mitigation measures. The outcomes were subject to solute transport modelling to predict the flow path of the seepage originating from the TSF.

Mixing and Dilution Modelling

The results of refined groundwater and solute transport modelling were then applied in mixing and dilution modelling to predict water quality in receiving surface water and groundwater systems.

The additional modelling provides a deliberately conservative indication of the flow path and dilution of seepage. It is noted that this approach to the assessment likely overpredicts potential outcomes and as it does not consider the natural processes within the TSF and receiving systems that will invariably influence actual outcomes. An example of this is the breakdown of cyanide within the TSF decant pond as the result of volatilisation, which would result in the loss of up to 90% of the cyanide present (NICNAS, 2010), substantially reducing the concentration of this compound in any seepage. Further to this, any cyanide within seepage would be subject to natural degradation within the natural groundwater setting.

The outcomes of the modelling have been considered in terms of:

- seepage flux from the TSF to the groundwater setting;
- seepage contribution to groundwater baseflow to Lawsons Creek;
- the percentage contribution of seepage to water flows in Lawsons Creek; and
- potential impacts to water quality.

The outcomes of the assessment undertaken by Jacobs (2021) demonstrates that extension of the BGM liner beyond the TSF embankment provides further reduction in predicted seepage. When solute transport, mixing and dilution is considered, an extended BGM substantially limits predicted changes to Lawsons Creek water quality. The TSF layout has been updated to include this mitigation and is presented in **Figure ES4**. It is proposed that in the event the Project is approved, further assessments would be undertaken to confirm the detailed design of the TSF, including the BGM liner extent. Bowdens Silver envisages that this approach would commence with a BGM liner over the entire impoundment area with any proposed reduction to BGM extent justified by technical assessment (i.e. seepage modelling). Therefore, the extent of BGM presented in **Figure ES4** may vary as a result of detailed design.

This assessment clearly demonstrated that, despite the highly conservative (i.e. worst case) approach, the proposed seepage mitigation would ensure that potential impacts to the groundwater setting and Lawsons Creek would not impair the existing or future use of these water resources. In almost all instances, the predicted Lawsons Creek water quality, across the range of flow conditions, is below the thresholds published in the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2019) for aquatic ecosystems and agricultural uses.

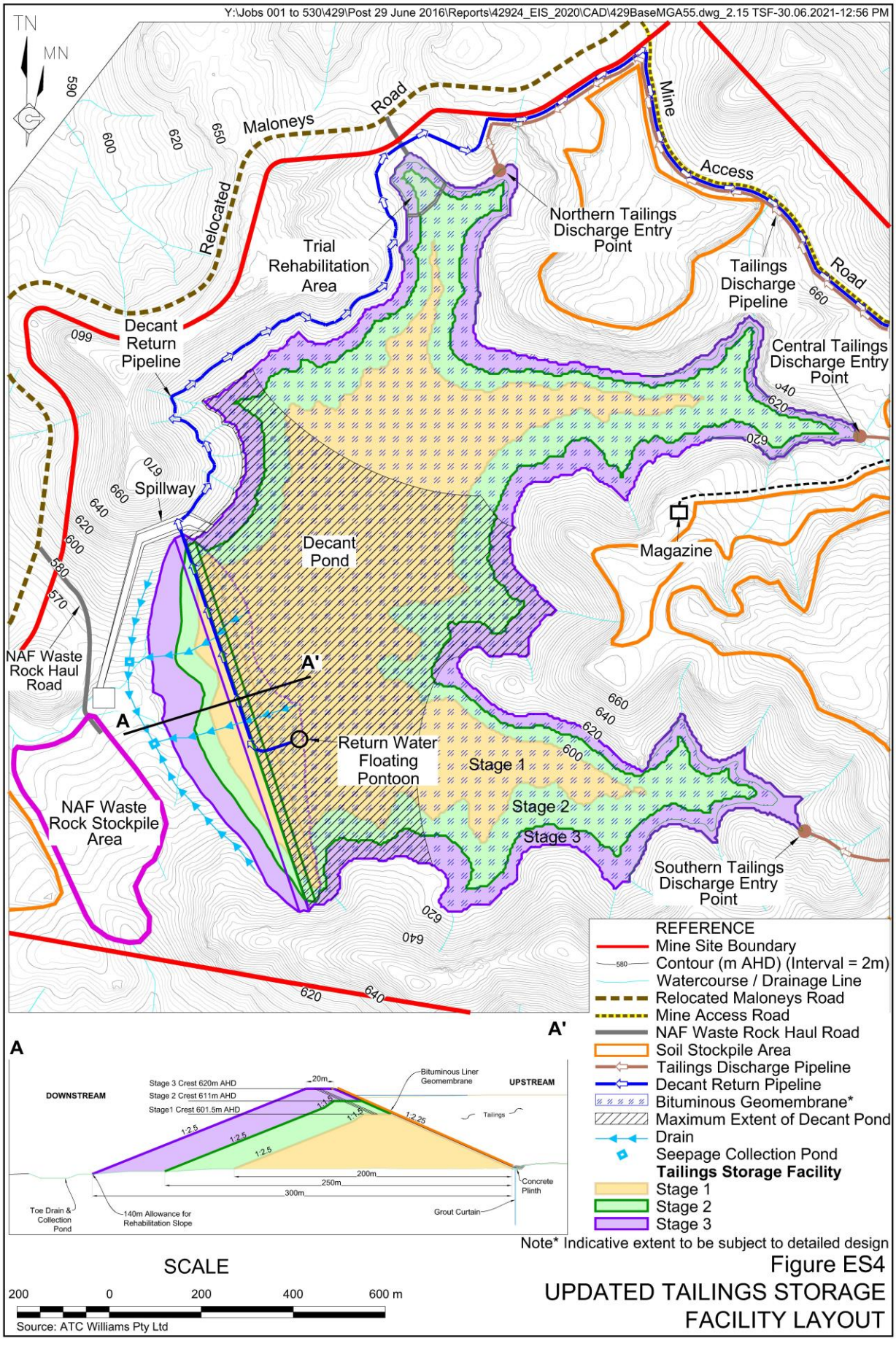


Figure ES4
UPDATED TAILINGS STORAGE FACILITY LAYOUT

It is considered that the assessment undertaken to date is sufficiently detailed and conservative to permit approval of the conceptual design of the TSF for the Project. Whilst the conceptual TSF design would be approved through the development application process, optimal configuration for TSF design elements would occur as part of the detailed design process. Refinement of the nature and extent of TSF design elements through detailed design would ensure the nominated seepage outcomes (or better) are achieved prior to construction. This process would be used to confirm the optimal configuration for seepage mitigation to achieve best practice TSF design intent and limit potential impacts to surface water and groundwater resources from seepage with regards to current and future beneficial uses, as defined by published water quality guidance.

Water Balance Modelling

Bowdens Silver commissioned WRM to revise the low runoff scenario water balance model outcomes to test the sensitivity of the site water balance to potential further reductions in the rate of surface water runoff. This was undertaken to demonstrate possible impacts of more extreme climate scenarios, such as that experienced during the recent drought, and to indicate the extent to which the operation would rely on make-up water under this scenario. The revised runoff parameters further reduced the runoff from different catchment types by between 9% and 24% as indicated in the average annual runoff.

The results identify that the AWBM parameter changes reduce mean annual runoff to 707ML. When compared to the low runoff water balance scenario presented in Table 5.10 of WRM (2020), these changes represent:

- a 7.6% reduction on the previously presented 765ML/year low runoff water balance scenario;
- a decreased evaporative loss from the previously modelled 430ML/year, due to the reduced water surface areas; and
- a 9.8% increase in average annual imported water requirements (from 361ML/year to 400ML/year).

Bowdens Silver considers the proposed external water supply will be more than sufficient to supply make up demands of this magnitude. Consequently, the impact of reduced runoff from the Mine Site on maximum water supply requirements (which are largely independent of the contribution of site runoff) would be minor.

Threatened Flora and Biodiversity Offsetting

During routine environmental management activities undertaken within the Mine Site, Bowdens Silver's Environmental Officers discovered a small population of the Small Purple-pea (*Swainsona recta)* within the proposed development footprint following a period of favourable weather conditions. An additional population was also identified beyond the development footprint within the proposed biodiversity offset area. As a result of these discoveries, AREA Environmental Consultants & Communication Pty Ltd (AREA) was commissioned to undertake further targeted threatened species searches within the Mine Site.

The searches identified a total of four *Swainsona recta* individuals (occurring as one discrete population) and approximately 64 Silky Swainsona-pea (*Swainsona sericea)* individuals (occurring as four discrete populations) within the proposed development footprint. No

Euphrasia arguta, *Prasophyllum* sp. Wybong or *Prasophyllum petilum* Tarengo Leek Orchid were detected. The *Swainsona recta* is a threatened species listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Biodiversity Conservation Act 2016* (BC Act). The *Swainsona sericea* is a threatened plant, listed as endangered, under the BC Act but is not listed as a threatened plant in the EPBC Act.

Using the OEH Biobanking Calculator (version 4.0), EnviroKey updated the biodiversity offset requirements for the Project, including the additional species credits required to offset impacts to *Swainsona recta* and *Swainsona sericea*. These updated credit obligations have been incorporated into an updated Biodiversity Assessment Report (BAR).

Bush fire Impact Assessment

Niche Environment and Heritage Pty Ltd (Niche) was commissioned to undertake an assessment of the impacts of the Summer 2019/2020 bushfires on Matters of National Environmental Significance (MNES) under the EPBC Act. This assessment (Niche, 2021) was a requirement of the Commonwealth Department of Agriculture, Water and Environment (DAWE) and includes an assessment of potential impacts to the following five species and one threatened ecological community.

- Koala (EPBC-Vulnerable)
- Large-eared Pied Bat *Chalinolobus dwyeri* (EPBC-Vulnerable)
- Regent Honeyeater *Anthochaera phrygia* (EPBC-Critically Endangered)
- Swift Parrot *Lathamus discolor* (EPBC-Critically Endangered)
- Small purple-pea *Swainsona recta* (EPBC-Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community (Box gum woodland) – (EPBC-Critically Endangered).

Niche (2021) concludes that the loss of regional habitat for MNES listed species may in some cases result in increased reliance upon habitat within the Mine Site and Biodiversity Offset Area. However, it is also noted that impacts associated with the Project are unlikely to commence until at least 2022 and a significant degree of vegetative recovery is expected in areas impacted by the bush fires, particularly in those areas impacted by low to moderate severity fire. As such, the increased significance of the habitat within the Project and Offset areas would reduce over time and the assessment outcomes of the BAR would not be significantly affected by the 2019/20 bush fires.

Construction and Road Noise

Minor updates to noise modelling and assessment have been undertaken in response to matters raised in submissions.

- Activities undertaken during the first six months of the site establishment and construction stage during proposed daytime out-of-hours (Saturdays 1:00pm to 6:00pm) have been re-assessed against the daytime background +5dB(A) criteria. The results of this assessment are presented in Section 5.18.5.

- The review of operational noise modelling scenarios identified that Scenario 3 (Year 8) required modification to more accurately assess the noise impact from the unrestricted in-pit operation of the D9 dozers. The results of this assessment are presented in Section 5.18.6.
- The component of construction works associated with the relocated Maloneys Road (where it is located between the mine entrance and the TSF) has been re-assessed as daytime operational noise rather than construction noise. The results of this assessment are presented in Section 5.18.7.
- The traffic noise assessment for operational Scenario 2 (Year 3) has been updated to include the vehicles required for the 500kV powerline re-alignment works. The results of this assessment are presented in Section 5.18.9.

It is noted that updated noise modelling and assessments result in no material change in the assessment outcomes for potential noise impacts or conclusions as presented in the Noise and Vibration Assessment.

Metal Concentrations in Dust

In response to matters raised by the EPA, the Air Quality Assessment (AQA) has been updated to address some typographical errors as well as to provide further statistical review of metal concentrations in source materials (i.e. soil, waste rock and ore). The statistical review concludes that the median values, which were adopted within the original AQA, remain the appropriate values in calculating received metal concentrations.

Additionally, a sensitivity analysis has been provided that demonstrates that, regardless of whether the median, mean or 90^{th} percentile of the assumed metal contents is used, the predicted concentrations are below the impact assessment criteria for all metals. The outcomes of this analysis demonstrate that metal concentrations in dust are best managed through reducing overall dust emissions, rather than specific management of materials that have elevated metal concentrations.

Human Health Risk Assessment

In response to the submissions received and an independent peer review commissioned by DPIE, the Human Risk Assessment (HHRA) has been updated to clarify and expand on matters presented in the original assessment. In addition, a clerical error in the units applied in the levels of copper and manganese sourced from dust generated through handling of ore and waste rock has been corrected. A sensitivity analysis has been included relating to adoption of lower background lead concentrations. The sensitivity calculation determined that adopting the background soil lead concentration presented by the Lue Action Group does not significantly change the total risk index (RI) for existing community exposures (as these are dominated by dietary intakes).

Project Matters

A range of project-related matters have continued to be investigated or completed during the period since exhibition of the EIS. These include the following.

- **Water Access Licence Entitlements** - Bowdens Silver has secured water access entitlements that cover the predicted peak water take during mining operations, including the following.
  - 907ML from the Lachlan Fold Belt (Other) Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources.
  - 194ML from the Sydney Basin Groundwater (Other) Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources.
  - 139ML from the Lawsons Creek Water Source of the Macquarie Bogan Unregulated and Alluvial Water Source.

  Bowdens Silver has continued discussions to finalise a commercial agreement for the external water supply for the Project from the Ulan Coalfield.

- **Landowner Agreements under VLAMP** - Bowdens Silver has continued to engage with landowners in the vicinity of the Mine Site that are predicted to experience an exceedance of noise assessment criteria under adverse meteorological conditions and worst-case operational scenarios. These outcomes of noise assessment trigger acquisition and/or mitigation rights under the NSW V*oluntary Land Acquisition and Mitigation Policy* (VLAMP) (NSW Government, 2018).

  The VLAMP requires that acquisition or negotiated agreements be considered by applicants in situations where there are no viable alternatives to minimise environmental impacts and these impacts do not comply with the relevant assessment criteria. Should the land not be acquired, or a negotiated agreement is not achieved, it is up to the consent authority (in this case the Independent Planning Commission (IPC)) to weigh up the relevant economic, social and environmental impacts of the Project and determine if the application should be approved.

  Of the five properties reported in the EIS to have triggered acquisition and/or mitigation under the VLAMP, agreements have been reached with one landowner and a draft agreement provided to another three. Discussions are continuing with those landowners and are yet to finalise agreements.

  A further six landowners have been offered tailored mitigation measures (to be determined with the landowner based on input from a builder and acoustic specialist) for predicted negligible noise impacts, but who would not require negotiated agreements under VLAMP. Agreements have been reached with three landowners and discussions are continuing with the remaining three landowners.

  It is Bowdens Silver's preference that acquisition or negotiated agreement be achieved. However, in the event this does not occur before determination of the application, Bowdens Silver agrees that conditions of consent would be set to the predicted noise levels and voluntary mitigation and/or acquisition rights continue

to apply for a specified period. It is noted that the VLAMP includes a dispute resolution process, however this relates to the agreement of reasonable and feasible mitigation measures or agreement on land valuation and not the predicted impact, which in the case of the Project have been peer reviewed and assessed by the EPA and DPIE.

- **Planning Agreement** - Bowdens Silver met with representatives of Mid-Western Regional Council (MWRC) on 23 November 2020 to discuss indicative terms for a Planning Agreement. Negotiations have continued since that date with Bowdens Silver agreeing to the most recently requested amendments to the terms of the agreement. An updated draft of these terms has been provided to MWRC for consideration and Bowdens Silver is awaiting advice that the terms of the agreement have been accepted. Once the terms are agreed, they will be made public. While the exact terms remain confidential at the time this document has been finalised, the Planning Agreement very broadly provides a mechanism for Bowdens Silver to make a financial contribution to the region that would be expended on community infrastructure and road maintenance.
- **Independent Peer Reviews** - Three independent peer reviews have been commissioned by the DPIE for the Project. The peer reviews reviewed the following technical assessments undertaken for the Project.
  - The Groundwater Assessment undertaken by Jacobs Group (Australia) Pty Limited.
  - The Human Health Risk Assessment undertaken by Environmental Risk Sciences (enRiskS) Pty Ltd.
  - The Economic Assessment undertaken by Gillespie Economics.

  Individual responses to these peer reviews have been presented to DPIE and are not included with this document. However, any updates to assessment outcomes as a result of the independent peer review outcomes have been presented with this document.

COMMENTARY ON SUPPORTIVE SUBMISSIONS

There is obvious support for the Project in the local, regional and NSW community. Bowdens Silver has engaged with and been a part of the local community since 2016. During that time, Bowdens Silver has sought to familiarise community members with Bowdens Silver and the Project. The extent of strong support in the community is testament to Bowdens Silver's efforts to answer questions and address concerns.

While many submissions commented on the need for employment opportunities and training, there were a number of matters raised that support the social licence for Project and the Company.

Bowden's Silver Support for Community

Some submissions highlighted the donations and sponsorships Bowdens Silver has made towards local community events, local sports, the local schools, local businesses as a perceived benefit of the Project and indicator of the Company's approach to the community.

Bowdens Silver recognises that the Company's support of the local community involves financial and other support for local groups and their initiatives. This support and involvement of Bowdens Silver's personnel with the surrounding community forms part of Bowdens Silver's commitment to obtain and maintain its social licence to operate the Project.

In the event the Project is approved, Bowdens Silver would continue its support for the local community through expansion of its highly successful Community Investment Program that would continue to support community-led initiatives and programs. In addition, Bowdens Silver has offered to enter into a Planning Agreement with the Council to provide for the making of further financial contributions to be used for the benefit of the local community.

Economic Benefits

A large proportion of the submissions raised the benefits that the Project would provide to the local, state, and federal economies. Similarly, submitters from outside the Mid-Western Regional LGA raised the benefits the Project would bring to the whole of NSW and not just the Mudgee, Rylstone and Kandos area.

The Economic Assessment of the Project established that the estimated net social benefits of the Project to NSW would be between $44 million and $146 million with the latter including employment benefits. The Project is estimated to have net social benefits to Australia of between $89 million and $192 million, with the latter incorporating the benefits of employment. A considerable contribution to the overall economic benefit to the Australian economy would be company tax estimated to be $48 million.

Employment / Job Training

Opportunities for employment and job training were the most frequently raised matters in all submissions. Bowdens Silver is committed to maximising the employment of persons residing in the Mid-Western Regional LGA and acknowledges that some personnel may require assistance in training / re-training. Part of that commitment would be participating in apprenticeship and traineeship programs for local youth.

Overall, Bowdens Silver would provide a considerable boost to employment in the Lue / Rylstone / Kandos / Mudgee area with up to 320 persons during the 18 month site establishment and construction stage and 228 persons during the operational life of the Project. It is also well known and widely shared amongst industry and business groups that for every job created within the mining industry, a further 2 to 3 jobs are created locally within the associated service and supply businesses.

General Environment

Numerous submitters expressed their recognition that Bowdens Silver has undertaken its activities to date in an environmentally responsible manner.

General Benefit to Local and Regional Community

Many submissions also noted that predicted benefit that the Project would have for the local and regional community in general. This included reference to matters such as the following.

- Support for ancillary businesses for the mining industry.
- Support "Bowdens Farm" on buffer land around the mining operation – i.e. making the best of any suitable agricultural land that is not required for the Project.
- Diversification of the mining industry that Mudgee has relied upon in recent years.
- The significant positive knock-on effects for local and regional communities.
- Young families would not be forced to move away from the area to secure long-term opportunities for themselves and their children.

General Support

Numerous submissions expressed general support for the Project, providing brief statements such as "A great project" or "I support mining in our community".

Growth of Small Business / Local Business / Tourism

Several submissions made reference to the benefits of the Project to either existing local businesses, or potentially new small businesses that could be supported by Bowdens Silver and its employees. These sentiments were expressed mainly by submitters from Lue, Rylstone, or Kandos.

Bowdens Silver intends to operate the Project with emphasis placed upon support for local businesses whenever possible. To date, Bowdens Silver has used in excess of 130 local businesses and suppliers across a range of industries and services. Bowdens Silver is committed to developing a local employment and procurement strategy to maximise the economic benefits within the Mid-Western Regional LGA. A local business and supplier register has been compiled that would assist Bowdens Silver in identifying local businesses and suppliers that have already registered an interest in working with the Company throughout the Project life.

Increased Services / Infrastructure / Road Upgrades

Several submissions supported the commitments from Bowdens Silver to undertake infrastructure improvements and road upgrades which would benefit the Project and the local community as well as tourists travelling on the subject roads.

Increase Quality of Living in Mudgee Region

Reference was also made to the potential for the Project to benefit the quality of living in the Mudgee region that would occur as a result of the Project. Bowdens Silver recognises that its Project would contribute, albeit to a modest extent, to the continued vibrancy of Mudgee through a diversification of the mining industry which together with other industries, has been instrumental in the recent growth of Mudgee and other areas in the Mid-Western Regional LGA.

Keeping Lue / Rylstone / Kandos Alive

Several submissions made a reference to the impact the Project would have in keeping Lue and the surrounding towns of Rylstone and Kandos alive. Bowdens Silver acknowledges that the Project has the potential to contribute in a substantial way to the revival and ongoing viability and social capital of the townships of Lue, Rylstone and Kandos through a boost in employment opportunities for the local population, opportunities for expansion in other industries such as tourism and accommodation and increasing the chances of sustainability of local business across a range of other industries.

Bowdens Silver is committed to implementing a local procurement and employment strategy that would help drive business within these small towns, both during and after the Project. Bowdens Silver has also sponsored and supported a large range of community groups, education providers and events in the Lue, Rylstone and Kandos areas through its Community Investment Program, which would be expanded should the Project be approved.

Misinformation and Lue Action Group

Concern regarding the campaign of opposition to the Project, including misleading information, was identified in some submissions. Bowdens Silver has been disappointed by the circulation of misinformation about the Project by the Lue Action Group (LAG). It is acknowledged that a proportion of Lue and district residents are opposed to the Project, however, it remains Bowdens Silver's preference that a constructive dialogue is established to enable concerns relating to the Project to be discussed.

Opportunities for Youth

Opportunities for the local youth population was identified as a benefit of the Project in some submissions. Bowdens Silver has made a commitment to provide employment for local people and proposes to support the training of a number of young people, in conjunction with local training organisations, to undertake a range of tasks within the Mine Site. The Company has held discussions with education providers and job seeker training and employment providers around future traineeship and apprenticeship programs.

School Number Enhancement / School Support

Several submissions made reference to the support Bowdens Silver has provided to the local school and the additional positive flow-on-effects the Project would have on the schools if it is approved. Bowdens Silver intends to continue to support the Lue Public School through sponsorship, special project funding and the participation of Company personnel to assist in school events, etc. Bowdens Silver currently leases company properties with a preference for those families that have school children attending Lue Public School and this will continue as the mine develops and operates.

Uses of Silver

Numerous submitters recognised the beneficial uses of silver, particularly for use in solar panels and emerging technological advances. This recognition underpinned the submitters' support for the Project. Along with these uses, silver is also used in a wide range of everyday electronic

devices, in the automobile, automation, aerospace, and the biosciences industry. Some submissions also expressed the need for the mining industry to diversify from the coal industry into more niche and beneficial metalliferous industries such as silver mining. In a number of cases, submitters expressed the benefits of mining the silver for use in Australia.

RESPONSES TO MATTERS RAISED

A varied number of matters were raised in Government agency, organisation and public submissions that requested additional information, clarification or additional assessment as well as general object in some organisation and public submissions. The matters raised have been addressed under the topics identified and are presented in alphabetical order.

Aboriginal Heritage

Submissions regarding matters of Aboriginal cultural heritage were received from some registered Aboriginal groups that are stakeholders for the Aboriginal Cultural Heritage Assessment (ACHA) (Landskape, 2020), as well as other Aboriginal groups and from the general public. It is noted that NSW Heritage provided comments on the ACHA and EIS that were generally supportive of outcomes of the assessment and the extent of consultation undertaken.

The matters raised in submissions included general objection to the Project due to impacts to land, the process of assessment and the conclusions of the assessment. It is acknowledged that additional archaeological field survey would be required for the Project to assess those areas of the water supply pipeline corridor for which access has not yet been possible. Regardless, the conclusions and outcomes of the ACHA remain unchanged following consideration of the submissions. That is, although the Project would require the removal and salvage of 25 Aboriginal cultural heritage sites, these sites are indicative of open occupation and are relatively common in the vicinity of the Mine Site. The assessment of significance has indicated that the artefacts and areas recorded by Landskape (2020) are generally of low cultural significance, however Bowdens Silver recognises the high cultural significance for the Aboriginal community of any disturbance of land.

Bowdens Silver acknowledges the need for ongoing management to limit the risk of inadvertent impacts to matters of Aboriginal cultural heritage significance. These measures would be implemented through a Heritage Management Plan that includes protocols for staff training and awareness and for the management of unexpected finds.

Acid Mine Drainage

Throughout the EIS, the liquid draining from the potentially acid-forming (PAF) ore, waste rock and tailings was consistently referred to as leachate, a term reflective of its origin as a product of interaction between water, oxygen and reactive sulphide minerals. The term leachate is therefore synonymous with acid mine drainage (AMD) which was the subject of a number of submissions.

Submissions that commented on leachate generation generally or the proposed management of leachate have been reviewed by Bowdens Silver and its consultants. Following this review, no changes to leachate management were considered to be necessary. However, Bowdens Silver has

elected to include additional seepage management measures for the TSF. Further consideration of leachate management measures would be a key component of detailed design processes, with the management approach to be refined and implemented throughout the Project life.

Agriculture

The agricultural history and productivity of the locality and the wider Mid-Western Regional LGA is acknowledged, and several submissions expressed concern at the potential loss of high value agricultural land and the potential for lead exposure of agricultural produce. The Agricultural Impact Assessment for the Project confirmed that the land within the Mine Site is not high value agricultural land and has thoroughly assessed the predicted changes in land use and concluded that adverse impacts on agriculture in the region would be negligible. Review of the submissions and comments provided by DPIE Agriculture and the community has not changed the proposed management or commitments relating to agricultural land and the conclusions relating to agricultural impacts have not changed. That is, given the design of the Project and the mitigation measures to be adopted, adverse impacts on agriculture would be negligible. The proposed progressive return of land to productive uses and following rehabilitation of the Mine Site are an important element of this conclusion.

Air Quality

Submissions relating to air quality included a range of queries and requests for clarification on the assumptions used for predictive modelling and the outcomes of the assessment. The EPA requested additional clarification on metal concentrations in dust / particulates and confirmation that best practice management and mitigation would be implemented. Bowdens Silver has also elected to include a sensitivity analysis of metal concentrations assumed for assessment to further test the outcomes of modelling. Submissions relating to health risk and lead are closely related to the outcomes of the Air Quality Assessment (AQA). An updated AQA has also been prepared to include clarification and additional statistical summary of metal concentrations in source materials, provide the detailed emissions inventory tables, and correct some clerical errors.

The following responses to air quality-related matters raised within the submissions provides further clarification and information, where necessary. The key matters and responses in relation to air quality are as follows.

- Predicted metal concentrations within particulates at surrounding receivers have been determined by application of the median metal concentration for three source groups, namely soil, waste rock and ore.
- The median metal concentrations from each source group have been determined from an extensive baseline sampling program.
- A sensitivity analysis was undertaken for the metal concentration with the analysis determining that, regardless of whether the median, mean or 90th percentile of the metal contents is used, the predicted concentrations are below the impact assessment criteria for all metals.
- The sensitivity analysis demonstrates that proposed management and mitigation practices which focus upon reducing overall dust emissions remain the most effective measure to minimise metal concentrations at surrounding receivers.

- The emission reduction factors applied within the AQA can be readily achieved and have been demonstrated in peer-reviewed literature and through standard industry practice to be effective and achievable.
- NO_2 emissions and blast fume risk would be managed in accordance with a Blast Management Plan incorporating blast management practices and blast fume prevention measures consistent with those demonstrated within the industry to be effective in controlling blast fume.

Importantly, none of the outcomes or conclusions from the AQA have changed. In particular, the AQA continues to predict that there would be no exceedance of the relevant air quality criteria for particulate matter (TSP, PM_{10}, $PM_{2.5}$) at any privately-owned residences or receivers, either from the Project alone or cumulatively. It is also predicted that there would be no exceedance of the impact assessment criteria at any receivers (Project-related or private) for metal dust concentrations, respirable crystalline silica or HCN.

An extensive range of proactive management measures are proposed to minimise potential for impacts most of which are incorporated into the predictive modelling assessment. In addition, a range of reactive / adaptive management measures have been proposed but which cannot be modelled in the assessment and therefore should be considered further mitigation to likely risks and predicted impacts.

Aquatic Ecology

Submissions commenting on the Aquatic Ecology Assessment (Cardno (2020)) were provided by NSW DPI – Fisheries and the Lue Action Group. The Aquatic Ecology Assessment for the Project was undertaken by Cardno (NSW/ACT) Pty Ltd (Cardno, 2020) based on comprehensive field survey and assessment.

The outcomes of the assessment relating to aquatic habitats and stygofauna remain unchanged as a result of additional review and consideration of the submissions. It has been confirmed that suitable watercourse crossings would be incorporated into the minor unsealed access road that crosses Price Creek to ensure passage for fish and other aquatic biota, although the relevant watercourses are ephemeral in nature and provide limited aquatic habitat.

It is also noted that there would be no direct disturbance at Hawkins and Lawsons Creeks and the un-named and ephemeral watercourses that would be removed have limited aquatic habitat value. The current poor condition of riparian vegetation in the vicinity of the Mine Site is the result of historic land use practices which would not be exacerbated by the Project.

Given the design of the Project and the mitigation measures to be adopted, adverse impacts on the aquatic environment would be unlikely. Any risk of impacts on aquatic ecology associated with operations within the Mine Site would be mitigated and/or minimised through the adoption of the proposed mitigation measures. The Project is expected to have limited impact to aquatic ecology in the context of the local and regional area within which comparable habitat is highly abundant.

Biodiversity Offsetting

Submissions were received from the Mid-Western Regional Council, NSW Government agencies and the public in relation to the outcomes of biodiversity assessment and the biodiversity offsetting obligations for the Project.

Biodiversity offsetting is required to account for residual Project-related impacts to native vegetation and threatened flora and fauna. One outcome of the Updated Biodiversity Assessment Report (EnviroKey, 2021) is the re-calculation of the offsetting obligations in accordance with the NSW Biodiversity Offsetting Scheme under the *Biodiversity Conservation Act 2016*. Updated calculations of biodiversity offsetting obligations are presented.

The Biodiversity Offsetting Strategy has been prepared by Niche Environment and Heritage (Niche, 2020) and outlines how Bowdens Silver intends to satisfy its biodiversity offsetting obligations and demonstrates that this is achievable under the relevant legislation and guidelines. Biodiversity offsetting is a common and standard practice for State Significant Development mining projects such as the Project. It is a technical and highly regulated process intended to ensure that residual impacts to biodiversity are offset by equivalent conservation in a manner that is transparent and accountable. Bowdens Silver has followed all relevant legislation and guidelines in its assessment of biodiversity impacts and in determining the offsetting obligations of the Project. Final strategies for offsetting would be subject to approval by DPIE.

The outcomes for biodiversity and the proposed Biodiversity Offset Strategy remain unchanged as a result of the review of submissions. That is, it is proposed that offsetting obligations would be satisfied in a staged manner consistent with the progressive development of the Project and would involve:

- establishing a Biodiversity Stewardship Site on land owned by Bowdens Silver in proximity to the Mine Site;
- purchase and retirement of credits generated by other parties on private property; and
- payment to the Biodiversity Conservation Trust.

Each of these options is available to Bowdens Silver in accordance with the *Biodiversity Conservation Act 2016*. The final Biodiversity Offset Strategy would be approved by DPIE prior to the commencement of vegetation clearing. It is currently unlikely that Bowdens Silver would need to rely upon credit generation following rehabilitation of the Mine Site to meet its offsetting obligations.

Bowdens Silver

A number of submissions included questions or statements regarding Bowdens Silver and its capabilities to develop and operate a silver mine, the general attitude of the Company towards local residents and approach to the community and becoming part of the Lue community.

The overwhelming support shown in the community for the Project is a testament to the manner in which Bowdens Silver has continued to engage with the local community in the planning and assessment of the Project. Bowdens Silver is a company committed to the Bowdens Silver Project as it is its main focus to obtain all necessary approvals to enable it to establish and operate the Project. Bowdens Silver is fully committed to establishing and operating the Project in a manner

that is environmentally responsible, compliant with all conditional requirements and proactively working with the local community to support Lue residents, businesses and the surrounding rural community.

Bowdens Silver is also fully committed to work with its immediate neighbours to ensure that the changes likely to be experienced as a result of the Project are acceptable to the neighbours, i.e. through the adoption of a range of neighbour-specific measures. It is important to Bowdens Silver that the concerns that have been expressed by Lue and district residents are responded to and managed through the adoption of the practical mitigation measures recommended throughout the comprehensive range of environmental studies prepared for the Project.

Bowdens Silver is proud of its interactions with the community to date and would continue to consult widely with the Lue and district community and surrounding rural areas and towns to ensure factual information is provided and any potential concerns are promptly addressed.

Cyanide

The concern and uncertainty reflected in public submissions regarding the potential risks associated with cyanide transportation, storage, use and the management of residual cyanide in tailings is acknowledged. Bowdens Silver is also aware that opponents of the Project have focused on this issue in their objections both formally through the development assessment process and publicly in the media and other avenues.

It should be clear that the use of cyanide in mining processes is a common and well understood process. The risks of potential adverse outcomes are well understood and managed, including in waste materials (tailings). It should be stressed that the concentrations of cyanide used for the Project would be significantly lower than other existing and approved mining such as the Tomingley Gold Project (Tomingley) and the Hera Gold Project (Nymagee) which have not reported pollution outcomes associated with cyanide over many years of operations.

Regardless, Bowdens Silver would ensure the safe transportation and storage of cyanide on site and that its use and management would be consistent with world's best practice. Bowdens Silver reiterates that the management of cyanide use in mining is a common and well understood practice and therefore the risk of pollution impacts are minimal.

Economic

Matters raised within submissions referring to the Economic Assessment prepared by Gillespie Economics (2020) principally related to Project economics and Mine viability, concerns relating to property devaluation, economic impacts to surrounding land uses, and compensation for impact. Discussion and clarification of these issues has been provided, however, no updates or changes have been required to the Economic Assessment which demonstrates that there would be substantial economic and employment benefits to the NSW and local community resulting from the Project.

Groundwater

Matters raised within submissions referred to the assessment of groundwater resources or generally commented upon the groundwater resources within the Mine Site and broader region. Matters raised in submissions that refer to groundwater encompassed a range of issues.

Groundwater availability, connectivity with surface water systems and water quality risks were raised in some submissions, reflecting the rural nature of the region and the likelihood of local residents relying on groundwater to water stock or irrigate. Potential impacts to groundwater resources from Project-related infrastructure such as the TSF, WRE and leachate management dam were also a focus for some community submissions. Predicted groundwater inflows, drawdown from development of the open cut pits, both during operations and following cessation of the Project were also noted in submissions. In addition, some community submissions also queried the inputs to the groundwater assessment including the results of water level and groundwater quality monitoring stream flow, presence of groundwater dependent ecosystems, geological structures and aquifer characteristics used for the groundwater modelling and assessment.

Comments arising from a review of the groundwater model by the Department of Planning, Industry and Environment – Water (DPIE Water) initiated the preparation of an update to the Groundwater Assessment (Jacobs, 2021). The Government reviews agreed with the independent peer review commissioned by Bowdens Silver (HydroSimulations, 2020), that the groundwater model developed to assess groundwater impacts is fit for the purpose of predicting changes to the groundwater setting as a result of the Project.

The principal updates to the Groundwater Assessment were associated with editorial comment and report re-structuring, whereby technical modelling information was moved from the main report to a technical modelling appendix (Annexure 9, Jacobs (2021)).

A refined groundwater model was also developed in the vicinity of the TSF to better understand groundwater movement in the Walkers Creek area. Whilst this model utilised the peer-reviewed groundwater model developed for the EIS, there are no changes to the potential impacts or predictions presented in the EIS. The additional modelling has provided increased certainty with regards to groundwater predictions in the vicinity of the TSF. However, more generally the following conclusions area relevant to the matters raised in submissions.

- Conceptualisation and modelling of the local and regional hydrogeological systems is supported by robust and site specific data (e.g. geology, water levels, flow, groundwater quality and hydraulic parameters).
- The numerical model developed for assessing the potential groundwater impacts from Project development, including the prediction of inflow volumes, water level drawdown and final void behaviour is fit for purpose.
- The Project would not significantly reduce access to, or availability for groundwater users including dependent ecosystems.
- The Project would not alter the beneficial use category of groundwater or surface water resources.
- The proposed design elements of the TSF, WRE, leachate management dam and processing area dams would reduce groundwater impacts such that the Project would not alter the beneficial use categories of local or regional groundwater resources.
- Bowdens Silver has secured water access licences to meet the predicted losses of groundwater from the system, both during operations and post closure.

Health

A number of submissions expressed concerns regarding physical and mental health risks associated with potential and perceived risks of the Project. Health risks associated with lead exposure were of particular concern. These concerns were identified in community consultation for the Project prior to completion of the EIS assessment and the expectations of the local community are well understood.

A comprehensive Human Health Risk Assessment (HHRA) has been undertaken that considered potential impacts on community health in relation to the predicted / assessed changes in air quality, water (both surface water and groundwater) and noise. An updated version of the HHRA has been prepared which clarifies and expands on matters presented in the assessment presented in the EIS. A sensitivity calculation has also been included relating to adoption of lower background lead concentrations as suggested in the review undertaken for the Lue Action Group.

No physical health risk issues have been identified that would be associated with the Project. Mental health matters, principally stress and anxiety, have also been raised by the community and addressed within the EIS and SIA. Notwithstanding, an extensive range of both proactive and reactive / adaptive management measures are proposed for the Project to minimise the potential for unexpected impacts to both physical and mental health.

The following responses to health issues raised within the submissions provides further clarification and information, where necessary. The key issues and responses in relation to health are as follows.

- Radioactive components of minerals would not be liberated by the proposed operations to interact within the environment.
- Where applicable, the assessments have assessed cumulative impacts with relevant criteria and guidelines. The use of conservatively high baseline metal concentrations (as suggested within some submissions) effectively results in a more conservative assessment with less 'buffer' remaining for any incremental increase to remain within the acceptable cumulative risk.
- The predicted concentrations for both respirable crystalline silica and cyanide are significantly below the respective health guidelines with the HHRA concluding that there are no health risk issues in relation to community exposures.
- Both positive and negative mental health outcomes have been identified in submissions. Management measures are proposed to ensure that the community is accurately informed of Project progress and availability of support for health services that would be provided through Bowdens Silver's Community Investment Program.
- It has been reaffirmed that an extensive range of monitoring is proposed and would commence at the beginning of operations to demonstrate compliance with the relevant criteria and guidelines.

Whilst these responses and the minor updates to the HHRA assist in clarifying the various matters raised within the submissions, the outcomes of the HHRA remain consistent with those originally presented, i.e. the Project presents no health risk issues to the local community.

Historic Heritage

Submissions that raised matters of historic heritage impacts associated with the Project referred to heritage buildings outside of the Mine Site disturbance areas and the general heritage of the landscape and locality. These concerns related to how the presence of the Project nearby may affect the heritage values of these buildings and of the locality.

Aside from the historical heritage items identified and assessed by Landskape Environment and Heritage (2020), the Project would not directly impact any items, buildings or places of historical heritage significance. Locations of historic heritage interest outside of mining disturbance would not be directly impacted by the Project. In addition, the Project would not significantly alter the experience of the local landscape particularly from a heritage perspective. Therefore, the impact referred to in submissions is something that is specific to the individual and the value they hold for an item, building or place.

On balance, the Project would not change the historical heritage values of these places nor significantly alter the experience of the local landscape. Therefore, it is concluded that any historical heritage impacts are minor and acceptable.

Infrastructure

Several submissions noted that Bowdens Silver had not concluded arrangements for power supply to the Mine Site at the time the EIS was finalised and that this would be applied for as a separate application to the Project application (SSD 5765). It remains the intention of Bowdens Silver to apply for approval for this powerline and power supply through an application under Part 5 of the *Environment Planning and Assessment Act 1979*. This approach has been agreed in principle with Endeavour Energy and investigations have commenced for this process. Bowdens Silver is investigating power supply via a 66kV powerline that would enter the Mine Site via Breakfast Creek, noting that the final alignment of this powerline remains subject to agreement with landholders.

It is noted that the proposed realignment of the 500kV transmission line that currently transverses the Mine Site has been included in the development application at the request of TransGrid (refer to the *Amendment Report for the Bowdens Silver Project*).

Lead

Whilst some submissions referred to concerns about air quality and human health risks generally, there were a number of submissions that referred specifically to the potential health impacts from lead exposure, principally through the generation and dispersion of dust that may contain higher than average levels of lead. Bowdens Silver has spent considerable time and resources educating and informing the local community regarding the risks associated with lead exposure associated with the Project. This included commissioning a detailed assessment of metal concentrations in particulate matter as part of the Air Quality Assessment (AQA) and then further commissioning a Human Health Risk Assessment (HHRA) that considered lead exposure pathways amongst other health risks.

Potential health impacts of lead were addressed as part of the HHRA. An updated HHRA has been prepared to clarify and expand on matters presented in the original assessment. The updated HHRA also includes a sensitivity calculation for the adoption of lower background lead

concentrations as suggested in the review undertaken for the Lue Action Group. Importantly, none of the outcomes of the HHRA have changed, with the HHRA concluding that impacts derived from the Project would make a negligible contribution to overall exposures to the assessed metals including lead. Importantly, the detailed technical assessment concluded that there would be no health risk issues relevant to the Project for any members of the community, including children and sensitive individuals. Regardless of this conclusion, a comprehensive monitoring program has been proposed so that this may be demonstrated in practice.

The following responses to lead-related issues raised within the submissions provides further clarification and information, where necessary. The key issues and responses in relation to lead are as follows.

- It is inappropriate and misleading to compare the Project to current and historical operations at Broken Hill and Mt Isa. Furthermore, the Project does not include on-site smelting or other high temperature processes that would volatilise the metals present in the ore.
- The HHRA has adopted a blood lead criteria of 3.5µg/dL which is lower than the NHMRC guidance of 5µg/dL and is therefore even more conservative/stringent than is required in Australia and suggested within the submissions.
- The HHRA has utilised a range of conservative assumptions, including use of the highest predicted metal concentrations at a surrounding receiver and applying this for the entire community over the life of the Project and, for relevant exposures, well beyond the life of the Project.
- The adopted baseline levels have been reviewed and continue to be considered appropriate. These levels have been, in part, based on an extensive baseline monitoring program completed as part of the assessment. Furthermore, a program of monitoring would commence at the beginning of operations to demonstrate compliance with the relevant criteria and guidelines.

The HHRA includes a comprehensive assessment of potential human health risks from metals, including lead. The HHRA concludes that impacts derived from the Project make a negligible contribution to overall exposures to the assessed metals. Furthermore, there are no health risk issues relevant to the Project for any members of the community, including children and sensitive individuals. Notwithstanding, in addition to the extensive range of proposed management measures to minimise dust generation and dispersion in accordance with best practice for mining, reactive / adaptive management would also be applied to ensure that Bowdens Silver promptly respond and resolve any unexpected outcomes.

Mine Design and Operations

Matters relating to mine design and the proposed mining operations for the Project were raised in submissions received from the NSW Government and the Lue Action Group. Review of the items identified in the submissions has prompted Bowdens Silver to clarify how the mine would be designed and operated to achieve the proposed outcomes in terms of mining productivity and environmental performance. On balance, it is considered that Bowdens Silver and its contractors AMC Consultants have proposed an achievable level of productivity using equipment and processes that would achieve the predicted levels of environmental performance.

Noise and Vibration

Noise was raised frequently in submissions with a range of matters identified to be of concern to the local community. The comments included general concern regarding the potential change in noise sources and therefore experience of the rural locality, the impacts of construction activities and traffic and specific comments concerning for example noise impacts at the Lue Public School. Comments from the EPA identified a number of technical matters for which clarification was sought.

It is acknowledged that noise from the Project could range from being totally indiscernible to being clearly audible at times depending on proximity to the Mine Site, meteorological conditions and the presence of other noise sources at the time. The EPA, in developing the current Noise Policy for Industry (NPfI) assessment methodologies, acknowledges that compliance with the Project Noise Trigger Levels would not lead to all members of the community finding the noise acceptable or that mining noise would be inaudible.

It is acknowledged that the Noise and Vibration Assessment (NVA) (SLR, 2020) has predicted a number of exceedances of adopted noise criteria during adverse climate conditions and assuming worst case operational circumstances. These outcomes would be managed in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy (VLAMP) with ongoing management designed to minimise the risk of impact.

The NVA and the responses to the submissions received have comprehensively evaluated noise and vibration levels associated with the Project. The key outcomes arising from the responses to the various issues provided are as follows.

- It is acknowledged that there is potential for noise impacts from conducting construction activities outside of standard construction hours between 1:00pm and 6:00pm on Saturdays. However, all construction activities would be managed in accordance with an approved Construction Noise Management Plan to ensure that any potential construction noise impacts are minimised in terms of magnitude, duration and character.
- An additional Modified Scenario 3 (Year 8) has been developed to predict noise levels under standard and noise-enhancing meteorological conditions with a bulldozer operating 'in-pit' operating unrestricted in 3rd gear. Predicted noise levels from the Modified Scenario 3 (Year 8) indicates that predicted noise levels remain generally unaltered from Scenario 3 (Year 8) as presented in the NVA.
- Additional assessment of road traffic noise was conducted to assess the relocated Maloneys Road against hourly noise criteria for 'existing residences affected by noise from new local road corridors' in accordance with the Road Noise Policy. Road traffic noise from the relocated Maloneys Road is predicted to comply at all receivers when assessed as a new local road corridor.
- An additional assessment of road traffic noise inclusive of additional road traffic associated with the power transmission line re-alignment works has been conducted. The assessment resulted in no material change in noise levels presented in the NVA.
- Blasting within the Mine Site is predicted not to result in any impacts to Country Rail Network infrastructure. As such, the John Holland Rail Blasting guideline would not be applicable.

The NVA has incorporated a comprehensive range of design and operational mitigation measures to reduce noise levels at surrounding receivers as far as practicable. These would be supported by reactive management in response to triggers that would permit Bowdens Silver to proactively reduce noise generation where there is a risk of non-compliance. The proposed use of real-time monitoring would assist Bowdens Silver to manage its operations upon receipt of feedback from the system.

The NVA and responses to submissions present the assessment of noise and blasting from the Project at privately-owned residences, other noise sensitive land uses, infrastructure and privately-owned land. The review of the comments made in submissions relating to noise generation and blasting have resulted in no material change in the assessment of potential noise and blasting impacts or conclusions as presented in the NVA.

Planning Issues

Several submissions included comments on general planning matters that principally related to the achievement of objectives for land zoning as described in the *Mid-Western Regional Local Environmental Plan 2012*. Bowdens Silver remains confident that the Project is both permissible and appropriate for mining and related development in the proposed locations.

Project-Related Issues

Matters relating to the funding and operating costs associated with the Project were raised in the submission received from the Lue Action Group. Review of the items identified in the submission has prompted Bowdens Silver to clarify funding matters for the Project. However, it should be clear that Bowdens Silver has the experience and financial support to establish and operate the Project. The management of costs including the timing of expenditure and how this is accounted in documentation is a matter of operational management. The Project is considered to be economically viable, not least because of the thorough approach to planning and design but also due to the buoyancy of the commodity market, local and regional support for the Project and the Company's detailed understanding of the mineral deposit.

Proximity to Lue Residences

The concern of some residents within the Lue community regarding proximity to mining has been acknowledged from the commencement of investigations and planning for the Project. The proximity of the Mine Site to Lue was one of the most commonly raised concerns in submissions. These comments are also consistent with the feedback received during stakeholder engagement for the Project. The Mine Site is located within the State suburb of Lue and approximately 2km north of the boundary of the village of Lue as presented in the land zoning maps within the *Mid-Western Regional Local Environmental Plan 2012*. Regardless of these formal boundaries, the potential environmental impacts for (any) privately-owned residence has been the focus of technical assessment presented in the EIS.

Section 1.7 of the EIS provides a detailed summary of other mining operations in NSW that operate in closer proximity to communities and have been doing so successfully for some time. Some rural centres have been established around mines while others have historically been agricultural centres, but which now benefit from the diversification of economic inputs.

A comprehensive range of design controls have been proposed taking into account the proximity to Lue and feedback from its residents. In addition, the proximity to Lue would remain a factor in planning for the rigour of operational monitoring programs including real-time air quality and noise monitoring.

The outcomes of the technical assessments for the Project have clearly demonstrated that the distance between operations and residences cannot be considered simply 'as the crow flies'. The assessments have comprehensively taken into account the local and regional topography, local climate conditions, local geology and current use of land in considering potential risks and assessing residual impacts. The following general conclusions to assessment relate to the proximity of the operations on the Mine Site to Lue.

- No operations would be visible from residences or generally within the village of Lue due to the substantial intervening topography. The top of the most dominant ridge between the Mine Site and Lue is approximately 118m above Lue. This is clearly evident when viewing the 3D interactive model prepared for the Project[1]. The Mine Site would be visible to varying extents from six rural residences, two of which are Project-related, having entered into agreements with Bowdens Silver. Overall, visual amenity impact risks at residences are considered to be acceptable, excluding one residence. Bowdens Silver has discussed this impact with the relevant landowner.
- No health risk issues of concern have been identified for Lue and surrounds either during or post completion of operations. This includes assessment of multiple pathways of exposure including air-borne exposures, exposure through food grown on properties in the locality and exposure through water tanks (drinking water), amongst others.
- No occupants of residences within the village of Lue are predicted to experience intrusive noise impacts during operations. Noise levels that trigger the VLAMP have been predicted outside the village boundary and negotiated agreements have been discussed with each of the affected landowners. Offers of compensation relative to predicted impacts have been provided and in most cases the compensation offer exceeds what is required under the policy.
- No occupants of residences within Lue or surrounds are predicted to experience significant concentrations of particulate matter exposure that exceed air quality criteria.
- No occupants of residences within Lue or surrounds are predicted to be exposed to airborne metal concentrations (including lead) that exceed the relevant guidance levels.
- No occupants of residences within Lue or surrounds are predicted to be exposed to respirable crystalline silica concentrations that exceed the relevant guidance levels.
- No occupants of residences within Lue or surrounds are predicted to be exposed to hydrogen cyanide concentrations that exceed the relevant guidance levels.

[1] Available to download and view from https://bowdenssilver.com.au/

- Any changes to water quality in Lawsons Creek would not be discernible from background water quality or would be within acceptable levels such that the ongoing use of that water by landholders within Lue and beyond would not be impacted.
- The reduction in water naturally flowing to Lawsons Creek would be minor and difficult to discern (4.4% reduction to flows in the worst-case). Therefore, those residents using water from Lawsons Creek would not be restricted from continuing to do so.
- Blasting and blast fume generation would be managed in accordance with best practice. Given the highly controlled nature of these processes, blast fume generation is considered unlikely.
- Traffic generation is not predicted to impact amenity within Lue village as the low levels of heavy vehicle traffic would be accommodated on the surrounding road network with virtually no adverse impacts to road users or the condition of the road network. Most traffic travelling to and from the Mine Site would comprise light vehicles and buses.
- The potential for lighting impacts (including sky glow) on the local environment has been assessed to be minimal.

Many submissions were received that noted the likely benefits of the Project relevant to its proximity to Lue.

- The expanded Community Investment Program would focus on benefits to Lue and surrounding areas. Submissions noted the positive outcomes of Bowdens Silver's current involvement with the community.
- The local procurement strategy for employment and suppliers to the Mine Site would benefit local residents. It is anticipated that this would foster further engagement in the local community including the Lue Public School and volunteering with local service providers.
- It is anticipated that the Project would attract people to move into the area and Bowdens Silver would encourage workers with family to become part of the community. The Company already leases land to local families and would continue to do so.

This is directly intended to ensure that the Project has overall positive effects on the character and sustainability of Lue.

Rehabilitation and Post Mining Land Use

Comments regarding rehabilitation of the landform and final land use were included in a number of public and organisational submissions. The comments varied from concern at the design and long-term risks associated with the proposed final landform including the final void and engineered closure of the TSF and WRE to the implementation of progressive and final rehabilitation and the financial security associated with the various closure commitments.

Rehabilitation of disturbed areas within the Mine Site would be an integral component of the entire Project. Bowdens Silver intends to progressively rehabilitate disturbed areas that are no longer required or have been completed in their final form. The use of trial rehabilitation areas across the Mine Site would assist Bowdens Silver to identify / confirm the most appropriate rehabilitation methods for the respective components of the Mine Site.

Mining would change the landform, however the overarching objective of rehabilitation would be to return land to its original land and soil capability and therefore land uses, where it is reasonable to do so. The risks associated with the final landform have been thoroughly assessed including the long-term implications of the open cut pit lake. Bowdens Silver would monitor and maintain all rehabilitated areas throughout and beyond the Project life until such time as the relevant Government agencies consider the standard of rehabilitation is appropriate for the mining lease to be relinquished.

Community expectations regarding defaults on rehabilitation commitments are not consistent with the expectations and conditional requirements that would be required by the NSW Government. This includes detailed planning, regular reporting and the provision of upfront financial securities that guarantee rehabilitation commitments are satisfied. Progressive and final rehabilitation are heavily regulated processes in NSW and Bowdens Silver welcomes such scrutiny, as successful rehabilitation outcomes have been an objective of the Project since initiation and a key factor in Project planning.

Social Impacts

Community engagement and research undertaken by Bowdens Silver and its consultants to inform and educate the community about the Project and to inform the Social Impact Assessment (SIA) for the Project identified that the concerns regarding the Project varied across stakeholder groups and geographic location. The level of support or objection and the matters raised in organisation and public submissions is consistent with this conclusion.

Consistent with the feedback received through engagement processes, the principal issues raised in submissions related to change that might affect the local sense of community and sense of place, health and wellbeing and social amenity. Equal consideration should be given to submissions that comment on the social benefits of the Project including employment opportunities, maintaining sustainable communities and the ongoing resilience of these communities.

It should be noted that there are linkages that exist between the social matters identified in submissions and the outcomes of other assessments or matters that are addressed elsewhere. The following matters are directly relevant to the consideration of social impacts.

- Aboriginal heritage values
- Economic benefits and impacts.
- Health risks
- Historic heritage values
- The proximity of the Mine Site to properties and Lue
- The attraction of tourists
- Visual amenity

This is notwithstanding the personal values held regarding assessment outcomes such as biodiversity, noise, vibration, air quality, water access and quality and traffic. It is acknowledged that any changes associated with the Project may have a social impact.

A comprehensive program of community engagement and research was undertaken by Umwelt, a leading consultancy in this field and presented in a detailed SIA (Umwelt, 2020). The research has identified the anticipated and likely social risks of the Project and resulted in a range of social enhancement strategies being recommended and that would be implemented by Bowdens Silver. With the implementation of these measures, the social benefits of the Project would be maximised and negative social impacts would be minimised.

Review of community submissions and the peer review commissioned by the LAG has resulted in a number of matters being clarified. This review has not changed any of the outcomes of the SIA, that is, the identified social risks have not changed and no new social impact mitigation is considered necessary.

Overall, Bowdens Silver is confident that the outcomes of the SIA reflect community expectations and the potential social impact risks for the Project. Notwithstanding, it is acknowledged the outcomes of the Project would be experienced differently in the community. Ongoing meaningful engagement throughout the Project life is proposed to ensure that mitigation programs are refined over time to minimise negative effects and ensure the benefits of the Project are distributed as equitably as possible.

Surface Water

Surface water resources were most commonly raised matters in submissions, acknowledging that these issues include:

- water resources of Lawsons Creek;
- access to water and water quality risks, reflecting the rural nature of surroundings and the likelihood of local residents relying on surface water to drink, water stock or irrigate and for recreation;
- the proposed management of surface water resources within the Mine Site and how this may result in external impacts;
- the inputs to the surface water assessment including stream flow, rainfall (climate change) and some assumptions used for assessment; and
- potential risk from flooding, reflecting past exposure to flooding in the local area.

Bowdens Silver commissioned WRM Water + Environment Pty Ltd to undertake a comprehensive Surface Water Assessment (WRM, 2020). WRM's assessment utilised site-specific data, best practice methods and modelling approaches to characterise and predict the response of the local and regional surface water system to the Project. The peer-reviewed assessment (WRM, 2020) confirmed that the Project would not increase the risk of flooding on neighbouring landowners nor would it pose a risk to water quality as modelling of the proposed water management system demonstrates it would have sufficient capacity to retain and manage runoff from areas disturbed by Project-related activities. Whilst WRM (2020) predicted the Project would marginally reduce downstream flows via the interception and retention of runoff

within the Mine Site during operations, most of this reduction would be reversed post-closure as rehabilitated catchments are re-instated and allowed to discharge. Any loss of downstream flow would not increase the overall demand on local water resources as all Project-related demand would be accounted for using existing rights and entitlements.

Whilst the following responses to a range of representative comments provide further clarification and information where necessary, there are no changes to the following findings of WRM (2020).

- The prevailing hydrologic regime, including the local and regional catchment response to rainfall has been established and verified using sub-regional rainfall and gauge data.
- The Project would not increase demand on available water resources and would not significantly reduce access to, or availability for downstream water users.
- The Project is legally entitled to water resources greater than that predicted to be lost from the system as the result of the Project.
- The proposed water management system, encompassing the TSF, WRE, leachate management dam and processing area dams can retain all runoff in the containment zone based on modelling of historic rainfall and runoff conditions.
- The Project would not significantly impact downstream water quality.
- The Project would not lead to flooding of neighbouring properties.

Bowdens Silver has confidence in the data collected to date, the surface water assessment undertaken by WRM (2020) and the proposed industry best practice design and management measures. In order to provide the community and the regulators with confidence in the outcomes and proposed management, the surface water assessment was subject to detailed peer review by HEC (2020) and further scrutiny by the EPA, DPIE Water and the public. It is reiterated that the proposed monitoring, reporting and auditing commitments and requirements for the Project would ensure that management is scrutinised and regulated throughout the Project life.

Tailings Storage Facility

Clarification regarding the design, operation, management and closure of the tailings storage facility (TSF) was requested in various Government agency submissions and concerns regarding the facility were the subject of many community submissions, across a range of associated environmental matters.

Bowdens Silver commissioned ATC Williams Pty Ltd (ATC Williams), a globally recognised engineering consultancy specialising in dam design and tailings management, to undertake preliminary design of the Project's TSF. The preliminary design of the TSF is presented in "*Bowdens Silver Project Lue, N.S.W. – Tailings Storage Facility Preliminary Design"* (ATC Williams, 2020). Specifically, ATC Williams was engaged to establish the TSF construction and operational methodologies and preliminary consequence categorisation to inform commensurate design criteria including:

- minimum storm storage allowance and contingency freeboard to reduce the risk of overtopping in an infrequent/rare rainfall event (1% Annual Exceedance Probability (AEP));

- emergency spillway capacity to safely convey peak flows of extremely rare rainfall events (0.001% AEP or 1 in 10 000 years);
- maximum ground acceleration to ensure embankment stability in 0.01% AEP or 1 in 1 000 years earthquake; and
- liner permeability and treatment to limit seepage.

These design criteria were identified using Dams Safety NSW, Australian National Council on Large Dams (ANCOLD) and NSW EPA guidelines for dam design. It is noted that ATC Williams (2020) identifies the most stringent design criteria were adopted for preliminary design of the TSF.

Whilst further clarification and information has been provided where necessary, there has been no change to the preliminary design or reporting prepared by ATC Williams (2020) with the following general conclusions retained.

- The preliminary design adopted minimum criteria in accordance with industry best practice.
- The preliminary design incorporates mitigation measures commensurate with identified risks.
- The engineering guidance utilised to inform preliminary design remains current and industry best practice.
- Seepage mitigation measures presented in ATC Williams (2020) would result in seepage rates lower than the maximum allowable rates of the EPA.
- The proposed water management of the TSF, including design storm storage allowance, freeboard and the additional mitigation measures of WRM (2020) reduce the risk of spillway discharge.
- Deposited tailings would be safely contained.

Notwithstanding the above, Bowdens Silver has proposed to add further design elements that provide additional seepage mitigation to the measures presented in ATC Williams (2020).

It is acknowledged that the TSF structure is a particular source of concern for some community members. It is considered that sufficient information has been provided regarding the preliminary design of the TSF to support approval of the Project and to inform the next stage in development of this structure, i.e. detailed engineering design supported by further sampling and technical assessment. It is re-iterated that the use of tailings storage facilities is common practice in metalliferous mining across Australia and globally. The few cases of failure are the exception for this practice and not consistent with the many successful facilities that are designed, constructed, used and rehabilitated for mining purposes.

As has been described for other practices applied for the Project, the management of the TSF would be subject to a strict compliance and reporting regime that would ensure that performance is checked, trends in monitored outcomes are identified and analysed and that management may be adaptive.

Terrestrial Biodiversity

The Biodiversity Assessment Report (BAR) for the Project has been updated to clarify and expand on matters presented in the assessment presented in the EIS. The updated BAR (EnviroKey, 2021) includes further details and survey information relating to *Swainsona* species after Bowdens Silver personnel identified individuals of *Swainsona recta* (a threatened species) within the Mine Site and proposed biodiversity offset area. Additional ecological field surveys were undertaken within the Mine Site by AREA during the spring flowering season and identified four *Swainsona recta* individuals and approximately 64 *Swainsona Sericea* individuals. Updated biodiversity credit calculations have been included in the BAR to provide for the *Swainsona* species. At the request of BCD, the credit summary now separates the credit calculations for the water supply pipeline and applies the linear-based assessment calculation tool.

The BAR, which incorporates additional ecological field survey and refinement of assessment outcomes, presents the comprehensive assessment that has been undertaken by EnviroKey and others and represents a thorough understanding of the potential risks to biodiversity values.

An assessment of the impacts of the 2019/2020 bush fires on MNES (Niche, 2021) has also been prepared. Niche (2021) concludes that the loss of regional habitat for MNES listed species may in some cases result in increased reliance on habitat within the Mine Site and Biodiversity Offset Area. However, it is also noted that impacts associated with the Project are unlikely to commence until at least 2022 and a significant degree of vegetative recovery is expected in areas impacted by the bush fires. As such, the increased significance of the habitat within the Project and Offset areas would reduce over time and the assessment outcomes of the BAR would not be significantly affected by the 2019/20 bush fires.

Whilst these updates assist in clarifying the biodiversity offset requirements and provide additional information on *Swainsona recta*, the outcomes of the BAR remain consistent with those originally presented in the EIS. That is, that while the Project would result in residual impacts to native flora and fauna, it is not expected to result in significant impacts upon migratory or threatened species, assuming the implementation of the range of on-site mitigation measures and the proposed biodiversity offsetting strategy.

Tourism

It is recognised that tourism and the small businesses that it supports such as those involved in wine, local produce, accommodation and hospitality are important parts of the regional economy and rely upon the environmental, historical and rural setting to attract visitors. The prospect of a new mining development raises fears for some as perceived impacts are projected to result in a decline in visitors who would not wish to visit areas associated with mining. These fears were raised in some of the community submissions regarding the Project.

It is re-iterated that the mining operations would not be visible from Lue and only from short sections of Lue Road. Therefore, it is unlikely that tourists would be aware of the presence of the Project unless they are looking for it. Similarly, Bowdens Silver has committed to a number of environmental management and mitigation measures that would limit the community exposure to mining and therefore it is not considered likely that tourism would diminish as a result of construction and operation of the mine.

It is considered that many small businesses in the locality would in fact benefit from the Project through an increase in wages flowing through the local economy. This was reflected in some of the supporting submissions received on the Project. Statements such as the following contradict the concerns expressed by others in the community.

> *"It will also bring money back into Rylstone, Kandos and stop shops closing and will put money back into the local economy and help support local businesses and families."*

Furthermore, Bowdens Silver has committed to funding community projects through an expansion of the existing Community Investment Program. Community members have already suggested a range of local projects to Bowdens Silver, some of which may enhance tourism within Lue.

Traffic and Transport

Minor matters of clarification requested in comments and submissions have been addressed in this document. A comprehensive assessment of the potential traffic-related impacts of the Project was prepared by TTPP (2020) and included with the EIS. There have been no significant changes to traffic levels or types and the outcomes of assessment undertaken by TTPP have not changed as a result of the comments raised in submissions.

The concern from residents in Lue relating to the potential for Mine-related traffic to pass through Lue and disrupt its peaceful and rural ambience have been acknowledged since the commencement of initial investigations by Bowdens Silver in 2016. The commitment of both the time and funds to relocate Maloneys Road was intended to demonstrate to the community Bowdens Silver's commitment to the sustainability of Lue. Regardless of this, when compared to existing traffic types and levels, the contribution of the Project to local traffic levels would be minor. This traffic generation and that required to pass through Mudgee would be subject to management through a Traffic Management Plan prepared in consultation with MWRC and TfNSW and ultimately approved by DPIE. It would be expected that, should the Project be approved, it will be a condition of the development consent that such a plan must be approved before site establishment and construction commences.

Visual Impacts

The responses in this document address comments received in community submissions relating to possible views of the Mine Site and associated infrastructure and the effects of lighting on the existing environment.

The visual impacts of the Project were comprehensively assessed by Richard Lamb and Associates in a Visibility Assessment (RLA, 2020) and the possible effects of night lighting on the surrounding environment and particularly the Dark Sky Region were assessed by Lighting, Art & Science Pty Limited in a Lighting and Sky Glow Assessment (LAS, 2020).

The review of the matters raised in the public submissions has not changed the outcomes of either the Visibility Assessment (RLA, 2020) and the Lighting and Sky Glow Assessment (LAS, 2020). Additional information and clarification has been provided for specific residences that would have views of the Project and to elaborate on views of the realigned 500kV transmission line. The outcomes of the Lighting and Sky Glow Assessment have also been clarified.

No components of the Mine Site would be visible from Lue village. Views of some components within the Mine Site from the public road network would be possible at some locations and it is acknowledged that the Project would result in changes in the visual landscape in the vicinity of the Mine Site with views from six private residences possible at certain stages of development (two of which are Project-related, having entered into agreements with Bowdens Silver). It is considered that the distance from the viewing locations and Mine Site as well as the proposed visual controls would achieve an acceptable level of impact. Lighting of the Project would result in only minimal and acceptable impacts to the built or natural environment and would have negligible impacts on astronomical observatories in the region.

Waste Rock Emplacement

Submissions associated with the Waste Rock Emplacement (WRE) covered a range of matters that included implied risks to groundwater from leachate, principally associated with the installation, efficacy and durability of the proposed WRE liner. These risks were invariably linked to the reactive nature and geochemical characteristics of potentially acid forming (PAF) waste rock, another subject of submissions. Further submissions queried the arrangements for identification, classification and handling of waste rock for either placement in the WRE or use in on-site construction whilst others identified concerns with the proposed capping and closure strategy of the Mine Site. Finally, the potential risk from airborne transport of particulate matter from the WRE was also raised, reflecting community concerns over dust exposure.

During the preparation of the responses to submissions relating to the WRE, it was identified that:

- the geochemical characteristics and behaviour of the Bowdens deposit ore and waste rock are well understood;
- waste rock storage and encapsulation is a common strategy predicated upon management of well understood environmental risks;
- the WRE and its cover system have been professionally designed using best practice engineering principles; and
- the long-term landform would be physically and chemically stable, non-polluting and blend sufficiently into the surrounding terrain.

Most importantly, the characterisation and placement of the PAF waste rock within the WRE would be undertaken in accordance with operational procedures specifically designed to identify, classify, transfer and encapsulate PAF waste rock to avoid the long-term generation of leachate (acid mine drainage).

Water Supply

Submissions associated with the Project's water supply covered matters relating to the water supply pipeline, water licensing, the implications of drought on water supply and associated contingencies to sustain operations.

Bowdens Silver has investigated a number of water sources for the Project with the intention of providing contingency options and therefore flexibility to respond to unexpected constraints (such as prolonged drought). The Project requires make-up water that would be supplied from

water that is surplus to the requirements of coal mining operations in the Ulan Coalfield. Bowdens Silver is continuing commercial negotiations regarding the supply of water. Regardless, it is considered that the environmental impacts of the proposed water supply arrangements have been thoroughly assessed and are acceptable.

Specifically, the review of Government agency, organisation and public submissions have identified the following.

- Bowdens Silver has licensed and landholder's rights entitlements to water resources exceeding that predicted to be lost from the system as the result of the Project.
- The proposed water supply arrangements provide sufficient contingency to sustain operations during periods of low rainfall (drought).
- The transfer of licensed inflows from mines in the Ulan Coalfield is permissible and would not adversely impact flow in the Goulburn River catchment.
- Installation and operation of the water supply pipeline would not impair existing land uses. However, the route of the water supply pipeline is the subject of ongoing consultation with landowners.
- The water supply pipeline would be subject to engineering design and include design elements to allow leak detection, water treatment at the start of the pipeline and isolation to reduce impacts in the event of pipe failure.

EVALUATION OF THE PROJECT

The technical environmental matters raised in objecting submissions have been reviewed by Bowdens Silver and its consultants and a detailed response prepared and presented in this document. However, there have been no changes to the assessment outcomes and overall conclusions as a result of the review of submissions. This includes for the concerns raised most frequently in objecting submissions relating to surface water resources, the health implications of lead, groundwater resources and the proximity of the mine to Lue. Bowdens Silver has also committed to additional design controls within the TSF in order to provide certainty in relation to potential risks associated with seepage from the structure. The only significant change to assessment has been an adjustment to the biodiversity offsetting obligations of the Project due to the identification of threatened flora. The species were initially identified by Bowdens Silver personnel during routine monitoring and subsequently verified through ecological field survey. This is evidence of the environmental responsibility of the Company.

Many submissions referred to social impacts associated with change that might affect the local sense of community and sense of place, health and wellbeing and social amenity. These concerns would be managed throughout the life of the Project through a comprehensive range of social mitigation measures. However, equal consideration must be given to the many submissions that commented on the social benefits of the Project including employment opportunities, maintaining sustainable communities and ensuring their ongoing resilience. These opportunities would be supported through the expanded Community Investment Program and other social mitigation measures.

The following provides a brief justification for the conclusion that the Project would be in the public interest.

- Bowdens Silver has designed a Project that ensures efficient development of the Mine but which also considers the likely experience of the Mine for the local community and the predicted short-term and longer-term environmental outcomes.
- There is a strong indication of the need for environmentally and socially sound projects to support the regional economy, especially in the Lue, Kandos, and Rylstone localities.
- Bowdens Silver considers that the Project would be of sufficient scale to provide a boost to the local economy but not cause substantial adverse environmental or social impacts.
- The outcomes of environmental, economic and social assessments for the Project have confirmed that the Project would operate in accordance with the legislation, policies and guidelines developed to ensure responsible environmental practices for development.
- The Project is considered to be consistent with the principles of ecologically sustainable development, would satisfy all relevant planning considerations and would achieve the objectives of the Project.
- The environmental, economic and social assessments have not only considered the immediate impacts of the operation but also longer-term outcomes involving potential land use conflict and residual impacts to resources (such as groundwater) that may be utilised by others. In each case, worst case scenario outcomes were considered to ensure a precautionary and conservative approach was taken.
- Bowdens Silver has made a range of clear commitments to the public that would be given legal force by way of conditions of a development consent.
- The expanded Community Investment Program would ensure that the economic outcomes are distributed locally, while programs for environmental and social monitoring, regular reporting and auditing of performance would ensure that the commitments to responsible environmental management are achieved.
- The legacy of the Project has been considered with regards to the rehabilitation and final land use options and mechanisms to preserve the existing character of Lue, while providing sufficient economic stimulus to ensure its sustainability.

The Project, as presented is considered to be in the public interest as it would provide an acceptable balance of environmental and social outcomes, whilst generating substantial benefits for the local, regional and State economies.

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1. INTRODUCTION

1.1 SCOPE

This document has been compiled to provide a response to the key matters raised in public and government agency submissions lodged with the Department of Planning, Industry and Environment (DPIE) during and following the public exhibition period for the Environmental Impact Statement (EIS) for the Bowdens Silver Project (hereafter referred to as the "Project") proposed by Bowdens Silver Pty Limited (Bowdens Silver).

Bowdens Silver is seeking approval to develop and operate an open cut mine 2km to 3km northeast of Lue and 26km east of Mudgee to extract almost 30 million tonnes (Mt) of ore from which silver, zinc and lead would be extracted and despatched as concentrates. The "Mine Site" for the Project includes the lands and infrastructure required for open cut mining and processing of ore, and the production of silver/lead and zinc concentrates including associated management of water resources, waste rock and tailings materials. While the response from public organisations and individuals was overwhelmingly in favour of the Project (1504 or 79% of submissions were supportive), 387 submissions opposed the Project. As a result, the Project will be assessed by DPIE and a recommendation provided with formal referral to the Independent Planning Commission (IPC) for determination.

This document provides an analysis of, and responses to, the advice provided in Government agency submissions and the key matters outlined in submissions provided by organisations and the public. In addition, the proposed conditions of Development Consent suggested by some Government agencies and community members have been considered. The document concludes with an updated evaluation of the Project's merits that reflect all additional matters arising from the review of submissions. A total of four appendices are provided relating to the Register of Submitters, a summary of the matters raised within the submissions, updated mitigation measures and supporting information. Several of the technical assessments supporting the Project have been updated and additional assessments commissioned with these reports have also been appended to this report.

This document should be read in conjunction with the *Amendment Report for the Bowdens Silver Project* that relates to the proposed re-aligned 500kV power transmission line.

1.2 BOWDENS SILVER'S CORPORATE PHILOSOPHY

Bowdens Silver is a wholly-owned subsidiary of Silver Mines Limited, a publicly listed company trading on the Australian Securities Exchange (ASX). Bowdens Silver was created as a stand-alone company whose purpose is mineral exploration and development primarily for the development of the Bowdens Silver Deposit. Since taking over the Project in June 2016, Bowdens Silver has placed a strong and necessary focus on ensuring that Bowdens Silver, its employees and contractors placed a high level of importance on conducting its business in a professional, community-minded and environmentally conscious and sustainable way. With this approach, Bowdens Silver is confident that it will earn and maintain its social licence as operator of the Project. As outlined in the EIS, the objectives of Bowdens Silver in developing and operating the Project continue to be to:

- maximise recovery of the silver, zinc and lead minerals from the defined ore reserves within the proposed open cut pits;

- undertake all activities in an environmentally and socially responsible manner to demonstrate compliance with relevant criteria and satisfy reasonable community expectations;
- ensure the health of its workforce and the surrounding community is not adversely affected;
- preserve the existing character of Lue;
- maintain a positive and co-existing relationship with the surrounding agricultural industry and maximise productivity on land retained for agricultural production;
- provide a stimulus for the Mudgee, Rylstone, Kandos and district economies; and
- achieve the above objectives in a cost-effective manner to ensure the Project is economically viable.

If the Project is approved, Bowdens Silver intends to continue to be an important community member for its 23-year Project life and will ensure that the Mine Site is rehabilitated progressively and upon closure to permit beneficial future land uses. Bowdens Silver is committed to continuing to undertake its activities in such a way that provides trust in Bowdens Silver's daily activities for not only the local communities but all stakeholders. Bowdens Silver believes that its involvement in the community combined with ongoing operations will provide multiple positive benefits to the local communities and the wider Mid-Western Regional Local Government Area (LGA).

1.3 BOWDENS SILVER'S ENGAGEMENT AND CONSULTATION

While Bowdens Silver moves through the assessment and development processes, community consultation has been and will continue to be a key aspect of the Project. Since its inception, Bowdens Silver has understood that ongoing and transparent consultation with all stakeholders is vital in gaining and maintaining a social licence to operate the proposed mine.

A comprehensive range of stakeholders have been consulted with by Bowdens Silver to ensure that there has been a broad approach to ensuring that all differing views and feedback on the Project could be heard and considered. These include the Project's immediate neighbours, local landholders and residents in the locality of the Mine Site and water supply pipeline, special interest groups, indigenous groups and representatives, local businesses and local business chambers, service providers, local schools and education providers, local and State government agencies and members of the public.

Likewise, a suite of different engagement techniques has been utilised which have incorporated personal meetings, newsletters and project information sheets, community open days, the creation of a Company and Project website, presentations to interested stakeholders and groups, a Community Consultative Committee, face to face and telephone interviews, public information displays and a continued "open door" policy for interested parties to seek information about the Project from the Bowdens Silver team based at the local Lue office. Bowdens Silver also maintains a comprehensive question and answer (Q&A) portal on its website. The results of the consultation with all relevant stakeholders and the varying engagement techniques has enabled Bowdens Silver to gain great insights into local topics of importance and feed that information into the overall Project design and proposed operations.

During the public exhibition of the EIS, Bowdens Silver also provided the community and other stakeholder groups with a comprehensive EIS Summary Booklet that outlined the outcomes of the specialist consultant studies as well as information on the assessment process and how community members can have their say on the Project. Also, due to COVID-19 restrictions, a "virtual open day" was conducted over two days where presentations were delivered by Bowdens Silver, R.W. Corkery & Co (the lead EIS consultants (RWC)) and specialists in the fields of noise and vibration, human health, social impact, air quality, biodiversity, groundwater and surface water. Members of the public were able to submit questions to Bowdens Silver, RWC and the specialist consultants and the presentations are available for ongoing reference on the Bowdens Silver website. Another tool made available to the public during the public exhibition and ongoing is a comprehensive and interactive 3-D model of the Mine Site. This enables the user to have a personalised experience and view the site from varying angles, over a range of different timelines and also includes outcomes of environmental modelling.

During preparation of this Submissions Report, Bowdens Silver and its consultants have consulted with relevant Government agencies to discuss the matters raised in submissions and the information required for these agencies to complete the assessment of the Project. Consultation was undertaken with the EPA (air quality, noise and water resource teams), BCD and NRAR and DPIE Water. Several meetings were also held with Mid-Western Regional Council regarding its submission and the proposed Planning Agreement.

The consultation methods and engagement described above will be a continuing theme for Bowdens Silver during its operations. Also, Bowdens Silver remains committed to providing a range of sponsorship opportunities to support the local communities that focus on overarching themes of community, education, arts and culture, sport, health and safety.

Bowdens Silver has implemented and would continue to fund a Community Investment Program that provides funding for a range of community-led initiatives, organisations, events and schools. This program is a key component of Bowdens Silver's commitment to being a valued member of the local community.

Bowdens Silver recognises the importance of establishing a relationship of mutual trust with the community that would be achieved through accountability and transparency and meaningful engagement throughout the Project life as well as monitoring of the environmental and social outcomes, with results made available to the public.

1.4 DOCUMENT FORMAT

This report has been compiled in eight sections with a set of seven appendices.

Section 1: introduces the report and provides an overview of Bowdens Silver's corporate philosophy and commitment to ongoing engagement and consultation.

Section 2: provides an analysis of the submissions received from Government agencies and from organisations and individuals in the community who either support or oppose the Project.

Section 3: describes a range of actions that have been taken either directly arising from the content of some of the submissions or ongoing routine tasks undertaken for the Project.

Section 4: provides a commentary on the supportive submissions received.

Section 5: provides a comprehensive set of responses to the matters raised by the Government agencies as well as organisations/individuals.

Section 6: provides a set of responses to the suggested Development Consent conditions.

Section 7: provides an updated evaluation of the Project in light of the responses provided and additional actions outlined in Section 3.

Section 8: lists the documents referenced throughout this report.

A set of appendices is provided to support the report addressing the following.

- Register of submitters and matters raised.
- Updated Summary of Environmental Management and Monitoring Measures.
- Groundwater Assessment – Updated (prepared by Jacobs Group (Australia) Pty Limited).
- Biodiversity Assessment Report – Updated (prepared by EnviroKey Pty Ltd).
- Bushfire Impact Assessment of Matters of National Environmental Significance (prepared by Niche Environment and Heritage Pty Ltd).
- Air Quality Assessment – Updated (prepared by Ramboll Australia Pty Limited).
- Human Health Risk Assessment – Updated (prepared by Environmental Risk Sciences Pty Ltd).
- TSF Liner and Seepage Monitoring – letter dated 18 March 2019 (prepared by ATC Williams).

2. ANALYSIS OF SUBMISSIONS

2.1 SUBMITTER LOCATION

During and following the formal exhibition period (Tuesday 2 June 2020 until Monday 27 July 2020) submissions were provided to DPIE from 16 Government agencies, 70 organisations and 1 839 individuals. Each of these submissions were registered on the DPIE Major Projects website. DPIE provided Bowdens Silver with ten additional supportive submissions which have not been registered. Only those submissions formally registered by DPIE have been analysed here.

Appendix 1 presents a compilation of the submitters in separate tables for Government agencies, supportive submitters and opposing submitters and those individuals that provided commentary submissions. A distinction is made between organisations and individuals for both the supportive and opposing submitters.

Figure 2.1 displays charts presenting the proportion of supportive, opposing and commentary submissions from all non-Government agency submitters and those from NSW and Mid-Western Regional LGA.

The overwhelming support for the Project in the regional and NSW community (the green section) is clearly evident from this information.

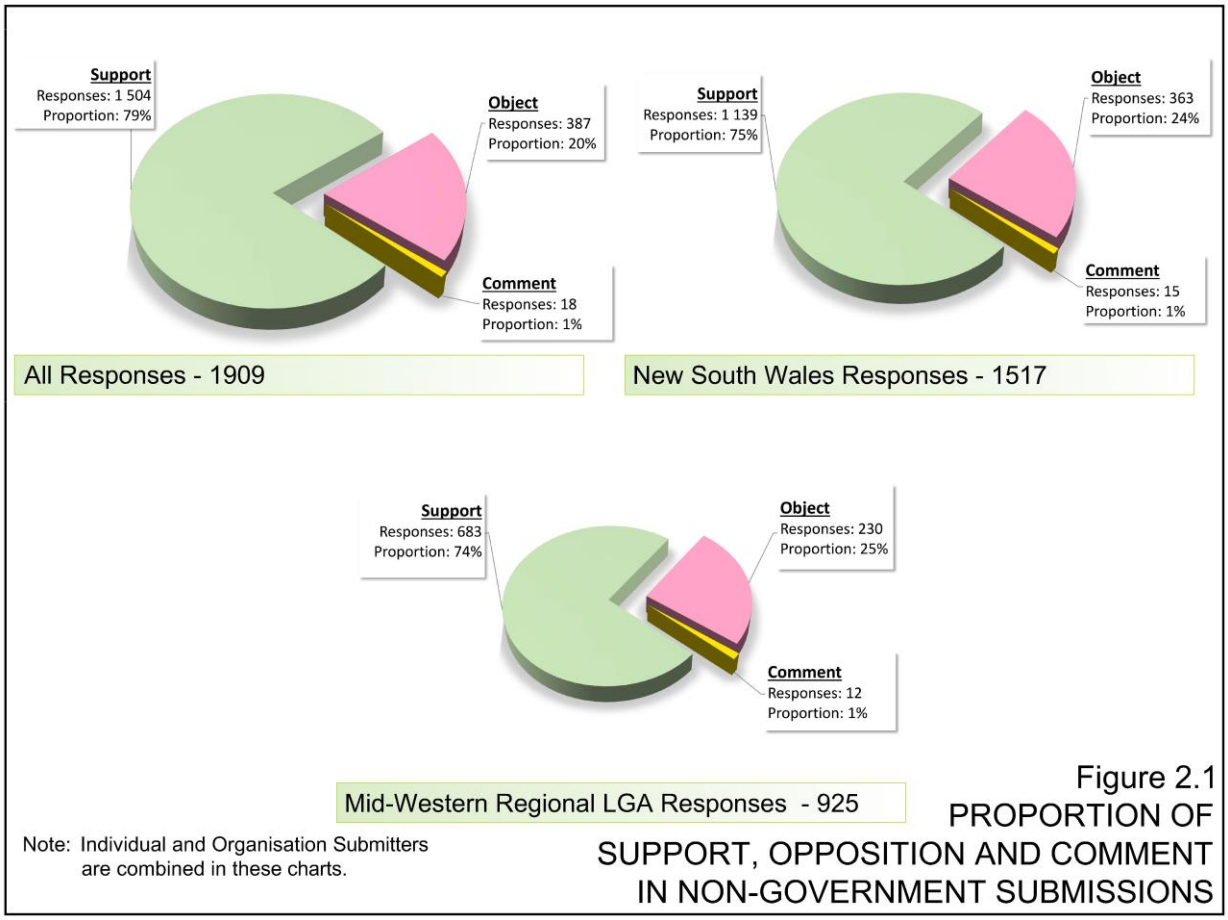


Figure 2.1
PROPORTION OF SUPPORT, OPPOSITION AND COMMENT IN NON-GOVERNMENT SUBMISSIONS

Data source: https://www.planningportal.nsw.gov.au/major-projects/project/9641

Table 2.1 provides a further analysis of submissions received from within the Mid-Western Regional LGA by postcode and lists the origin of all organisations and individual submitters who expressed support or opposition in their submissions together with the small number of submitters who provided comments, but neither objected or supported the project. **Figure 2.2** displays the boundaries of the four postcode areas within the Mid-Western Regional Local Government Area.

Table 2.1
Organisation and Individual Submitter Origins

	Submitter Location	Support	Object	Comment	Total No. Submissions	Support	Object	Comment
Mid-Western Regional LGA	**Postcode 2848**	**87**	**6**	**0**	**93**	**94%**	**6%**	**0%**
	Organisation	1	0	0	1			
	Individual	86	6	0	92			
	Postcode 2849	**99**	**55**	**2**	**156**	**64%**	**35%**	**1%**
	Organisation	3	1	0	4			
	Individual	96	54	2	152			
	Postcode 2850	**455**	**164**	**9**	**628**	**73%**	**26%**	**1%**
	Organisation	16	8	1	25			
	Individual	439	156	8	603			
	Postcode 2852	**41**	**5**	**1**	**47**	**87%**	**10%**	**2%**
	Organisation	0	0	0	0			
	Individual	41	5	1	47			
	Subtotal	**682**	**230**	**12**	**924**	**74%**	**25%**	**1%**
Other	**NSW Other**	**457**	**133**	**3**	**593**	**77%**	**22%**	**1%**
	Organisation	13	10	1	24			
	Individual	444	123	2	569			
	Interstate	**365**	**21**	**3**	**389**	**94%**	**5%**	**1%**
	Organisation	16	0	0	16			
	Individual	349	21	3	373			
	International	**0**	**1**	**0**	**1**			
	Organisation	0	0	0	0			
	Individual	0	1	0	1			
	Unknown	**0**	**2**	**0**	**2**			
	Organisation	0	0	0	0			
	Individual	0	2	0	2			
	Subtotal	**822**	**157**	**6**	**985**	**84%**	**16%**	**1%**
Total		**1 504**	**387**	**18**	**1 909**	**79%**	**20%**	**1%**

Key outcomes from **Table 2.1** are as follows.

- Approximately 79% of the submitters expressed support for the Project and 20% of the submitters expressed opposition to the Project. Approximately 1% of submitters provided comments about the Project.
- The ratio of support and objection is consistent for the Mid-Western Regional LGA and the rest of NSW.

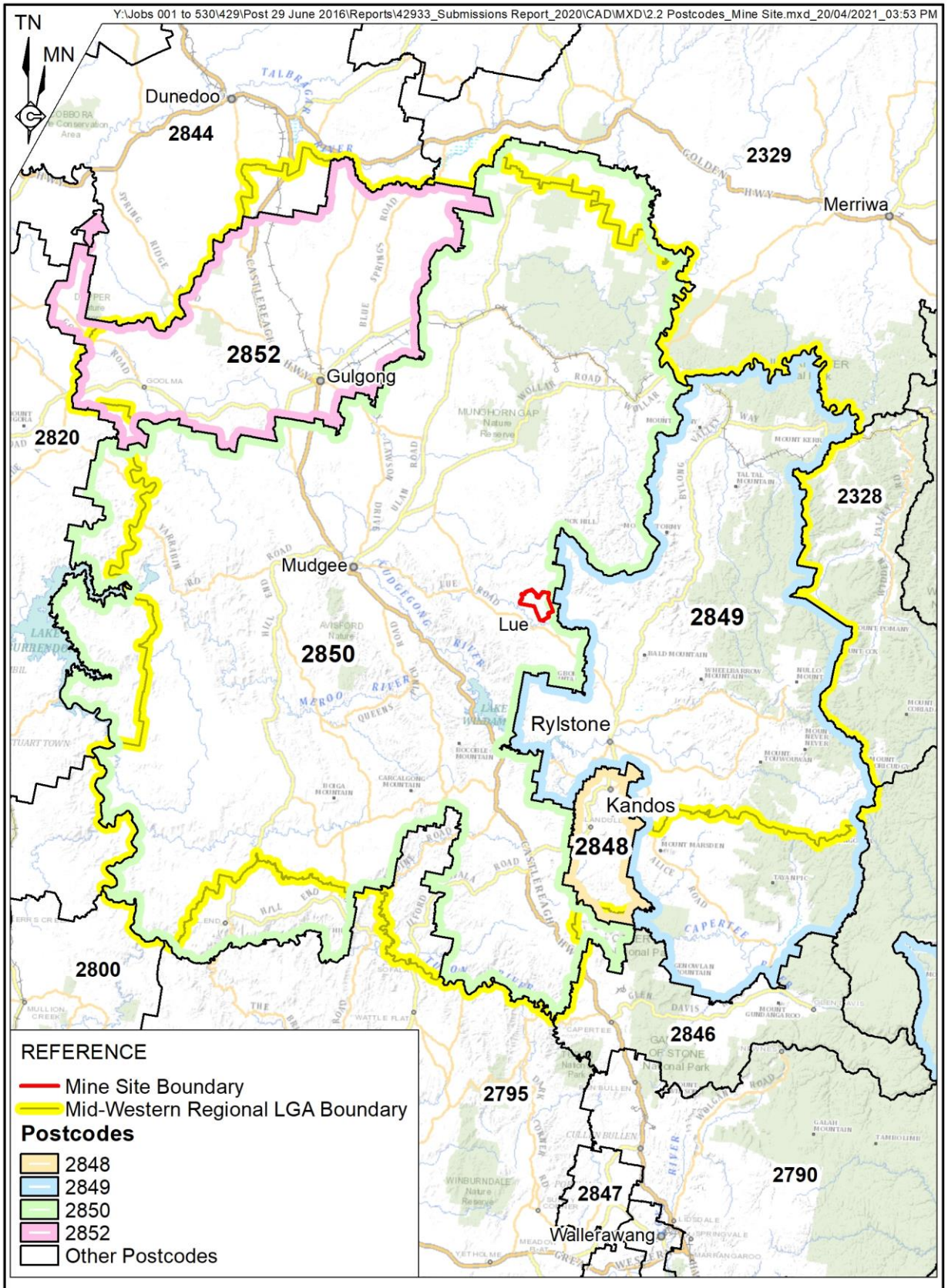
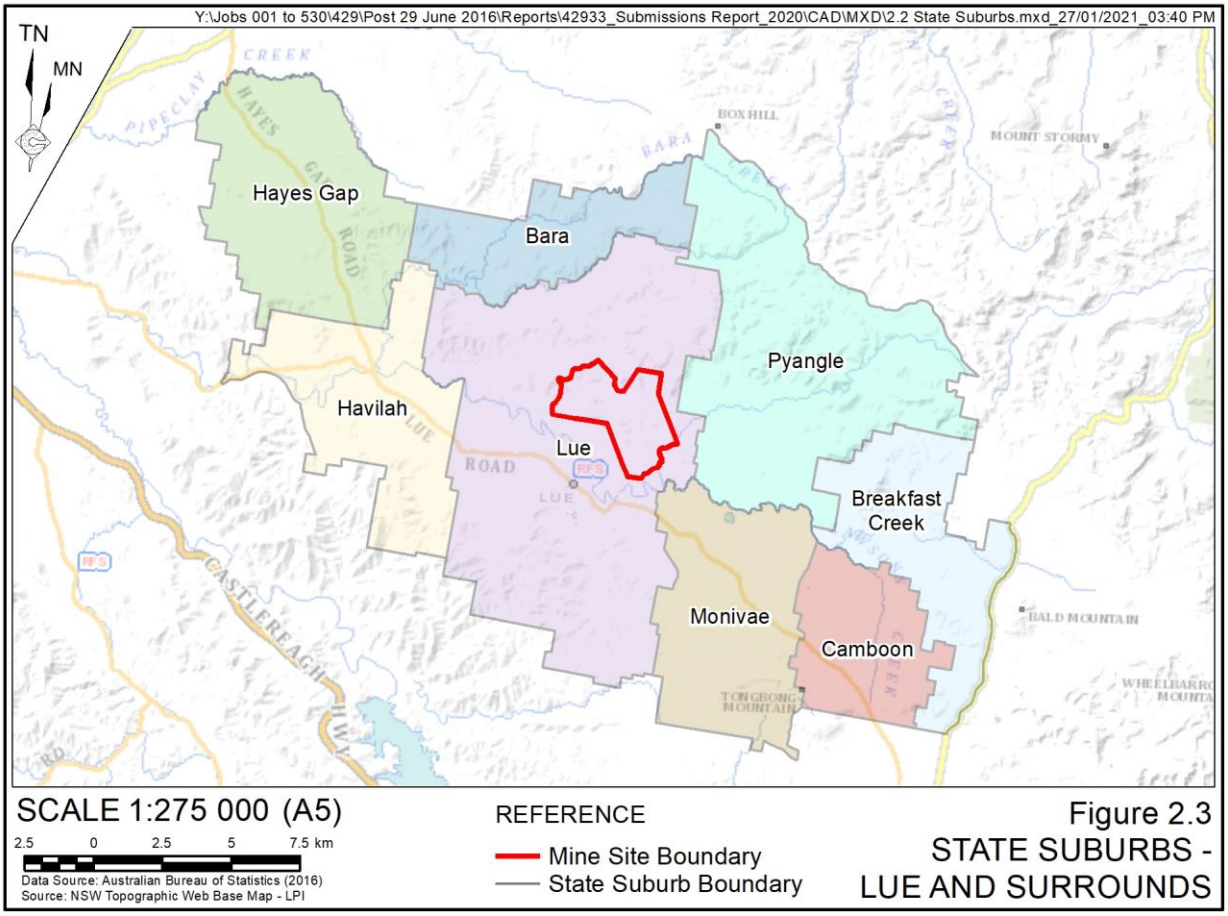


Figure 2.2
POSTCODES IN THE VICINITY OF THE MINE SITE

- Interstate submissions were 94% supportive.
- Approximately 45% of the submissions received were provided by individuals living and organisations based within the Mid-Western Regional LGA.
- Approximately 74% of the submitters from the Mid-Western Regional LGA expressed support for the Project and 25% expressed opposition to the Project. Approximately 1% of submitters provided comments on the Project.
- The ratio of support and objection varied by postcode but consistently more submitters supported the Project than opposed it (lowest supportive percentage was 64% in postcode 2849).

For the purpose of review of the location of submitters, "Lue and surrounds" has been defined as residents of Lue, Breakfast Creek, Bara, Camboon, Havilah, Hayes Gap, Monivae and Pyangle. The locations of these suburbs are displayed on **Figure 2.3**. Of the 154 submitters who listed their residential address within Lue and surrounds, 95 or (62%) objected to the Project, 57 or (37%) supported the Project and 2 or (1%) provided a comment.

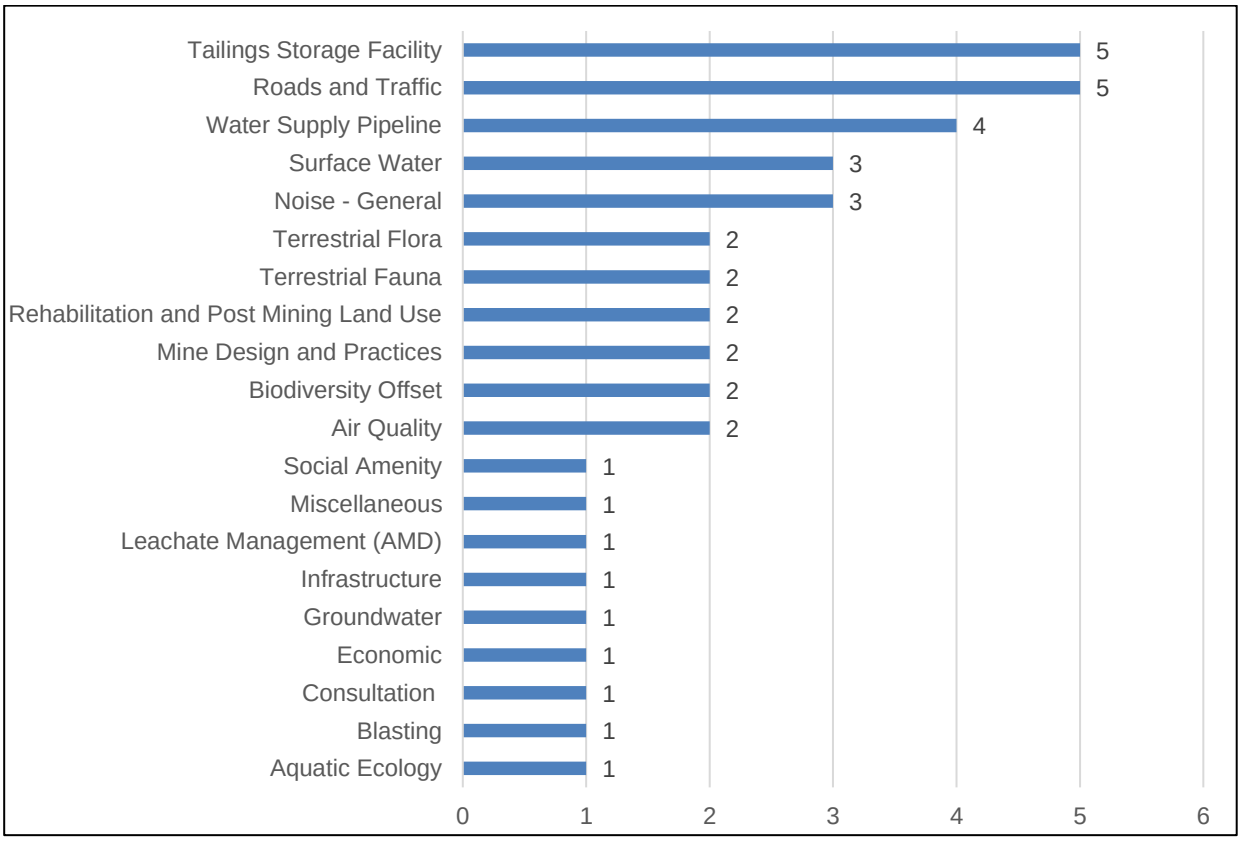
Of the 154 submissions provided from Lue and surrounds, 87 (57%) listed their address as Lue. More specifically, 45 (52%) of the submissions provided from within Lue opposed the Project and 40 (46%) supported the Project.



2.2 GOVERNMENT AGENCY SUBMISSIONS

Figure 2.4 displays the frequency with which the listed matters were raised by the 16 State Government agencies that provided a submission and Mid-Western Regional Council (MWRC). In most cases, the topics raised related directly to the matters administered by the respective agencies.

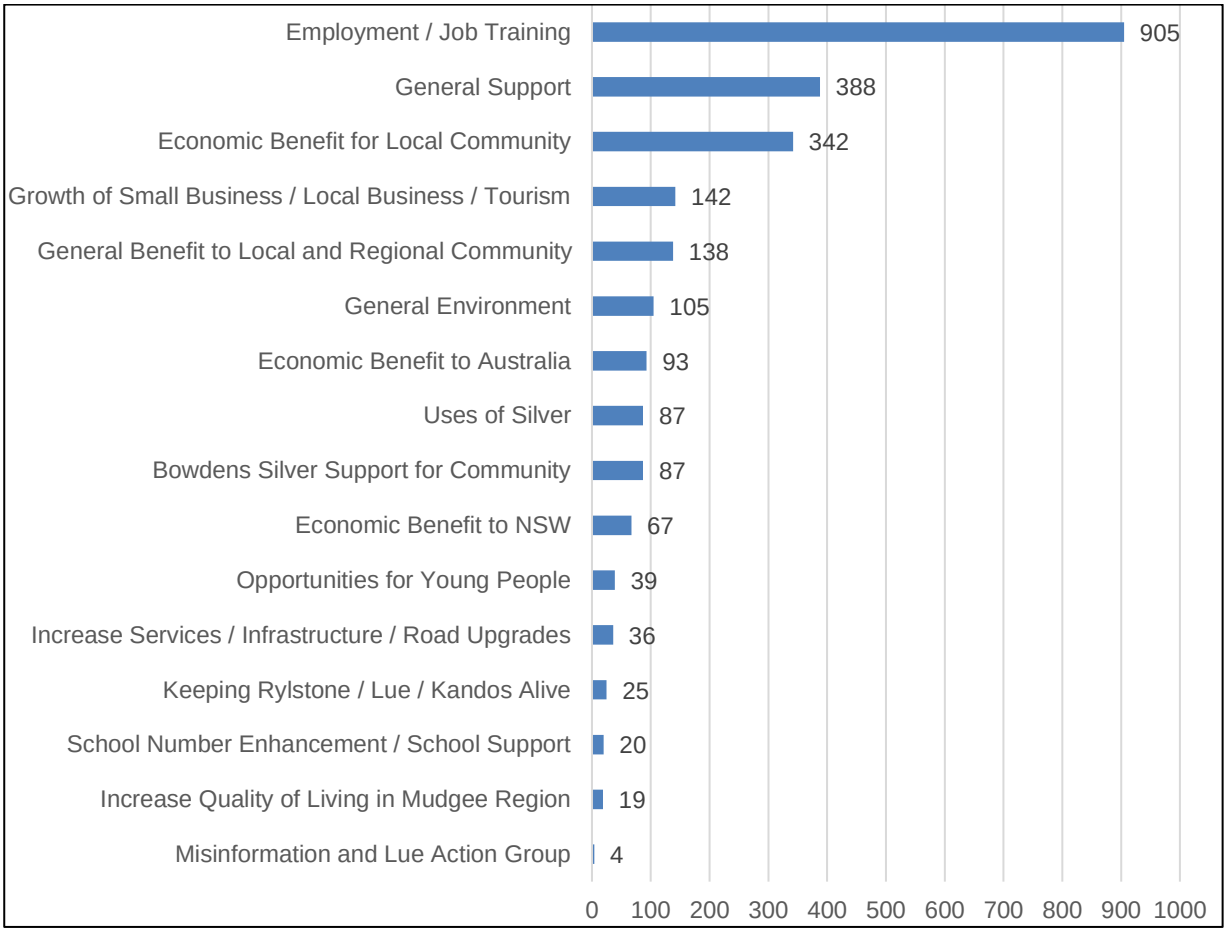
Figure 2.4 Matters Raised in Government Agency Submissions



2.3 SUPPORTIVE SUBMISSIONS

Figure 2.5 displays the frequency with which the listed matters were raised by the organisations and individuals who expressed their support for the Project. Section 4 provides a commentary regarding the matters raised.

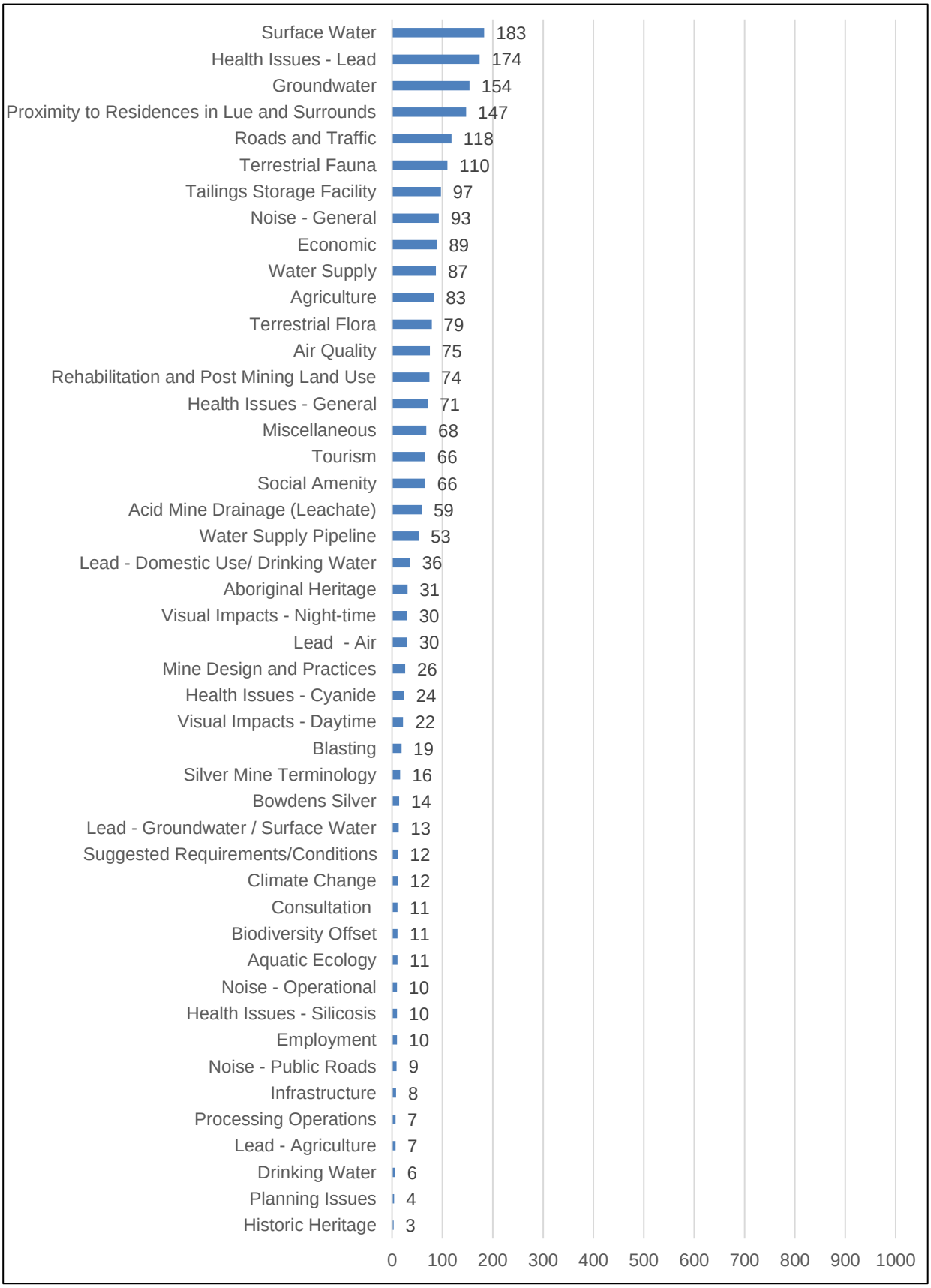
Figure 2.5 Frequency of Matters Raised in Supportive Submissions



2.4 OPPOSING SUBMISSIONS

Figure 2.6 displays the frequency with which the listed matters were raised by the individuals and organisations who expressed their opposition to the Project. Section 5 provides a set of comprehensive responses to the range of matters raised in these objections.

Figure 2.6 Frequency of Matters Raised in Submissions Objecting to the Project



2.5 COMMENTARY SUBMISSIONS

A total of 18 submissions provided comments for consideration but did not express either support or opposition to the Project although some raised matters that they requested by addressed during the assessment of the Project.

Two submissions acknowledged the positive benefits of the Project but expressed caution regarding the need for careful environmental management.

Two individual submissions expressed concern and provided commentary on the options for the supply of power to the Mine Site.

The remaining submissions either raised specific concerns and/or acknowledged the benefits of the Project for the local area around Lue such as employment and improved infrastructure.

3. ACTIONS TAKEN SINCE EXHIBITION

3.1 INTRODUCTION

For the purpose of this Submissions Report, Bowdens Silver has differentiated between amendments to the Project and actions taken since exhibition of the EIS, including additional assessment undertaken to refine the understanding of the potential environmental impacts of the Project.

Clause 55 of the *Environmental Planning and Assessment Regulation 2000* specifies the procedures for amending a development application and specifically provides for the following.

1. That a development application may be amended or varied by the Applicant at any time before it is determined, but only with the agreement of the consent authority.
2. The application to amend the development application for the Project must include sufficient information to demonstrate the nature of the changed development.
3. The amendment must be lodged via the NSW Planning Portal.

Bowdens Silver has consulted with DPIE and TransGrid regarding an amendment to the Bowdens Silver Project to incorporate the proposed realignment of the existing 500kV transmission line, owned and maintained by TransGrid. The environmental impacts associated with the realignment of the existing 500kV transmission line have been presented in the Amendment Report that has been submitted via the NSW Planning Portal. It is noted that the inclusion of the proposed realignment of the existing 500kV transmission line in the application does not change the land on which the Project would be developed or the outcomes of assessment as this component (being the powerline) was comprehensively assessed in the EIS. However, it is noted that there has been stakeholder interest in this matter and therefore a more comprehensive review of this activity is included in the Amendment Report.

Management or mitigation measures that have been added to the Project and that do not change the land disturbed or the nature of activities, are not amendments to the Project for the purpose of the development application and have therefore been treated separately. It is considered that these additions and associated assessments provide a greater level of management and understanding of potential environment impacts. In most cases, these refinements improve the environmental outcomes of the Project.

The submissions received during and following the public exhibition of the EIS and supporting assessments for the Project demonstrate the overwhelming level of public support for the Project. However, some submissions objecting to the Project raised a number of matters regarding the information presented in the EIS. The Lue Action Group submission included a number of reviews of the technical aspects of the Project assessment as presented in the EIS. In order to address the matters expressed in the community submissions objecting to the Project and the requests for clarification or more refined assessment from Government agencies, Bowdens Silver has refined its proposed environmental management approach and commissioned a range of additional supplementary technical assessments to provide additional information and clarification on the various matters. This subsection presents a summary of these assessments and

their outcomes. Where additional or updated reporting has been prepared, the reporting is provided as separate appendices to this report. A brief summary of the actions taken since the exhibition of the EIS is presented below with the outcomes of any technical assessment presented in more detail in the following subsections. An updated summary of the environmental management and monitoring measures is provided in **Appendix 2**.

- In response to both Government and community submissions, Bowdens Silver has commissioned a more detailed assessment of risks associated with construction and development of the Tailings Storage Facility (TSF). This involved the development of a refined groundwater model, based on the peer-reviewed regional groundwater model, to better understand potential TSF impacts. Also assessed were additional seepage mitigation measures and their implications for groundwater and surface water (Lawsons Creek) quality via solute transport, mixing and dilution modelling. This assessment provides greater clarity with respect to the TSF and is described in the Groundwater Assessment (Jacobs, 2021) and specifically Annexure 10 of that document. The Groundwater Assessment has been updated and is included as **Appendix 3**. Matters raised in submissions relating to groundwater and the TSF are addressed in Section 5.11 and Section 5.25 respectively.

- Routine environmental monitoring of Bowdens Silver-owned land identified several individual Small Purple-pea plants (*Swainsona recta*). AREA Environmental Consultants & Communication Pty Ltd (AREA) was commissioned to undertake targeted ecological field surveys that also identified several Silky Swainsona-pea plants (*Swainsona sericea*) within the Mine Site. Impacts to both species have been assessed by EnviroKey. The removal of some of these threatened plants is unavoidable given their location. The outcomes of assessment have been incorporated into the Biodiversity Assessment Report (BAR) (EnviroKey, 2021 – see **Appendix 4**) which has been updated and now includes updated biodiversity offsetting to account for removal of several of these plants. Reporting on the outcomes of the AREA field surveys are presented in Annexure 9 of the BAR. Matters raised in submissions relating to biodiversity offsetting and terrestrial ecology are addressed in Section 5.7 and Section 5.26 respectively.

- Bowdens Silver has consulted with the Commonwealth Department of Agriculture, Water and the Environment regarding potential impacts to Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as a result of the Summer 2019/2020 bushfires. Niche Environment and Heritage Pty Ltd (Niche) was commissioned to undertake an assessment that considered the known habitat of threatened species listed under the EPBC Act and the extent of recent bushfires (2019/2020) (see **Appendix 5**). While fire did not affect the Mine Site or the alignment for the proposed water supply pipeline, there is potential that habitat within these locations will be more important in the short-term due to the loss of habitat elsewhere. This short-term reliance on other habitat has been considered against the likely timing for approval and development of the Project. Matters raised in submissions relating to biodiversity offsetting and terrestrial ecology are addressed in Section 5.7 and Section 5.26 respectively.

- Minor updates to noise modelling assessments have been undertaken to refine the understanding of potential noise generation and impacts at privately-owned residences. The Noise and Vibration Assessment was not updated to incorporate these changes as the overall conclusions of the assessment did not change. Matters raised in submissions relating to noise and vibration are addressed in Section 5.18.

- Additional reporting on metal concentrations in dust has been undertaken and is presented in this document. The additional reporting was undertaken to further justify the assumed metal concentrations in dust generated by the Project. The Air Quality Assessment (AQA) has been updated to address a request from the EPA to adjust Table 7.7 relating to metal concentration in dust (see **Appendix 6**). A clerical error was identified that resulted in row headings for PM_{10} and $PM_{2.5}$ being reversed. As the location selection for sampling relied upon for metal concentration assumptions is random, a sensitivity analysis has also been included to review what effect differing metal concentrations of source materials would have on the outcomes of the Air Quality Assessment. In addition, it was identified that incorrect units were applied for data relating to sampled copper and manganese levels within in the resource block model for the Project (that is, for waste rock and ore sources). The correct units have now been incorporated in the assessment, but these changes did not alter the overall outcomes of the assessment. Matters raised in submissions relating to air quality, and lead are addressed in Section 5.5 and Section 5.15 respectively.

- A range of clarifications have been included within the updated Human Health Risk Assessment (HHRA) (**Appendix 7**) in response to the review of public submissions and an independent peer review commissioned by DPIE. In addition, the assumptions made concerning levels of copper and manganese sourced from dust generated through handling of ore and waste rock has been updated to correct an error in the units applied to this data when generated from the resource block model. A sensitivity analysis has also been included to consider what effect some of the claims in relation to background conditions in the submissions would have to the outcomes of the HHRA. Importantly, the additional review and clarification has not resulted in any changes to the conclusions of the HHRA. Matters raised in submissions relating to health and lead are addressed in Section 5.12 and Section 5.15 respectively.

- Since the EIS was submitted, Bowdens Silver has secured water access entitlements that cover the predicted peak water take during mining operations, including the following.
  - 907ML from the Lachlan Fold Belt (Other) Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources.
  - 194ML from the Sydney Basin Groundwater (Other) Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources.
  - 139ML from the Lawsons Creek Water Source of the Macquarie Bogan Unregulated and Alluvial Water Source.

  Bowdens Silver has continued discussions to finalise a commercial agreement for the external water supply for the Project from the Ulan Coalfields.

- Bowdens Silver has continued to engage with landowners in the vicinity of the Mine Site that are predicted to experience an exceedance of noise assessment criteria under adverse meteorological conditions and worst-case operational scenarios. These outcomes of noise assessment trigger acquisition and/or mitigation rights under the NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP) (NSW Government, 2018) as discussed in EIS Section 2.1.4 and Section 4.2.2.6.

  The VLAMP requires that acquisition or negotiated agreements be considered by applicants in situations where there are no viable alternatives to minimise environmental impacts and these impacts do not comply with the relevant assessment criteria. Should the land not be acquired, or a negotiated agreement is not achieved, it is up to the consent authority (in this case the Independent Planning Commission (IPC)) to weigh up the relevant economic, social and environmental impacts of the Project and determine if the application should be approved.

  Of the five properties reported in the EIS to have triggered acquisition and/or mitigation under the VLAMP, agreements have been reached with one landowner and a draft agreement provided to another three. Discussions are continuing with those landowners and are yet to finalise agreements.

  A further six landowners have been offered tailored mitigation measures (to be determined with the landowner based on input from a builder and acoustic specialist) for predicted negligible noise impacts, but who would not require negotiated agreements under VLAMP. Agreements have been reached with three landowners and discussions are continuing with the remaining three landowners.

  It is Bowdens Silver's preference that acquisition or negotiated agreement be achieved. However, in the event this does not occur before determination of the application, Bowdens Silver agrees that conditions of consent would be set to the predicted noise levels and voluntary mitigation and/or acquisition rights continue to apply for a specified period. It is noted that the VLAMP includes a dispute resolution process, however this relates to the agreement of reasonable and feasible mitigation measures or agreement on land valuation and not the predicted impact, which in the case of the Project have been peer-reviewed and assessed by the EPA and DPIE.

- Bowdens Silver met with representatives of Mid-Western Regional Council (MWRC) on 23 November 2020 to discuss indicative terms for a Planning Agreement. Negotiations have continued since that time with Bowdens Silver agreeing to the most recently requested amendments to the terms of the agreement. An updated draft of these terms has been provided to MWRC for consideration and Bowdens Silver is awaiting advice that the terms of the agreement have been accepted. Once the terms are agreed they will be made public. While the exact terms remain confidential at the time this document has been finalised, the Planning Agreement very broadly provides a mechanism for Bowdens Silver to make a financial contribution to the region that would be expended on community infrastructure and road maintenance.

- Three independent peer reviews have been commissioned by the DPIE for the Project. The peer reviews reviewed the following technical assessments undertaken for the Project.
  - The Groundwater Assessment undertaken by Jacobs Group (Australia) Pty Limited.
  - The Human Health Risk Assessment undertaken by Environmental Risk Sciences (enRiskS) Pty Ltd.
  - The Economic Assessment undertaken by Gillespie Economics.

  Individual responses to these peer reviews have been presented to DPIE and are not included with this document. However, any updates to assessment outcomes as a result of the independent peer review outcomes have been presented with this document, including to the Groundwater Assessment (**Appendix 3**) and the HHRA (**Appendix 7**). The outcomes of the Economic Assessment have not changed as a result of the peer review and as a result this document has not been updated. The responses to the peer reviews should be read in conjunction with the updated assessment reports.

3.2 500KV TRANSMISSION LINE

As noted above, the inclusion of the 500kV transmission line in the development application for the Project has been presented in an Amendment Report for the Project.

At the time the EIS for the Project was finalised, it was proposed that the realignment of the TransGrid 500kV transmission line that crosses the proposed Mine Site would be the subject of a separate development application. It was intended that the application would rely upon assessment presented in the EIS to justify the application and therefore the environmental impacts of the realignment were comprehensively assessed and presented in the EIS. Following review of the EIS, TransGrid requested that the proposed realignment be included in the current development application for the Project. The *Amendment Report for the Bowdens Silver Project* presents the proposed realignment of the 500kV transmission line and the assessed environmental impacts as a component of the Project. It should be noted that no additional environmental impacts have been identified, although discussion of potential impacts from Electric and Magnetic Fields (EMF) has been included and identified that while construction of the realigned transmission line would satisfy the TransGrid guidelines for EMF, the proposed location would actually be further away from privately-owned residences than the existing transmission line.

The power supply for the Mine Site would be sourced via the existing 66kV powerlines in the vicinity of Breakfast Creek (infrastructure owned by Endeavour Energy would be upgraded for this purpose). An additional section of powerline and associated easement would be established between Breakfast Creek and the Mine Site for this purpose. The precise alignment of the additional powerline is not yet finalised and will be subject to the outcomes of ongoing consultation with landowners and MWRC (in relation to use of the road corridor). Approval for the construction and use of the additional powerline would be subject to a separate application under Part 5 of the EP&A Act and submitted to Endeavour Energy for assessment and determination.

3.3 TSF MODELLING AND SEEPAGE MITIGATION

3.3.1 Overview

A key matter raised in submissions related to perceived risks to groundwater and surface water resources arising from the construction and development of the TSF. Submissions from the EPA and DPIE Water also requested additional assessment of seepage from the TSF and any related potential impacts.

Further consultation with the EPA since the exhibition of the EIS has confirmed that the TSF liner configuration and permeability presented in the TSF conceptual design meets the EPA's criteria, provided any approval was supported by appropriate conditions of consent. The EPA criteria are intended to set best practice design principles for the permeability of clay linings for tailings storage. Regardless of the above and in response to the submissions and comments, Bowdens Silver has proposed to add further design elements to the TSF that are focused on providing additional seepage mitigation. As Bowdens Silver is focused on demonstrating its commitment to the highest feasible environmental standards, it considers the cost associated with additional seepage mitigation as reasonable, given that it will provide added certainty for the community, relevant Government agencies and for the consent authority when reviewing the merits of the Project.

The following subsections present a detailed summary of the outcomes of an additional assessment of the TSF operation undertaken by Jacobs Group (Australia) Pty Ltd (Jacobs) and presented in **Appendix 3.** Two design options were considered that added to the preliminary design presented by ATC Williams (2020) and incorporated different scenarios for the application of additional Bituminous Geomembrane (BGM) liner and the use of underdrainage. Both options were subject to the following additional modelling.

Refined Groundwater and Solute Transport Modelling

Small scale refinements were made to the peer-reviewed regional groundwater model in the vicinity of the TSF. These refinements allowed for improved prediction of seepage and assessment of the effectiveness of mitigation measures. The outcomes were subject to solute transport modelling to predict the flow path of the seepage originating from the TSF.

Mixing and Dilution Modelling

The results of refined groundwater and solute transport modelling were then applied in mixing and dilution modelling to predict water quality in receiving surface water and groundwater systems.

The additional modelling provides a deliberately conservative indication of the flow path and dilution of seepage. It is noted that this approach to the assessment likely overpredicts potential outcomes and as it does not consider the natural processes within the TSF and receiving systems that will invariably influence actual outcomes. An example of this is the breakdown of cyanide within the TSF decant pond as the result of volatilisation, which would result in the loss of up to 90% of the cyanide present (NICNAS, 2010), substantially reducing the concentration of this compound in any seepage. Further to this, any cyanide within seepage would be subject to natural degradation within the natural groundwater setting.

The outcomes of the modelling have been considered in terms of:

- seepage flux from the TSF to the groundwater setting;

- seepage contribution to groundwater baseflow to Lawsons Creek;
- the percentage contribution of seepage to water flows in Lawsons Creek; and
- potential impacts to water quality.

The outcomes of the assessment undertaken by Jacobs (2021) demonstrates that extension of the BGM liner beyond the TSF embankment provides further reduction in predicted seepage. When solute transport, mixing and dilution is considered, an extended BGM substantially limits predicted changes to Lawsons Creek water quality. It is proposed that in the event the Project is approved, further assessments would be undertaken to confirm the detailed design of the TSF, including the BGM liner extent. Bowdens Silver envisages that this approach would commence with a BGM liner over the entire impoundment area with any proposed reduction to BGM extent justified by technical assessment (i.e. seepage modelling). Therefore, the extent of BGM may vary as a result of detailed design.

This assessment clearly demonstrated that, despite the highly conservative (i.e. worst case) approach, the proposed seepage mitigation would ensure that potential impacts to the groundwater setting and Lawsons Creek would not impair the existing or future use of these water resources. In almost all instances, the predicted Lawsons Creek water quality, across the range of flow conditions, is below the thresholds published in the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2019) for aquatic ecosystems and agricultural uses.

It is considered that the assessment undertaken to date is sufficiently detailed and conservative to permit approval of the conceptual design of the TSF for the Project. Whilst the conceptual TSF design would be approved through the development application process, optimal configuration for TSF design elements would occur as part of the detailed design process. Refinement of the nature and extent of TSF design elements through detailed design would ensure the nominated seepage outcomes (or better) are achieved prior to construction. This process would be used to confirm the optimal configuration for seepage mitigation to achieve best practice TSF design intent and limit potential impacts to surface water and groundwater resources from seepage with regards to current and future beneficial uses, as defined by published water quality guidance.

3.3.2 Approach to Assessment

Bowdens Silver commissioned Jacobs to assess two design options for the TSF as part of refined TSF modelling. The design elements presented in the EIS and described in the preliminary TSF design (ATC Williams, 2020) formed the basis for each design option assessed and incorporated the following measures to mitigate seepage.

- Foundation treatment to establish a low permeability clay liner (0.45 m thick) under the decant pond and tailings impoundment area.
- A low permeability geomembrane / clay zone on the upstream face of the embankment and a low permeability Bituminous Geomembrane (BGM) liner.
- Curtain grouting to a nominal depth of 40m of the rock foundations along the upstream toe of the TSF embankment.
- Toe drains downgradient from the TSF embankment to direct seepage towards a seepage collection pond that would be pumped back to the TSF.

In addition to the above seepage mitigation measures, the following additional design elements were added to the assessed design options.

1. TSF Design Option 1

This TSF design option included extension of the area covered by a low permeability BGM liner so that it covered the entire tailings impoundment area. The preliminary design of the TSF considered low permeability BGM only being placed on the upstream face of the embankment.

2. TSF Design Option 2

This TSF design option included extension of the area covered by a low permeability BGM liner so that it covers the decant pond area. The remainder of the TSF impoundment area would be underlain by a clay liner, as per the TSF preliminary design. For this TSF design option, water levels within the TSF and decant pond would be maintained at a constant level via underdrains that would be placed on top of the BGM during TSF construction. These underdrains would drain to a central point within the TSF with collected decant water pumped back for re-use in the processing circuit. This approach would therefore promote drainage of deposited tailings towards the BGM lined decant pond.

Jacobs undertook additional numerical groundwater flow and solute transport modelling to assess potential impacts on local groundwater and surface water resources from the TSF, specifically at Lawsons Creek and associated alluvial aquifers. The modelling outcomes were then subject to dilution and mixing modelling to determine a conservative estimate of seepage concentrations at sensitive locations. The numerical groundwater flow and solute transport modelling utilised the peer-reviewed regional groundwater flow model prepared to inform the Groundwater Assessment for the EIS. In order to achieve the model objectives, the model was refined in the vicinity of the TSF. The model was prepared using the United States Geological Survey (USGS) modelling code, MODFLOW, which is an industry standard groundwater modelling code. The MODFLOW-USG variant was used for the model with support from MODPATH Version 7 (particle tracking) and USG Transport (solute transport).

The numerical groundwater flow modelling predictions were used to provide greater insight into the predicted flow rate of seepage (seepage flux) originating within the TSF area and entering the natural groundwater setting. This approach permitted an assessment of the effectiveness of the additional seepage mitigation measures in conjunction with those proposed in the conceptual design. Comparison between the modelled iterations will be used to inform the detailed design of the TSF.

The results of each model iteration were then used for particle tracking (solute) transport modelling. That is, the fate and transport of seepage from the TSF was then modelled to predict the potential influences of seepage on the receiving system. This was treated as a groundwater tracer assessment that adopted a conservative approach, considering only advection and dispersion to assess potential volumes of seepage reaching Lawsons Creek.

The results of particle tracking (solute) transport modelling were then used for the further assessment of Lawsons Creek water quality via dilution and mixing modelling. In order to adopt a conservative approach, the mixing and dilution modelling did not consider natural chemical reactions and attenuation within the TSF, groundwater, along the flow path, via water rock

interactions. Rather, constituent concentrations were mixed with host systems to establish indicative water quality over a range of flow conditions modelled within Lawsons Creek. The adopted range of receiving flow conditions were obtained from the Australian Water Balance Model (AWBM) developed by WRM Water & Environment Pty Ltd (WRM, 2020). The outcomes are therefore highly conservative and likely to overpredict concentrations in Lawsons Creek.

The model iterations, their calibration, development, implementation, predictions and results are described in detail in Section 6.5 and Annexure 10 of the Groundwater Assessment (Jacobs, 2021) which is provided as **Appendix 3**.

3.3.3 Changes to the Regional Groundwater Flow Model

The regional groundwater flow model was first refined with the inclusion of additional data collected in the period since EIS preparation. This helped refine the conceptual model in the vicinity of the TSF with an objective to increase the resolution of model predictions.

Refinement was achieved through changes to the model grid including reduced grid cell spacing, a more refined representative model of land surface elevation and regolith/alluvium thickness and the inclusion of additional model layers to replicate TSF components. A summary of these refinements is provided below.

- **Model layers**: two model layers (new Model Layer 1 and new Model Layer 2) were added to explicitly simulate the tailings within the TSF and allow modelling of additional seepage mitigation measures.
- **Hydraulic conductivity**: changes were made in Model Layer 2 to simulate the varying tailings thickness and design elements.
- **Horizontal flow barrier**: TSF Design Options 1 and 2 both included a grout curtain beneath the embankment that would be completed into fresh rock and represent a horizontal flow barrier.
- **Drain boundary conditions**: drain boundaries were added to TSF Design Options 1 and 2 to simulate the toe drain downgradient from the embankment in accordance with the preliminary TSF design (ATC Williams, 2020). All drain boundaries were removed from within the TSF footprint.
- **Head boundary condition**: to simulate a constant head boundary condition, the decant pond was modelled using the head-dependent MODFLOW-USG General Head boundary condition.
- **Recharge**: groundwater recharge from precipitation was set to zero in the tailings impoundment area.
- **Solute transport**: solute transport was added to the model iterations using the capabilities within MODFLOW-USG. This was added to predict the blending ratio of water originating at the TSF with groundwater within the host system.

Additional model iterations that included the modifications to the regional groundwater flow model identified above, were then run to assess effectiveness of the TSF design options. Full details of the modifications are provided in Section 2 and Section 4.1.1 of TSF Modelling Report (Annexure 10 of Jacobs (2021)) with a summary provided below.

3.3.4 Modelled Iterations

Based on the refinements to the regional groundwater flow model, model iterations were developed to predict and assess the potential groundwater impacts from operation of the TSF under the two TSF design options. The results of each model iteration were then used to determine the seepage flux. These fluxes were then applied for solute transport modelling to determine percent groundwater contributions from the TSF and to inform conservative calculations with regards to mixing and dilution with receiving waters.

The following subsections detail the modelling approach used to assess the two design options. Model iterations for both design options were transient simulations over a 200 year period.

3.3.4.1 TSF Design Option 1

In order to simulate the staged development of the TSF throughout the 15.5-year period of TSF operation (as presented in the EIS), an active decant pond with increasing head (water level) was modelled at the TSF embankment. The operation of the TSF in this design option is broadly similar to that presented in the EIS however, seepage would be further reduced by the extended low permeability BGM liner.

3.3.4.2 TSF Design Option 2

For this TSF design option, water levels (head pressure) within the TSF and decant pond are assumed to be managed via underdrains. The underdrains are not explicitly represented in the model iteration but rather the effect of their use was applied through constant head conditions with suitable head levels provided by ATC Williams (*pers.com.* ATC Williams, 2021).

In order to replicate the underdrainage and decant return system, the TSF was modelled using the following two separate constant head conditions over different sections of the tailings impoundment area:

1. Constant head of 10m above the modelled land surface was maintained in the central and downgradient portions of the TSF, that is closest to the embankment, throughout the period of TSF operation.
2. Constant head of 2m above the modelled land surface was maintained in those areas of the tailings impoundment beyond the 10m managed head zone throughout the period of TSF operation.

The low permeability BGM was modelled underneath the 10m managed head zone (Condition 1 above).

For this model iteration, the managed head conditions were simulated as active throughout the TSF operational period and maintained for a further 6.5 years.

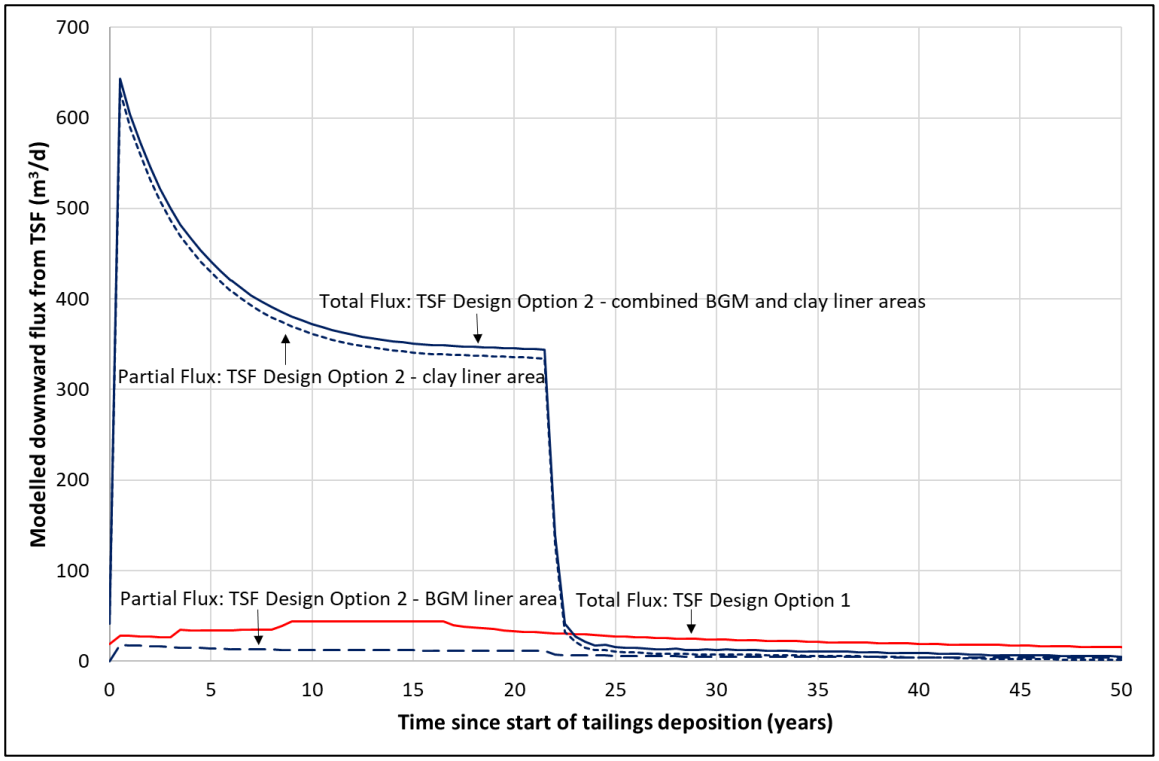
3.3.5 Results

3.3.5.1 Seepage Flux

The predicted seepage fluxes through the base of the TSF are provided in **Figure 3.1**. As shown on **Figure 3.1**, the predicted flux for TSF Design Option 2 is significantly greater than that for TSF Design Option 1. This is attributable to seepage originating from the approximately

594 000m^2 upgradient area of the TSF that did not have the low permeability BGM liner applied for modelling of Design Option 2. However, during operations the entire extent of the TSF, particularly the upgradient areas, is unlikely to be saturated and the results of seepage fluxes for this model iteration is likely to substantially overpredict actual seepage. Regardless, it is apparent from this modelling that a BGM underlying the entire tailings impoundment area is most effective at reducing seepage with the addition of underdrainage in TSF Design Option 2 having a relatively minor effect on seepage rates.

Figure 3.1 Predicted TSF Seepage Flux



Source: Jacobs (2021) – modified after Figure 52

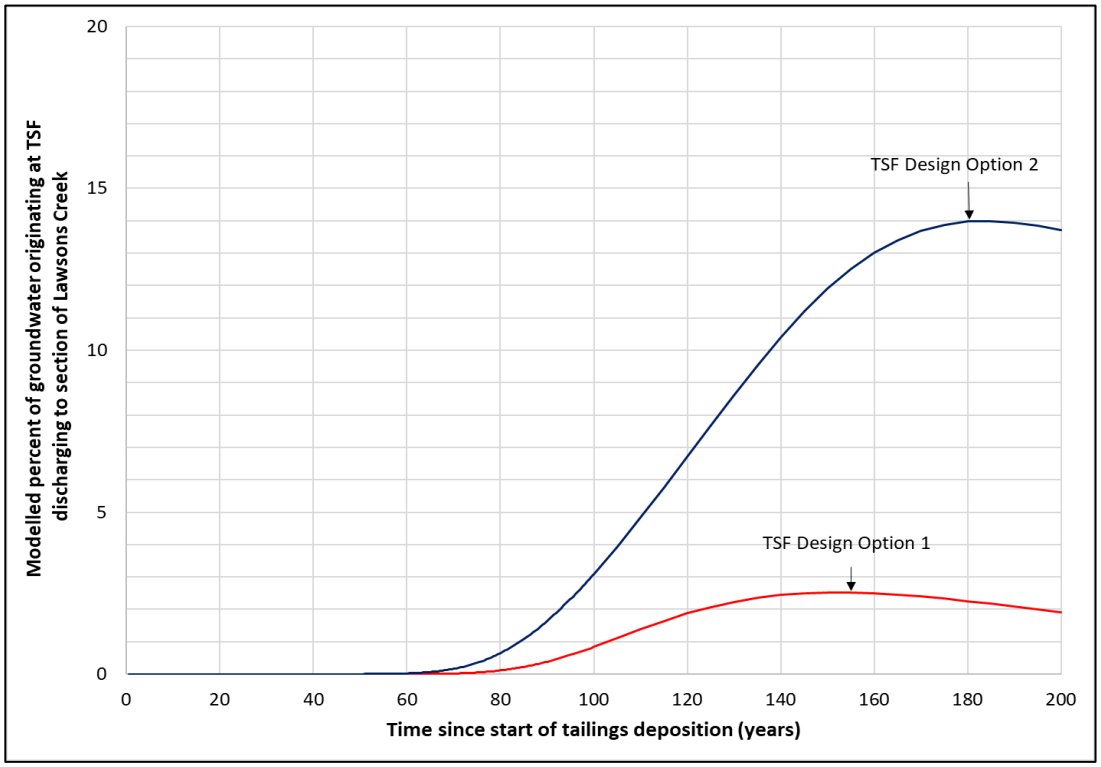
3.3.5.2 Groundwater Baseflow to Lawsons Creek

Outputs from the refined TSF modelling were then used to assess the extent of influence and percentage of groundwater originating from the water/liquid contained within the TSF. This was undertaken using simulated monitoring bores representing shallow (regolith at approximately 10mbgl[2]) and deep (weathered lithologies at approximately 20mbgl) aquifers downgradient of the TSF, between the TSF embankment and Lawsons Creek. The focus of assessment was the predicted discharge of groundwater to Lawsons Creek ("baseflow") given the sensitivity of this watercourse for downstream water users.

The results identified that TSF Design Option 1 resulted in a lower contribution to naturally occurring groundwater (percent of total) than TSF Design Option 2. This is consistent with the prediction of reduced seepage flux of TSF Design Option 1 (see **Figure 3.2**). For TSF Design Option 1, the percentage of groundwater originating at the TSF and entering Lawsons Creek as baseflow, does not exceed 2.5% whilst for TSF Design Option 2 it increases to approximately 14% of groundwater baseflow entering Lawsons Creek after 180 years (see **Figure 3.2**).

[2] Mbgl = metres below ground level

Figure 3.2 Percentage of groundwater originating from TSF and flux at Lawsons Creek



Source: Jacobs (2021) – modified after Figure 53

3.3.5.3 Percentage Flow Contribution

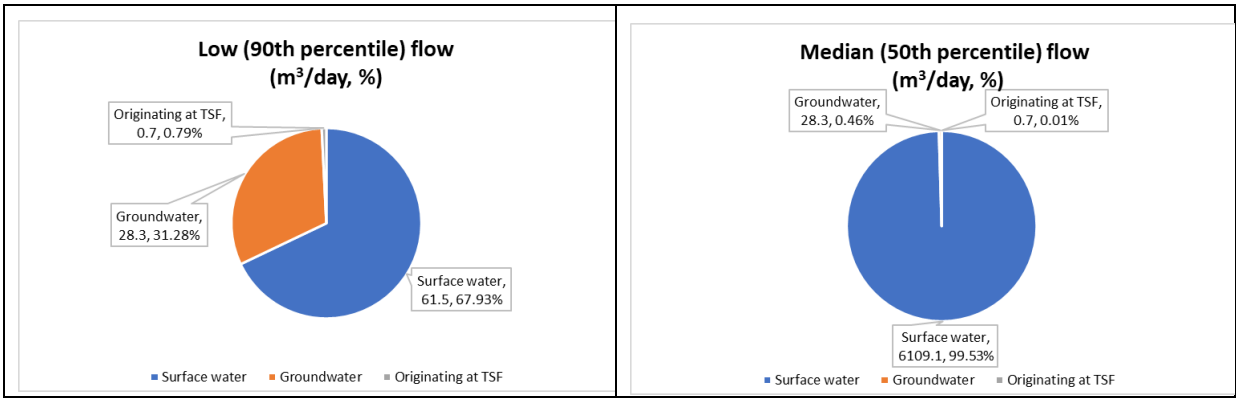
Figure 3.3 and **Figure 3.4** present the relative Lawsons Creek flow percentage contributions for each design option at the forecast peak arrival time and the 90th percentile (low flow) and 50th percentile (median flow) surface water flow conditions[3] for the following components of flow in Lawsons Creek.

- Surface water already in the receiving system of Lawsons Creek.
- Groundwater (baseflow) contribution.
- The component of groundwater originating at the TSF.

The forecast peak arrival time for TSF Design Option 1 is 150 years and 180 years for TSF Design Option 2. As shown on **Figure 3.3**, for TSF Design Option 1, the proportion of groundwater originating at the TSF and entering Lawsons Creek does not exceed 0.7m^3/day, less than 1% of total streamflow in either the low (0.79%) or median (0.01%) flow conditions. In the case of TSF Design Option 2, whilst the predicted 4.0m^3/day represents 4.22% of the 61.5m^3/day total streamflow in the low flow condition, when median streamflow (6 109.1m^3/day) is considered, the TSF contribution to total flow reduces to less than 1% (see **Figure 3.4**). Whilst not shown in **Figure 3.4** above, the proportion of TSF groundwater contribution of TSF Design Option 2 reduces to less than 1% of total streamflow upon flows reaching 86th percentile flow conditions. Notwithstanding this**, Figure 3.3** and **Figure 3.4** show the minor contributions of groundwater originating at the TSF to total Lawsons Creek streamflow in both the low flow and median flow conditions.

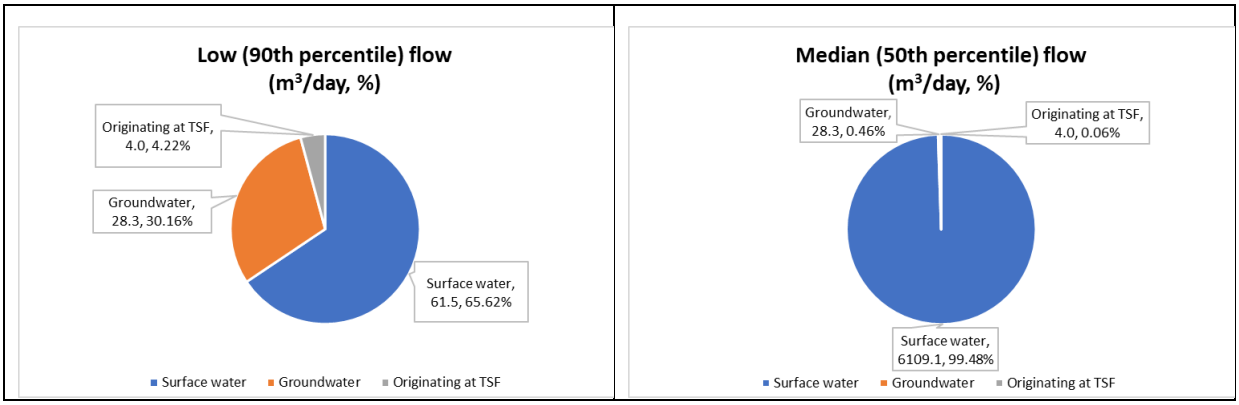
[3] Stated percentiles relate to percentage of time that nominated flow condition is exceeded.

Figure 3.3 Percentage of total flow volume (m³/day) at peak arrival time – TSF Design Option 1



Source: Jacobs, 2021 – modified after Figure 56

Figure 3.4 Percentage of total flow volume (m³/day) at peak arrival time – TSF Design Option 2



Source: Jacobs, 2021 – modified after Figure 57

3.3.5.4 Potential Impacts to Water Quality in Lawsons Creek

The analyte concentrations of tailings slurry were determined through leach tests of representative tailings samples undertaken by Graeme Campbell and Associates (GCA, 2020). The tailings concentrations and median surface and groundwater concentrations derived from Bowdens Silver long-term monitoring water quality program were applied to the modelling outcomes to conservatively predict water quality outcomes in Lawsons Creek for assessment against national water quality guidelines. This process assumes that any TSF seepage is diluted within the host groundwater system (added and mixed with background groundwater concentrations) which subsequently flows down gradient and is further diluted by surface water when reporting to Lawsons Creek (added and mixed with background surface water concentrations).

In this manner, the water quality changes associated with the small percentage of groundwater originating at the TSF can be estimated through mixing and dilution modelling. Mixing was assumed under the modelled Lawsons Creek low (90th percentile) and median (50th percentile) flow conditions (WRM, 2020). The results for each TSF design option are presented in **Table 3.1** and compared against the Australian and New Zealand (ANZ) guideline value for 95% protection of freshwater aquatic ecosystems (ANZG, 2019). As complexation with dissolved ions reduces the toxicity of certain metals, the ANZ guideline values for cadmium, chromium, zinc and lead have been adjusted using the hardness modification algorithms provided in ANZECC (2000).

The median values applied for the hardness modified algorithms was 331.2mg/L that was calculated using median calcium (59.5mg/L) and magnesium (44.5mg/L) concentrations derived from ambient water quality monitoring in Lawson Creek upstream of the confluence with Walkers Creek.

It should be noted that this assessment is deliberately conservative and therefore is likely to overpredict potential impacts as it assumes no natural degradation or reduction in concentrations either within the TSF or via physical (e.g. adsorption) or biogeochemical (e.g. bacterial) processes as the groundwater moves through the aquifer. For example, when considering cyanide, this compound will be subjected to volatilisation processes, such that up to 90% of cyanide present may be lost from the TSF decant pond (NICNAS, 2010). In addition further removal of cyanide (if any present) is very likely to occur upon entry to the groundwater system via processes such as the formation of insoluble iron-cyanide precipitates or formic acid (HCOOH) from hydrolysis. For metals such as copper and zinc, adsorption to calcium and iron oxides and precipitation within the aquifer will also likely act to significantly reduce any concentrations remaining in groundwater.

Furthermore, in some cases the median background concentrations in host groundwater or Lawsons Creek surface water, as established from long-term ambient water quality monitoring, already exceed the guideline values and these existing conditions effectively provide the greater contribution to predicted water quality compared to very minimal (if any) contributions from the TSF. Whilst certain aspects of water quality parameters are likely attributable to catchment specific factors, such as mineralised geology, Bowdens Silver notes that the Aquatic Ecology Assessment conducted for the EIS (Cardno, 2020) considered that Lawsons Creek flowed through habitat of relatively low ecological value due to the level of catchment disturbance and that water quality was moderate to poor, with low dissolved oxygen and elevated turbidity and electrical conductivity. Despite this, Cardno (2020) identified a diverse macroinvertebrate fauna assemblage, however this was dominated by pollution tolerant species.

Table 3.1 identifies the potential concentrations of copper and cyanide to be greater than the ANZ guideline values within Lawsons Creek. For TSF Design Option 1, when dilution for low and median flows in Lawsons Creek are considered, only copper is above the guideline values for aquatic ecosystem protection. It is however, noted that for TSF Design Option 1, the concentration for copper is commensurate with the 0.002mg/L median background concentration which, as established by ambient water quality monitoring also exceeds the 0.0014mg/L guideline value.

For TSF Design Option 2, at low flow, copper (0.006mg/L) and cyanide (0.14mg/L) exceed the respective guideline values, with only copper (0.002mg/L) persisting above guideline values at median flow. Whilst the exceedance for copper is commensurate with the background concentrations, it is likely that cyanide concentrations would be significantly lower than predicted due to volatilisation processes.

As noted above, the predicted cyanide concentration is highly conservative and assumes no degradation of this compound, such as volatilisation with the TSF decant pond. In reality, these processes would be expected to further reduce cyanide concentrations by up to 90% (NICNAS, 2010) in a realistic scenario. For example, if the modelled tailings cyanide concentration of 0.53mg/L was reduced by 90% (0.053mg/L), as referenced in NICNAS (2010), it would result in predicted concentrations that are an order of magnitude lower (i.e. negligible).

Table 3.1
Seepage Dilution and Mixing Concentrations

Analyte	Tailings slurry concentration (mg/L)[1]	Background (receiving) Groundwater concentration (mg/L)[2]	Modelled Groundwater concentration (with TSF contribution) at Lawsons Creek (mg/L)	Background Lawsons Creek (receiving) concentration (mg/L)[3]	Lawsons Creek modelled concentration (mg/L)		ANZG 2019 Guideline Value (mg/L)	ANZECC 2000 (sheep)	ANZECC 2000 (beef cattle)	ANZECC 2000 (long term irrigation)
					Low flow (90th %ile)	Median flow (50th %ile)				
TSF Design Option 1										
Aluminium	0.08	nd[4]	0.002	nd[4]	$4.0x10^{-4}$	$9.2x10^{-6}$	*0.055*	-	*5*	*5*
Arsenic	0.033	0.002	0.003	0.002	0.002	0.002	*0.013*	-	*0.5*	*0.1*
Cadmium	0.006	nd[4]	$1.6x10^{-4}$	$1.0x10^{-4}$	$1.1x10^{-4}$	$1.0x10^{-4}$	*0.002*[5]	-	*0.01*	*0.01*
Chromium	0.02	nd[4]	$5.0x10^{-4}$	nd[4]	$9.5x10^{-5}$	$2.3x10^{-6}$	*0.007*[5]	-	*1.0*	*0.1*
Copper	0.17	0.001	0.005	0.002	0.003	0.002	*0.0014*	*0.4*	*1.0*	*0.2*
Cyanide	0.53	nd[4]	0.013	nd[4]	0.002	$6.1x10^{-5}$	*0.007*	-	-	-
Lead	0.051	nd[4]	0.001	0.002	0.002	0.002	*0.072*[5]	-	*0.1*	*2.0*
Manganese	19	0.01	0.488	0.132	0.199	0.134	*1.9*	-	-	*0.2*
Phosphorous	0.1	0.075	0.076	nd[4]	0.014	$3.5x10^{-4}$	*0.02*	-	-	-
Zinc	1.1	0.01	0.037	0.009	0.014	0.009	*0.062*[5]	-	*20.0*	*2.0*
TSF Design Option 2										
Aluminium	0.08	nd[4]	0.011	nd[4]	0.002	$5.1x10^{-6}$	*0.055*	-	*5*	*5*
Arsenic	0.033	0.002	0.006	0.002	0.003	0.002	*0.013*	-	*0.5*	*0.1*
Cadmium	0.006	nd[4]	$8.7x10^{-4}$	$1.0x10^{-4}$	$2.5x10^{-4}$	$1.0x10^{-4}$	*0.002*[5]	-	*0.01*	*0.01*
Chromium	0.02	nd[4]	0.003	nd[4]	5.3x10-4	$1.3x10^{-5}$	*0.007*[5]	-	*1.0*	*0.1*
Copper	0.17	0.001	0.025	0.002	0.006	0.002	*0.0014*	*0.4*	*1.0*	*0.2*
Cyanide	0.53	nd[4]	0.074	nd[4]	0.014	$3.4x10^{-4}$	*0.007*	-	-	-
Lead	0.051	nd[4]	0.007	0.002	0.003	0.002	*0.072*[5]	-	*0.1*	*2.0*
Manganese	19	0.01	2.668	0.132	0.612	0.143	*1.9*	-	-	*0.2*
Phosphorous	0.1	0.075	0.078	nd[4]	0.015	$3.7x10^{-4}$	*0.02*	-	-	-
Zinc	1.1	0.01	0.162	0.009	0.038	0.010	*0.062*[5]	-	*20.0*	*2.0*

Note: Grey shading indicates exceedance of ANZG (2019).
1: Data from GCA (2020)
2: Groundwater background concentrations are median values from BGW16 and BGW17.
3: Lawsons Creek background concentrations are median values from BSW28.
4: Where no data (nd) is available, background concentrations assumed negligible.
5: Hardness modified trigger values (Table 3.4.3 ANZECC, 2000)

Source: Jacobs, 2021 – Modified after Table 25

It is also noted that licensed water extraction and landholder rights uses of water drawn from Lawsons Creek is principally for agricultural purposes (e.g. fodder cropping and stock watering). As shown on **Table 3.1**, even when conservative assumptions are applied to the assessments of the design options, the predictions for Lawsons Creek water quality clearly identify that TSF seepage would have no adverse impact to these beneficial uses of Lawsons Creek.

3.3.6 Seepage Mitigation and Management

The outcomes of the assessment undertaken by Jacobs (2021) demonstrates that Design Option 1 is the most effective for reducing potential groundwater impacts from the TSF. The inclusion of a BGM liner over the entire TSF impoundment area provides the most effective reduction in seepage and when solute transport, mixing and dilution is considered, substantially limits predicted changes to water quality at Lawsons Creek from seepage. The TSF layout has been updated to include this mitigation and is presented in **Figure 3.5**. Underdrainage, when combined with the BGM liner provided additional albeit relatively minor improvements, however the overall outcome did not perform as well. This is likely due to the modelling of this design option over-estimating seepage from upstream areas of the TSF as these areas would not necessarily maintain the modelled constant 2m head pressure. It may reasonably be expected the seepage generation in these areas would be much lower. Therefore, further refined modelling during detailed design is likely to indicate that a BGM liner and underdrainage beneath the decant pond, where sustained pressure heads are highest throughout the operational life of the TSF, is the most optimal arrangement for seepage mitigation.

It is proposed that in the event the Project is approved, further assessments would be undertaken to confirm the detailed design of the liner for the TSF. These assessments are standard engineering practice and would further refine understanding of seepage flux and determine the most effective design elements for mitigation and would involve further seepage modelling that is informed by detailed geotechnical investigations. Bowdens Silver envisages that the approach to TSF detailed design would commence with a BGM liner over the entire impoundment area with any proposed reduction to BGM extent justified by technical assessment (i.e. seepage modelling). Therefore, the extent of BGM presented in **Figure 3.5** may vary as a result of detailed design. In addition, underdrainage coupled with a BGM would also be considered as part of seepage mitigation measures. In line with the conservative nature of the assessment undertaken to date, Bowdens Silver would ensure that the final TSF design would achieve seepage rates and impacts that are no greater than those predicted by Jacobs (2021).

Bowdens Silver has also committed to undertaking reactive transport modelling to refine its understanding of the natural chemical reactions arising from water/rock interactions along the flow path. This modelling would increase, to the greatest extent practicable, understanding of the potential impacts to water quality from seepage mitigation measures to support the conclusions of detailed design of the TSF.

As noted in Section 29 of ATC Williams (2020) in addition to further assessment of seepage mitigation measures, during the detailed design phase for the TSF, the following additional works are recommended to ensure the TSF meets Dam Safety NSW and ANCOLD design guidance.

- Additional tailings testing.
- Detailed site investigation (geotechnical) including borrow investigation for construction material.

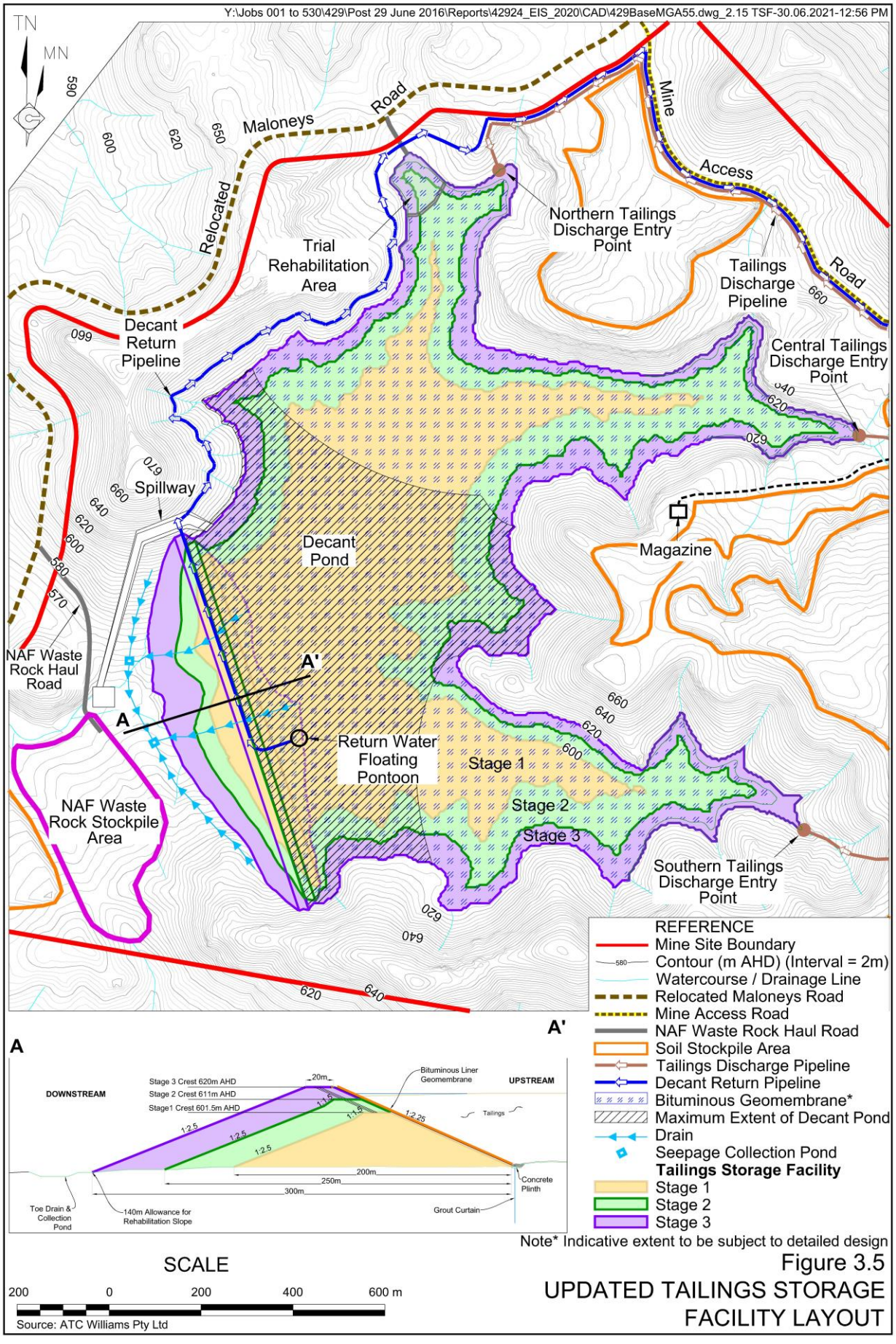


Figure 3.5
UPDATED TAILINGS STORAGE FACILITY LAYOUT

- Site-specific seismic risk study.
- Site-wide water balance that builds on the work completed by WRM.
- Detailed tailings deposition and staging plans.
- Refinement of flood storage requirements.
- Dam break analysis.
- Stability analysis.
- Foundation preparation design.
- Grouting design.
- Underdrainage design (if required).
- Water recovery system design.

During TSF construction and operations, the following measures would be implemented to manage seepage risks from the TSF.

- Installation of a system of vibrating wire and standpipe piezometers upstream and downstream of the foundation grouting, beneath the embankment, at the toe of the embankment.
- Installation of groundwater monitoring bores downgradient of the TSF to monitor for any seepage migration.
- Monitoring of all vibrating wire and standpipe piezometers as well as groundwater monitoring bores during and following TSF operations. All monitoring requirements would be documented in either the Water Management Plan or TSF management documentation that would need to be approved by DPIE and Dam Safety NSW respectively.
- Undertake inspections of the tailings discharge pipelines, water return pipeline, discharge points, decant system and decant pond in accordance with TSF Operations and Maintenance Plan.
- Undertake inspections of the external embankment and associated structures, the tailings beach, decant pond level and all monitoring installations in accordance with TSF Operations and Maintenance Plan.
- Prepare a comprehensive Trigger Action Response Plan that is associated with monitoring outcomes and which would be included in the Water Management Plan for the Project.
- Comply with all reporting and regulatory requirements of DPIE, EPA and Dams Safety NSW throughout the life of the development.
- Undertake regular independent reviews and audits against contemporary engineering and environmental standards.

The mitigation identified above would be documented in the TSF Operations and Maintenance Plan, which may be updated over time, as required by Dam Safety NSW.

3.3.7 Conclusion

Refined groundwater flow modelling in the vicinity of the TSF was undertaken to address submissions relating to the potential environmental implications of seepage from the proposed TSF. Whilst seepage rates for the preliminary design of the TSF were within the specific bounds stipulated by the NSW EPA, Bowdens Silver elected to include additional design elements for seepage mitigation. These design elements were then subjected to refined modelling for assessment of potential impacts. The results of the refined modelling of additional design elements were then used for solute transport modelling and subsequent dilution and mixing modelling to assess implications for downstream water quality in Lawsons Creek (median and low flow conditions).

The outcomes of the assessments for potential water quality impacts from seepage are inherently conservative, as all natural processes and reactions that will occur within the TSF and along the flow path were excluded from consideration. For example, whilst the assessment identifies that guideline values for cyanide are exceeded, the adopted approach disregarded the significant natural attenuation processes that this compound would undergo (i.e. volatilisation). This natural attenuation of cyanide would result in concentrations up to an order of magnitude lower than predicted by the modelling or its complete degradation and removal. Furthermore, in many instances where modelled water quality would be outside guideline values for aquatic ecosystem protection, these instances invariably arise when background conditions are already elevated. When agricultural guideline values are applied to the assessment of water quality in Lawsons Creek (i.e. irrigation and stock watering), it is clear that TSF seepage would have no adverse impact on these beneficial uses.

Furthermore, a detailed suite of management and seepage mitigation measures would be incorporated into the design, construction and operation of the TSF. The effectiveness of these measures would be routinely assessed using data collected from a comprehensive groundwater monitoring program that would be implemented for the Project.

It is considered that the assessment undertaken to date is sufficiently detailed and conservative to permit approval of the conceptual design of the TSF for the Project. Notwithstanding this, in the event Development Consent is granted for the Project, Bowdens Silver would further assess the effectiveness of these design elements aimed at seepage mitigation as part of detailed TSF design undertaken to the satisfaction of DPIE and/or EPA. This process would be used to confirm the optimal configuration for seepage mitigation (i.e. full or partial BGM with underdrainage) to achieve the TSF design intent and limit potential impacts to surface water and groundwater resources from seepage with regards to current and future beneficial uses, as defined by published water quality guidelines.

3.4 WATER BALANCE MODELLING

Bowdens Silver commissioned WRM to revise the low runoff scenario water balance model outcomes to test the sensitivity of the site water balance to potential further reductions in the rate of surface water runoff. This was undertaken to demonstrate possible impacts of more extreme climate scenarios, such as that experienced during the recent drought, and to indicate the extent to which the operation would rely on make-up water under this scenario. As summarised in **Table 3.2**, the revised runoff parameters further reduced the runoff from different catchment types by between 9% and 24% as indicated in the average annual runoff.

Table 3.2
Australian Water Balance Model (AWBM) Parameters: Low Runoff Scenario

Adopted AWBM Parameters – Revised Low Runoff scenario[1]						
Parameter	**Dry Tailings Beach (TSF)**	**Natural / Undisturbed**	**Roads / Hardstand / Pits**	**Waste Rock Emplacement**	**Rehabilitation**	**Lined**
A1[2]	0.134	0.2	0.134	0.2	0.2	1
A2[2]	0.433	0.2	0.433	0.2	0.2	0
A3[2]	0.433	0.6	0.433	0.6	0.6	0
C1[3] (mm)	8	90	8	90	90	10
C2[3] (mm)	15	185	25	185	185	-
C3[3] (mm)	25	215	45	230	230	-
C_{avg} (mm)	18.4	184	31.4	193	193	10
BFI[4]	0	0.6	0	0.6	0.6	0
K_{base}[5]	0	0.7	0	0.7	0.7	0
K_{surf}[6]	0	0.4	0	0.4	0.4	0
Average Annual Runoff/ Rainfall (%)	32.1	2.7	24.5	2.5	2.5	42
Average Annual Runoff (ML/ha/a)	2.1	0.16	1.56	0.15	0.15	2.75
Reduction compared to previous low runoff model[6]	20%	15%	9%	24%	24%	10%

Notes
1: WRM, 2020 – Update of Table 5.8
2: Partial areas of catchments
3: Storage capacity of partial catchment areas (i.e. before runoff generated).
4: Baseflow index, the fraction of excess runoff entering groundwater (recharge)
5: Baseflow recession constant (proportion of moisture remaining after each time step)
6: Surface flow recession constant (proportion of moisture remaining after each time step)

The overall site water balance for the re-modelled low runoff scenario is summarised in **Table 3.3**.

Table 3.3
Average Annual Site Water Balance – Years 1 to 14 – Revised Low Runoff Scenario

Item	**Inflow ML/a**	**Outflow ML/a**
Rainfall and runoff	*707*	
Net groundwater inflows to open cut pit	637	
Imported water	*400*	
Ore moisture	83	
Retained tailings moisture		1 151
Evaporation		*417*
Dust suppression demand		204
Product moisture		*22*
Dam overflows		0
Annual increase in stored volume		*34*
Total	**1 828**	**1 828**

Source: WRM, 2020 – Update of Table 5.10
Note: italicised numerals identify changes in comparison with Table 5.10 of WRM (2020)

The results shown in **Table 3.3**, identify that the AWBM parameter changes reduce mean annual runoff to 707ML. When compared to the low runoff water balance scenario presented in Table 5.10 of WRM (2020), these changes represent:

- a 7.6% reduction on the previously presented 765ML/year low runoff water balance scenario;
- a decreased evaporative loss from the previously modelled 430ML/year, due to the reduced water surface areas; and
- a 9.8% increase in average annual imported water requirements (from 361ML/year to 400ML/year).

Bowdens Silver considers the proposed external water supply will be more than sufficient to supply make up demands of this magnitude. Consequently, the impact of reduced runoff from the Mine Site on maximum water supply requirements (which are largely independent of the contribution of site runoff) would be minor.

3.5 THREATENED FLORA AND BIODIVERSITY OFFSETTING

During routine environmental management activities undertaken within the Mine Site, Bowdens Silver's Environmental Officers discovered a small population of the Small Purple-pea (*Swainsona recta)* within the proposed development footprint following a period of favourable weather conditions. An additional population was also identified beyond the development footprint within the proposed biodiversity offset area. As a result of these discoveries, AREA Environmental Consultants & Communication Pty Ltd (AREA) was commissioned to undertake further targeted threatened species searches within the Mine Site for the following species.

- *Swainsona recta*
- *Swainsona sericea*
- *Euphrasia arguta*
- *Prasophyllum* sp. Wybong
- *Prasophyllum petilum* Tarengo Leek Orchid

Searches were undertaken between 24 and 30 November 2020 under favourable weather conditions and principally focussed on areas within the proposed development footprint, although several areas beyond the development footprint were also surveyed. These also included roadside areas and observations made over boundary fences while conducting searches on Bowdens Silver-owned land.

The searches identified a total of four *Swainsona recta* individuals (occurring as one discrete population) and approximately 64 Silky Swainsona-pea (*Swainsona sericea)* individuals (occurring as four discrete populations) within the proposed development footprint. No *Euphrasia arguta*, *Prasophyllum* sp. Wybong or *Prasophyllum petilum* Tarengo Leek Orchid were detected. The outcomes of this survey are presented in **Figure 3.5**.

The *Swainsona recta* is a threatened species listed as endangered under the EPBC Act and the *Biodiversity Conservation Act 2016* (BC Act). The *Swainsona sericea* is a threatened plant, listed as endangered, under the BC Act but is not listed as a threatened plant in the EPBC Act. The AREA report presenting the outcomes of targeted survey for these species is presented in Annexure 9 of the BAR.

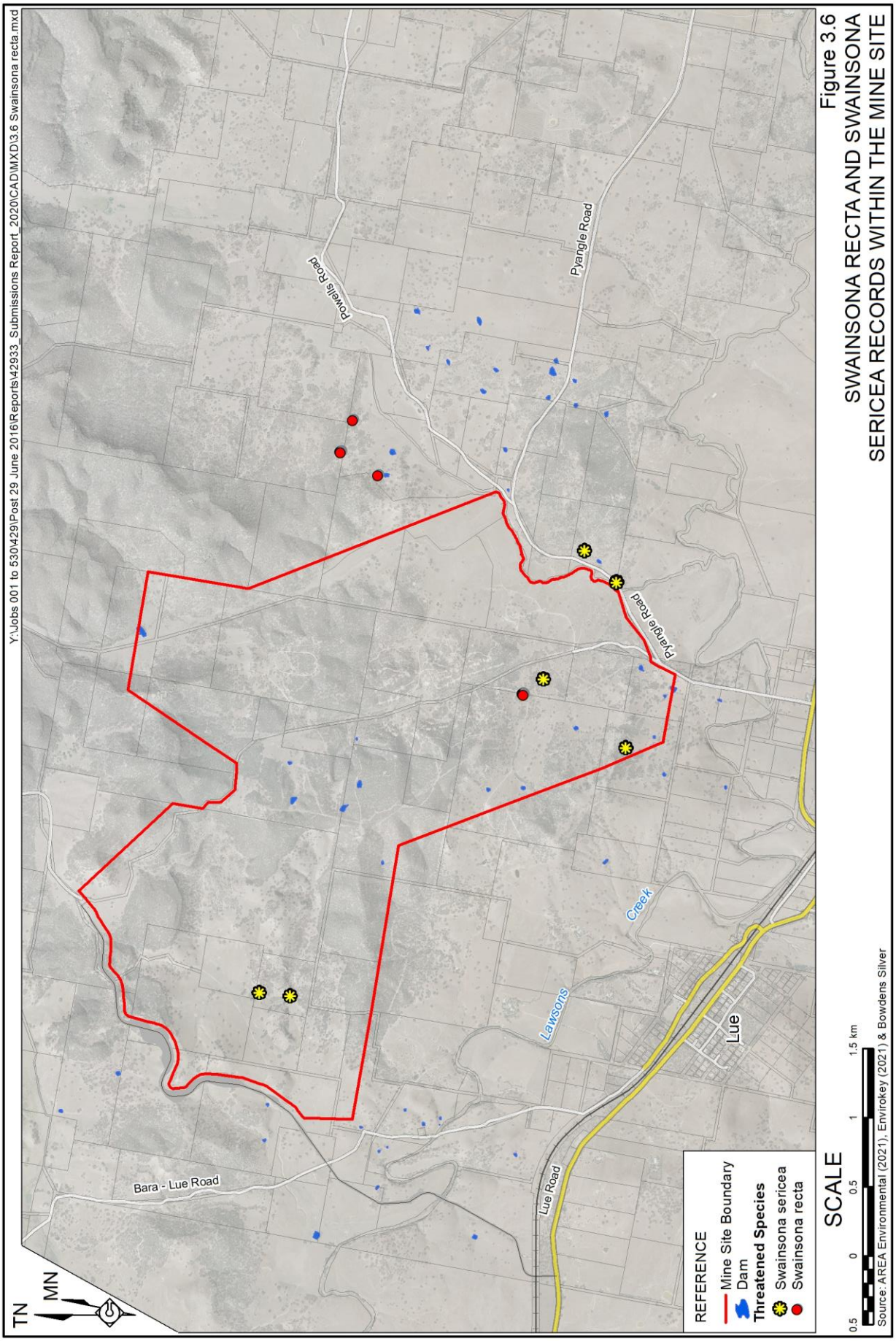


Figure 3.6
SWAINSONA RECTA AND SWAINSONA SERICEA RECORDS WITHIN THE MINE SITE

Using the OEH Biobanking Calculator (version 4.0), EnviroKey calculated the biodiversity offset requirements for the Project, including the additional species credits required to offset impacts to *Swainsona recta* and *Swainsona sericea*. **Table 3.4** and **Table 3.5** present an updated summary of the ecosystem credits and species credits required to respectively offset impacts to biodiversity values as a result of the Project. These updated credit obligations have been incorporated into an updated Biodiversity Assessment Report (BAR) that is presented in **Appendix 4**.

Table 3.4
Ecosystem Credits Required for Biodiversity Offset

Biometric Vegetation Type	Area Impacted (ha)	Ecosystem Credits Required
CW112 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	21.80	1 187
CW242 Blue-leaved Stringybark open forest of the Mudgee region, NSW central western slopes	1.04	48
CW249 Derived grassland of the NSW South Western Slopes	5.18	60
CW263 Inland Scribbly Gum grassy open forest on hills in the Mudgee Region, NSW central western slopes	56.65	4 006
CW270 Mugga Ironbark – Red Box – White Box – Black Cypress Pine tall woodland on rises and hills in the northern NSW, South Western Slopes Bioregion	0.77	46
CW272 Narrow-leaved Ironbark – Black Cypress Pine +/- Blakely's Red Gum shrubby open forest on sandstone low hills in the southern Brigalow Belt South Bioregion (including Goonoo)	0.65	38
CW291 Red Stringybark – Inland Scribbly Gum open forest on steep hills in the Mudgee – northern section of the NSW South Western Slopes Bioregion	112.62	6 545
CW299 Rough-barked Apple – Blakely's Red Gum – Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region	0.76	29
CW111 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	159.24	9 957
CW216 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	1.24	35
CW217 White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region of the of central western slopes of NSW	21.70	1 339
Total	**381.65**	**23 290**

Source: EnviroKey (2021) – Modified after Table 32 and Table 33

Table 3.5
Species Credits Required for Biodiversity Offset

Species		Impact	Species Credits Required
Common Name	**Scientific Name**		
Koala	*Phascolarctos cinereus*	140.36ha	3 669
Squirrel Glider	*Petaurus norfolcensis*	182.27ha	4 010
Regent Honeyeater	*Anthochaera phrygia*	288.48ha	22 213
Silky Swainson-pea	*Swainsona sericea*	64 individuals	1 152
Small Purple-pea	*Swainsona recta*	4 individuals	104
Ausfeld's Wattle	*Acacia ausfeldii*	120 individuals	9 240

Source: EnviroKey (2021) – Modified after Table 35 and Table 36

3.6 BUSH FIRE IMPACT ASSESSMENT

Niche Environment and Heritage Pty Ltd (Niche) was commissioned to undertake an assessment of the impacts of the Summer 2019/2020 bushfires on Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This assessment (Niche, 2021) was a requirement of the Commonwealth Department of Agriculture, Water and Environment (DAWE) and includes an assessment of potential impacts to the following five species and one threatened ecological community.

- Koala (EPBC-Vulnerable)
- Large-eared Pied Bat *Chalinolobus dwyeri* (EPBC-Vulnerable)
- Regent Honeyeater *Anthochaera phrygia* (EPBC-Critically Endangered)
- Swift Parrot *Lathamus discolor* (EPBC-Critically Endangered)
- Small purple-pea *Swainsona recta* (EPBC-Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community (Box gum woodland) – (EPBC-Critically Endangered).

The 2019/2020 bushfires did not impact either the Mine Site or the nominated Biodiversity Offset Area. As such, no areas of habitat within these areas suitable for any of the six MNES listed entities were directly impacted by the fires. The closest large fire occurred approximately 15km to the southeast of the Mine Site and 12.8km to the southeast of the Biodiversity Offset Area.

Niche (2021) includes an assessment of impacts to regional habitat for MNES listed species with "regional habitat" defined as an area of 100km surrounding the Mine Site and Biodiversity Offset Area. **Table 3.6** presents a summary of the area of habitat for each MNES listed species impacted by bush fire.

Table 3.6
Regional Habitat Impacted by the 2019/2020 Bush Fires

Species	Likelihood for Habitat to Occur	Potential Habitat within 100km Buffer (ha)	Habitat Burnt within 100km Buffer (ha)	Percentage Habitat Burnt within 100km Buffer (%)
Koala	Likely to Occur	2 245 830	470 408	21
	May Occur	1 884 793	174 893	9.3
Large-eared Pied Bat	Likely to Occur	3 531 155	476 964	13.51
	May Occur	599 258	0	0
Regent Honeyeater	Likely to Occur	4 058 996	442 891	10.91
	May Occur	71 626	34 073	47.57
Swift Parrot	Likely to Occur	3 245 221	476 919	14.70
	May Occur	130 619	0	0
Small purple-pea	Likely to Occur	80 896	0	0
	May Occur	1 207 428	10 114	0.84
Source: Niche (2021) – Modified after Tables 4-2, 4-3, 4-6, 4-7 and 4-8				

Niche (2021) concludes that the loss of regional habitat for MNES listed species may in some cases result in increased reliance upon habitat within the Mine Site and Biodiversity Offset Area. However, it is also noted that impacts associated with the Project are unlikely to commence until at least 2022 and a significant degree of vegetative recovery is expected in areas impacted by the bush fires, particularly in those areas impacted by low to moderate severity fire. As such, the increased significance of the habitat within the Project and Offset areas would reduce over time and the assessment outcomes of the BAR would not be significantly affected by the 2019/20 bush fires.

The *Bushfire Impact Assessment of Matters of National Environmental Significance* is presented as **Appendix 5**.

3.7 CONSTRUCTION AND ROAD NOISE

The following minor updates to noise modelling and assessment have been undertaken in response to matters raised in submissions. The outcomes of each of these updates to the assessment are discussed in Section 5.18 in response to the specific comments that prompted the additional assessment.

- Activities undertaken during the first six months of the site establishment and construction stage during proposed daytime out-of-hours (Saturdays 1:00pm to 6:00pm) have been re-assessed against the daytime background +5dB(A) criteria. The results of this assessment are presented in Section 5.18.5.
- The review of operational noise modelling scenarios identified that Scenario 3 (Year 8) required modification to more accurately assess the noise impact from the unrestricted in-pit operation of the D9 dozers. The results of this assessment are presented in Section 5.18.6.
- The component of construction works associated with the relocated Maloneys Road (where it is located between the mine entrance and the TSF) has been re-assessed as daytime operational noise rather than construction noise. The results of this assessment are presented in Section 5.18.7.
- The traffic noise assessment for operational Scenario 2 (Year 3) has been updated to include the vehicles required for the 500kV powerline re-alignment works. The results of this assessment are presented in Section 5.18.9.

It is noted that updated noise modelling and assessments result in no material change in the assessment outcomes for potential noise impacts or conclusions as presented in the Noise and Vibration Assessment.

3.8 METAL CONCENTRATIONS IN DUST

In response to matters raised by the EPA, the Air Quality Assessment (AQA) has been updated to address some typographical errors as well as to provide further statistical review of metal concentrations in source materials (i.e. soil, waste rock and ore) (**Appendix 6**). The statistical review concludes that the median values, which were adopted within the original AQA, remain the appropriate values in calculating received metal concentrations.

Additionally, a sensitivity analysis has been included within this Submissions Report (see Section 5.5.5). The analysis shows that, regardless of whether the median, mean or 90^{th} percentile of the metal contents is used, the predicted concentrations are below the impact assessment criteria for all metals.

The outcomes of this analysis demonstrate that the management of received metal concentration is best managed through reducing overall dust emissions rather than specific management of materials that have elevated metal concentrations.

3.9 HUMAN HEALTH RISK ASSESSMENT

In response to the submissions received, the Human Risk Assessment (HHRA) has been updated to clarify and expand on matters presented in the original assessment. Furthermore, whilst the assumptions, approach, and outcomes of the HHRA remain consistent with those originally presented, a sensitivity calculation has been included relating to adoption of lower background lead concentrations as suggested in the review undertaken for the Lue Action Group. The sensitivity calculation determined that adopting the background soil lead concentration presented by the Lue Action Group does not significantly change the total risk index (RI) for existing community exposures (as these are dominated by dietary intakes).

The response to the independent peer review commissioned by DPIE is presented as a separate report and is not included within this Submissions Report. However, it is noted that, as for the matters raised in the submissions, no aspects raised within the independent peer review alter the assumptions, approach or outcomes of the HHRA. The updated HHRA is presented in **Appendix 7**.

4. COMMENTARY ON SUPPORTIVE SUBMISSIONS

4.1 INTRODUCTION

Bowdens Silver has engaged with and been a part of the local community since 2016. During that time, Bowdens Silver has sought to familiarise community members with Bowdens Silver and the Project. The extent of strong support in the community is testament to Bowdens Silver's efforts to answer questions and address concerns.

This section has been prepared given the substantial number of individual and organisation submissions that were submitted in support of the Project. This section reviews and provides a brief commentary on the main topics raised in the supportive submissions.

4.2 BOWDENS SILVER'S SUPPORT FOR COMMUNITY

Representative Comment(s)

Bowdens Silver has donated and sponsored a lot of community events and supported the local school.

Kara Statham of Lue, NSW (Submission SE-8603693)

It would bring local employment to the area. The company supports many local groups and provides support in the running of local sports. It is important for the economy to further industries in our area. Bringing more people, means more upgrades to roads and infrastructure to our area.

Kylie Marshall of Mudgee, NSW (Submission SE-8718511)

Great Company, has shown support for our community.

(Name Withheld) of Bogee, NSW (Submission SE-128137)

The Bowdens Silver Project has the support of the local community, local MPs, local Council and local businesses.

(Name Withheld) of Figtree, NSW (Submission SE-8408827)

Response

Since June 2016 when Bowdens Silver took over the Project, Bowdens Silver has demonstrated that it is fully supportive of the Lue and district community together with the surrounding communities centred on Mudgee, Rylstone and Kandos. Acknowledgement of this support is provided in many supportive submissions. Bowdens Silver recognises that Bowdens Silver's support of the local community involves financial and other support for local groups and their initiatives. This support and involvement of Bowdens Silver personnel with the surrounding community forms part of Bowdens Silver's commitment to obtain and maintain its social licence to operate the Project. Feedback provided to Bowdens Silver has demonstrated that without that support, many local events, organisations and events would not occur.

Currently, Bowdens Silver has undertaken a range of community initiatives. As an example, Bowdens Silver is the major sponsors of Mudgee Rugby Union Club, Mudgee District Netball Association, Rylstone Streetfeast, Rylstone Bullarama and the Rylstone Kandos Show. This support has directly positively impacted hundreds of local families across the Mid-Western Regional LGA.

In the event the Project proceeds, Bowdens Silver would continue its support for the local community through expansion of its highly successful Community Investment Program that would continue to support community-led initiatives and programs. In addition, Bowdens Silver has offered to enter into a Planning Agreement with MWRC to provide a mechanism for further financial contributions to be used for the benefit of the local community.

4.3 ECONOMIC BENEFITS

4.3.1 Economic Benefits for Local Community

Representative Comment(s)

I hope to gain employment, also it will create more jobs, which will bring more money to our little town.

Stephen Hulme of Lue, NSW (SE-8609293)

Job creation, financial boost to our local community. Will keep our struggling business open to benefit locals and improve tourism.

Jo Brown of Breakfast Creek, NSW (SE-8623533)

The Bowdens project stands to provide a much needed boost to the local economy, and the company to date has done a commendable job of ensuring that wherever possible, local businesses are engaged and given priority over non-local businesses.

(Name Withheld) of Camboon, NSW (SE-8407532)

The Mine will mean work for the local villages and towns. This will also mean more business / customers to the towns and villages.

Deborah Ann Holla of Kandos, NSW (SE-8603651)

Response

The supportive submissions regularly nominated that the local community would experience the economic benefits of the Project including:

- the provision of a wide range of jobs and the associated job security;
- improved level of local spending for local shops, restaurants, cafes, etc.;
- enhanced school enrolments;
- support of local industries;
- growth of small businesses;
- the revitalisation of Kandos – for shops and hotels/motels;
- improvement of some services;
- ongoing support for local events, e.g. Rylstone Kandos Show;
- an increased standard of living;
- preferred employment of local people;

- benefits for local suppliers;
- opportunities for career development for local people, especially young people;
- ongoing support for local schools including the Lue Public School;
- support for charities and sponsorships;
- support for the local tourist sector; and
- support farming families with potential to earn an off-farm income.

Separate to the items above that were outlined in the submissions, Bowdens Silver has also committed to a Planning Agreement with MWRC. Through this agreement, funds will be made available for MWRC to increase spending on community infrastructure and roads throughout the life of the Project. Apart from the economic benefits derived by residents within the Mid-Western Regional LGA from the increased financial contributions, positive flow on effects will also undoubtedly occur throughout the local tourist, business and agricultural industries via safer and more efficient transport routes and upgraded community infrastructure.

Bowdens Silver also currently supports a wide range of community events, groups and initiatives as part of its Community Investment Program. The main areas of support revolve around education, community, sport, safety and arts and culture. This support will continue throughout the Project life and through community led initiatives such as youth training and scholarships, apprenticeships and traineeships and employment readiness programs in conjunction with ongoing support for community events and sporting organisations provides opportunities for far reaching economic benefits across the local population through multiple industry sectors.

4.3.2 Economic Benefits to NSW

Representative Comment(s)

Royalty Revenue that the government collects will be a good source of revenue for the state especially during such uncertain times. Mining locally also adds to Australia's self-sustainability in a period where global times are being restricted.

Ali Maidoub of Greenacre, NSW (Submission SE-8356244)

I believe this state significant project would greatly benefit NSW and its local economy, with silver price increasing and current COVID-19 situation, the project would be a much needed boost to local jobs for many years to come

(Name Withheld) of Belmore, NSW (Submission SE-8561867)

The Silver Mine's Bowden project despite obviously creating many jobs and additional revenue streams for regional NSW will also provide much needed diversification to the mining communities of Newcastle, Mudgee and Muswellbrook.

Andrew Todd of Claremont, WA (Submission SE-11403979)

Mining industry provides great employment opportunities to regional areas of NSW. Also through royalties, provide good income to the state.

(Name Withheld) of Mosman, NSW (Submission SE-8745727)

Response

Many submitters, mainly from outside the Mid-Western Regional LGA, raised the benefits the Project would bring to the whole of NSW and not just the Mudgee, Rylstone and Kandos area.

EIS Section 4.19.3.4 and Table 4.87 present the results of the cost benefit analysis to the Project. The Economic Assessment of the Project established that the estimated net social benefits of the Project to NSW would be between $44 million and $146 million with the latter including employment benefits.

More generally, the introduction of a metalliferous mine into the Mid-Western Regional LGA not only provides diversification benefits through new employment roles and skills in the area and the economic benefits that follow, but also provides for a new industry within an existing coal mine area. As more pressure is placed upon fossil fuels and any new and existing coal mines within the State, the Project provides opportunity for the State and LGA to benefit from the utilisation of workers and associated businesses and suppliers to expand into mineral mining. This diversification is necessary and important for regional areas within the State to prosper and grow particularly after the economic effects of the COVID-19 pandemic.

4.3.3 Economic Benefits to Australia

Representative Comment(s)

The EIS is a comprehensive and favourable analysis on the Bowden's silver project which will serve the locals, NSW and Australia's national interest for self sufficiency, ethical mining and leading the world in renewables.

(Name Withheld) of Kudla, SA (Submission SE-8414057)

We as Australian shall all aim towards to the same directions, work together to boost the recovery of our economy! The opening of this mine would help create jobs and facilitate the recovery of economy.

(Name Withheld) of Chatswood, NSW (SE-8660216)

I support this application for a number of reasons. Firstly it creates jobs and wealth within Australia.

William Keating of Blackheath, NSW (SE-8673378)

It would possibly add to the wealth of Australia and the government with royalties and income from oversees (sic) *sales.*

(Name Withheld) or Doncaster East, VIC (SE-8700802)

Silver is a particularly important metal in modern and upcoming technologies. Australian silver output receives a significant boost with this mine.

(Name Withheld) of O'Connor, ACT (SE-8751692)

Response

The Project is estimated to have net social benefits to Australia of between $89 million and $192 million, with the latter incorporating the benefits of employment. A considerable contribution to the overall economic benefit to the Australian economy would be company tax estimated to be $48 million.

4.4 EMPLOYMENT / JOB TRAINING

Representative Comment(s)

I have 2 teenage sons looking for work. We need industry in the area to provide employment, training and apprenticeships in industrial fields and support for local businesses.

Leonie Armstrong of Rylstone, NSW (Submission SE-127695)

I support Bowdens Silver application as the job opportunities and economic value for our community is paramount.

Helen Battye of Lue, NSW (Submission SE-8749943)

We need the Bowdens Silver Project to be approved to secure jobs and investment for local communities.

(Name Withheld) of Figtree, NSW (Submission SE-8408827)

Hopefully it will employ locals

Duncan Unicomb of Lue, NSW (Submission SE-8690493)

Employees sourced locally will in put money back into this area, keep family dynamics' as a whole, maintain Schools, Health and help and most importantly help Close the Gap with the Indigenous in our Area.

Patricia Ridley of Kandos, NSW (Submission SE-8605538)

Response

This issue was incorporated in almost 900 supportive submissions and has been discussed with numerous local residents who have approached Bowdens Silver since 2016. As part of the community consultation program, Bowdens Silver has regularly been approached by a combination of employed and unemployed persons regarding the range of jobs that are likely to be available if the Project proceeds. In some cases, those persons have expressed their intention to gain the required qualifications / training to enable them to secure employment with Bowdens Silver.

Bowdens Silver has also been approached by a number of persons who live in the Lue / Rylstone / Kandos area and work in the Ulan Coalfield. These persons expressed a desire for shorter travel times to work and in some cases, the desire to work above the surface and not in an underground mine, while at the same time being able to transfer their existing skills.

In recognition of this interest in employment with Bowdens Silver, Bowdens Silver has established a Careers link on its website to enable persons to view current jobs being offered and to enable interested persons to register their interest in a job, if the Project proceeds. To date, Bowdens Silver has received in excess of 500 direct approaches (via all forms) regarding employment covering a wide and varied range of roles ranging from manual type roles such as plant operators, tradespeople such as mechanics, fitters and electricians, truck drivers and general unskilled labouring type roles through to professional and office-based roles such as geologists, administration roles, surveyors and engineers.

Bowdens Silver is committed to maximising the employment of persons residing in the Mid-Western Regional LGA. Bowdens Silver is supportive of some personnel that may require assistance in training / re-training. Part of that commitment will be participating in apprenticeship and traineeship programs for local youth.

Overall, Bowdens Silver would provide a considerable boost to employment in the Lue / Rylstone / Kandos / Mudgee area with up to 320 persons during the 18-month site establishment and construction stage and 228 persons during the operational life of the Project. It is also well known and widely shared amongst industry and business groups that for every job created within the mining industry, a further 2 to 3 jobs are created locally within the associated service and supply businesses.

4.5 GENERAL ENVIRONMENT

Representative Comment(s)

Bowdens Silver have managed their land in an ecologically sustainable way, from their dedication to correctly rehabilitating drill sites to the implementing of effective operations for the control of feral animals and noxious weeds. The EIS indicates that they will continue to maintain their high standards in these areas.

(Name Withheld) of Camboon, NSW (Submission SE-8407532)

I believe that the Bowden business is strongly committed to minimising their impact to Lue area and removing all environmental and health risks. We now live in a new era of mining and mining governance which will ensure that impacts of this important operation are controlled with continual monitoring and reporting.

David Fuller of Rylstone, NSW (Submission SE-8512179)

The EIS contains sound water, dust and noise control and usage measures. The regeneration plan will actually improve the natural environment already degraded through agriculture over many decades.

Gillian Purcell of Ganbenang, NSW (Submission SE-8609261)

The deposit will provide many economic and societal benefits with minimal disruption to long term ecology and biodiversity.

The mine would incorporate a range of biodiversity offset and habitat enhancement initiatives to ensure biodiversity values in the vicinity of the mine site are maintained and improved in the long term.

Peter Maconachie of Frenchs Forest, NSW (Submission SE-8715557)

Response

Numerous submitters expressed their recognition that Bowdens Silver has undertaken its activities to date in an environmentally responsible manner. Further, there has been many submitters who, after reading the EIS, consider the environmental impacts of the Project are minimal and acceptable. Many submitters expressed their recognition, based on their local knowledge, that the Mine Site is definitely not "prime agricultural land" but rather, low productivity land.

It is also important to note that the Project would be regulated by the NSW Government and subject to monitoring, reporting and independent auditing requirements. As noted in the submission of Mr Fuller (Submission SE-8512179), mining and mining governance in NSW has evolved and is arguably more tightly regulated than other states in Australia.

4.6 GENERAL BENEFIT TO LOCAL AND REGIONAL COMMUNITY

Representative Comment(s)

There is no doubt that, when operational, Bowdens will become a modern showpiece in community supported mining. It will provide the local community with new work opportunities and improved lifestyle and it will be a significant contributor to the NSW economy.

Silver has a growing market in many new technologies, particularly energy transmission and storage and I believe Bowdens is in NSW's best interest.

Dr Ian Pringle of Surry Hills, NSW (Submission SE-8689765)

Very positive that waste water from local mine sites will be utilised

Lynette Ellery of Mudgee, NSW (Submission SE-8710142)

It will also bring money back into Rylstone, Kandos and stop shops closing and will put money back into the local economy and help support local businesses and families

Tony Schneider of Rylstone, NSW (Submission SE-8691508)

Live almost next door. Great for the area with employment. Does not effect (sic) *my property in any way. Water testing done – all was good!*

(Name Withheld) of Lue, NSW (Submission SE-8656256)

The region can live with some reasonable standards of living.

Tracy Boxsell of Rylstone, NSW (Submission SE-128167)

Response

The submitters who provided their support for this issue did so with reference to a wide range of benefits, some of which were raised in the above representative comments. Other benefits raised in other submissions related to the following.

- Support for ancillary businesses for the mining industry.
- Support "Bowdens Farm" on buffer land around the mining operation – i.e. making the best of any suitable agricultural land that is not required for the Project.
- Diversification of the mining industry that Mudgee has relied upon in recent years.
- The significant positive knock-on effects for local and regional communities.
- Young families would not be forced to move away from the area to secure long-term opportunities for themselves and their children.

4.7 GENERAL SUPPORT

Representative Comment(s)

The Bowden's Silver discovery is a perfect exemplar of creativity and innovation in discovery. These unusual discoveries provide considerable opportunity beyond traditional mining.

Marlee Minerals Pty Ltd – The Board of Wollstonecraft, NSW (Submission SE-8749939)

Bowdens' silver mine representatives have always been very open and honest with any of our questions. I feel the mine should be a great asset to Lue and surrounding areas for future prosperity.

(Name Withheld) of Lue, NSW (Submission SE-8685129)

This mine is owned by an Australian company which during these tough times should be supported.

(Name Withheld) of Adamstown, NSW (Submission SE-8374747)

Response

Numerous supportive submitters expressed general support for the Project with statements such as those above. Sometimes, the submitters provided brief statements such as "A great project", "I have no concerns about any chemical / substances affecting the local area" or "I support mining in our community".

Bowdens Silver has received numerous supportive general comments before and since its involvement in the Project in 2016 and particularly as Bowdens Silver has been designing the Project and preparing the EIS. Comments have been received in both a formal and informal manner. During community consultation activities such as displays at local agricultural shows, community open days, engagement from preparation of the Social Impact Assessment (SIA) for the Project, information sessions as well as during informal and unplanned discussions with members of the public, there have been countless comments of support received by Bowdens Silver staff and their contractors.

4.8 GROWTH OF SMALL BUSINESS / LOCAL BUSINESS / TOURISM

Representative Comment(s)

Will keep our struggling businesses open to benefit locals and improve tourism.

Jo Brown of Breakfast Creek, NSW (Submission SE-8623533)

We believe the Silver mine will be a good fit for the community and region, with the closure of Cement Australia (Kandos) and the closure of Big Rim that this venture pick up the small business and employment in the area. As this venture is under the umbrella of the mining law which has very stringent regulations on the operation of the site and also the environmental concerns of the community would be monitored by both the EPA and DPI of the highest standard compared to any other industry.

Mudgee Dolomite and Lime of Mudgee, NSW (Submission SE-8683506)

I support the project because I think it will boost the economy in Lue and the surrounding area by creating local jobs they have always sponsored local events and sporting teams and I would like to see more of this in the area as well as supporting local businesses.

Cody Hulme of Lue, NSW (Submission SE-8361273)

Projects such as these have a huge positive impact on the lives of those who are fortunate enough to be employed by the mine as well as all those local businesses that benefit from the increased revenue that the employment brings.

Andrew Sloot of Mosman, NSW (Submission SE-8407177)

Response

Numerous submissions made reference to the benefits of the Project to either existing local businesses or potentially new small businesses that could be supported by Bowdens Silver and its employees. These sentiments were expressed mainly by submitters from Lue, Rylstone, or Kandos but also from within Mudgee and the broader LGA. Many of the small businesses within Kandos and Rylstone have experienced considerable economic hardships since the closure of the Kandos Cement Works, the Charbon Coal Mine and other local businesses. In addition, since the public exhibition of the EIS, the Bylong Coal Mine Project has been refused Development Consent which has placed increasing importance on other opportunities for local jobs and suppliers.

Submissions from tourism operators in the area around Lue have predominantly been against the Project, however, some operators have expressed support based upon the levels of impact not being at the scale that Lue Action Group and others in the community have promoted. Bowdens Silver is keen to work with all tourism operators to ensure that the Project's impacts do not adversely impact their business. Rather, the Project would offer the opportunity for visitors to the Mine Site to benefit from the country hospitality within a few kilometres. There will also be the potential for tourists to visit a viewing platform of the Mine Site, therefore encouraging visitors to the region to not only stop in Lue but to create another experience along the Mudgee to Rylstone/Kandos tourist route.

Bowdens Silver intends to operate the Project with emphasis placed upon support for local businesses whenever possible. To date, Bowdens Silver has used in excess of 130 local businesses and suppliers across a range of industries and services. Bowdens Silver is committed to developing a local employment and procurement strategy to maximise the economic benefits within the Mid-Western Regional LGA. As part of the Social Impact Assessment conducted by Umwelt, a local business and supplier register was compiled that would assist Bowdens Silver in identifying local businesses and suppliers that have already registered an interest in working with Bowdens Silver.

4.9 INCREASED SERVICES / INFRASTRUCTURE / ROAD UPGRADES

Representative Comment(s)

More work & infrastructure for locals & community.

CR Engineering of Ulan, NSW (Submission SE-8714719)

...and one day hope the community get a water system like town water.

Eileen Statham of Lue, NSW (Submission SE-8609227)

It will be great to see an updated road in that part of our region and will be an asset for continued tourism.

William Murphy of Cooks Gap, NSW (Submission SE-8502472)

The project will create more jobs and increase infrastructure in the area and be good for the regional community and boost much needed resources to the area.

(Name Withheld) of Sydney, NSW (Submission SE-8405614)

Response

Bowdens Silver is committed (at its cost) to undertake the following infrastructure improvements and road upgrades which would benefit the Project and the local community and tourists travelling on the subject roads.

- Bowdens Silver proposes to relocate the section of Maloneys Road that currently traverses the proposed open cut pit. A new section of road approximately 5.2km long would be constructed from a point 1.8km west of Lue on Lue Road to the proposed Mine Access Road. Its intersection with Lue Road would be upgraded to provide safe turning movements into and from the new road. The relocated road would service properties north of the Mine Site and provide a safe access for Lue and district residents travelling to and from the proposed relocated Lue Waste Transfer Station proposed by Bowdens Silver.
- Bowdens Silver proposes to upgrade the intersection of Lue Road and Pyangle Road during the first 6 months of the site establishment and construction stage to improve safety for all motorists at the intersection.
- In addition to the above road improvements, Bowdens Silver would enter into a Planning Agreement with MWRC that would provide a funding contribution to a range of community infrastructure projects. At the time this document was finalised, Bowdens Silver was awaiting advice that the terms of the agreement had been accepted by MWRC. Bowdens Silver envisages that a proportion of the funds provided to MWRC would cover costs associated with the relocation of the existing Lue Waste Transfer Station. In addition, Bowdens Silver would contribute to the cost of MWRC maintaining the local roads impacted by the Project.

If approved, the Mine Site will host a range of equipment and skilled employees that can add to the existing services in the locality of Lue. These include but are not limited to earthmoving and other equipment as well as employees to help in bush fire fighting and emergency management scenarios and the availability of emergency first aid equipment and trained staff members. Bowdens Silver has also proposed to provide support in bringing further General Practice medical services to the region.

Some submitters, either supporting or opposing the Project suggested that Bowdens Silver could assist to fund a water supply for Lue, principally to remove the current reliance on rainwater tanks, and for some, groundwater. For some submitters, the request for a water supply was based upon an expectation that their current tank water would be polluted by the Project or their groundwater supplies would diminish due to the Project. Given the detailed studies for the Project have predicted that water quality within rainwater tanks would not be adversely impacted and that groundwater supplies within Lue would not be impacted, Bowdens Silver considers it is not appropriate for Bowdens Silver to assist with funding a mains water supply for Lue. Notwithstanding this conclusion, Bowdens Silver would support any publicly-funded programs to improve household water supply to Lue.

4.10 INCREASE QUALITY OF LIVING IN MUDGEE REGION

Representative Comment(s)

This Project is a great way to ensure that the Mudgee region glows in a variety of different industries, which mean long term viability in all areas, (mining, tourism, live music events, wine production and other supporting businesses.

(Name Withheld) of Mudgee, NSW (Submission SE-8690479)

This Project is fantastic for Mudgee. The positives far outweigh any sort of negative.

It doesn't just boost the economy but it also promotes Mudgee as a long term sustainable city with industries of all kinds and a diverse range of people / families, lifestyles and activities.

Tiana Bailey of Mudgee, NSW (Submission SE-8686034)

Keep jobs around Mudgee and support the local shops and keep Mudgee Booming.

Locky Benson of Mudgee, NSW (Submission SE-8710996)

Response

Bowdens Silver recognises that its Project would contribute, albeit to a modest extent, to the continued vibrancy of Mudgee through a diversification of the mining industry which together with other industries, has been instrumental in the recent growth of Mudgee and other areas in the Mid-Western Regional LGA.

Importantly, Bowdens Silver recognises that the Project has the potential to contribute in a substantial way to the revival of the townships of Rylstone and Kandos. Potential positive impacts for Rylstone and Kandos include but are not limited to:

- a boost to local employment from an area where unemployment rates are higher than the NSW average;
- an increase in support and sustainability of local businesses across a range of industries, improving their long term viability;
- tourism and accommodation opportunities;
- increased accessibility to community services due to continued and stable population growth; and
- employment and training opportunities for school leavers and youth.

4.11 KEEPING LUE / RYLSTONE / KANDOS ALIVE

Representative Comment(s)

This support and economic benefit will enable the Hotel to continue to increase its offerings and services to the local community. The Hotel is not just a hotel. It is the hub and heart of this community.

Hotel Manager, Lue Hotel of Lue, NSW (Submission SE-8406154)

They (Bowdens) *have already supported many organisations in the community, that without their evolvement* (sic) *would have not survived. Our towns needs* (sic) *this to be approved to help with our survival.*

(Name Withheld) of Rylstone, NSW (Submission SE-127727)

Creates employment for many in local areas. It will be nice to see our town Kandos back to a thriving community.

(Name Withheld) of Kandos, NSW (Submission SE-8609360)

Need local jobs and work for young people so our towns can survive.

(Name Withheld) of Kandos, NSW (Submission SE-8686688)

Response

The impacts of the Project on the ongoing viability and social capital of Lue, Rylstone and Kandos are likely to be substantial, particularly given the comparatively small size of these population centres, i.e. compared with Mudgee. Bowdens Silver has been extremely aware of the depressed nature of the retail and services sector in these townships over the past 4 years as it has progressively developed the Project and is committed to the ongoing support of these townships. Bowdens Silver is committed to implementing a local procurement and employment strategy that will help drive business within these small towns, both during and after the life of the Project.

Bowdens Silver has also sponsored and supported a large range of community groups, education providers and events in the Lue, Rylstone and Kandos areas. This type of support will continue if the Project is approved. Stakeholders that are involved in these initiatives have stressed the importance of support from large employers/projects like Bowdens Silver in being able to run or improve community events, services and infrastructure. Some would not exist without long-term external support, therefore denying the community of social and community opportunities.

Community support and sponsorship has been provided to the following within Lue, Rylstone and Kandos.

- Lue Public School and P&C, Rylstone Public School and P&C, Kandos Public School and Kandos High School
- Kandos CWA
- Rylstone Kandos Show
- Rylstone Streetfeast
- Rylstone Bullarama
- Kandos Rylstone Men’s Shed
- Kandos Museum
- Rylstone Kandos Volunteer Rescue Association
- Kandos Rylstone Little Athletics
- Kandos PCYC Youth Moto Workshop

4.12 MISINFORMATION AND LUE ACTION GROUP

Representative Comment(s)

Disagree with bullying tactics from Action Group dividing the local community with their lies.

Steve Battye of Lue, NSW (Submission SE-8691502)

Unfortunately there are more people from outside the community against the Project and the community liaison group is being influenced by the Lue Action Group members on both.

Lindsay Statham of Lue, NSW (Submission SE-8603697)

I am delighted to learn that all environmental issues have been addressed and genuinely and convincingly counter the misinformation campaign which is designed to torpedo the project.

(Name Withheld) of MacMasters Beach, NSW (Submission SE-8609362)

Response

Bowdens Silver has maintained an open, honest and factual dialogue with the residents of Lue, the surrounding district and townships throughout and following the preparation of the EIS.

Bowdens Silver has been disappointed by the circulation of misinformation about the Project by the Lue Action Group (LAG) through documents distributed throughout the community, information provided to local and national press and local and city-based radio stations. Much of the information presented by the LAG is considered misleading, particularly around lead and human health risks, water usage on site and via the proposed pipeline and a range of impacts if the Project proceeds. The information circulated has blatantly ignored the outcomes of assessment in some cases and likely contributed to misunderstanding and anxiety in some members of the local community.

Bowdens Silver has endeavoured on numerous occasions to converse with LAG and its members, including the provision of invitations to the June 2019 Open Day. Rather than attend, most members chose to protest nearby to the event. Importantly, LAG members who sit on the Community Consultative Committee have complained about the lack of information provided, but chose not to attend that Open Day and therefore denied themselves access to discuss various aspects of the Project with a number of specialist consultants who were present on the day.

Bowdens Silver acknowledges that a proportion of Lue and district residents are opposed to the Project, however, it remains Bowdens Silver's preference that a constructive dialogue is established to enable concerns relating to the Project to be discussed.

4.13 OPPORTUNITIES FOR YOUTH

Representative Comment(s)

The opportunity to keep our youth in employment for years to come is invaluable.

Susan Black of Orange, NSW (Submission SE-8610206)

It is a job opportunity for my children when they grow up and get in to the work force.

(Name Withheld) of Lue, NSW (Submission SE-8655578)

Response

Bowdens Silver is committed to providing employment for local people and proposes to support the training of a number of young people, in conjunction with local training organisations, to undertake a range of tasks within the Mine Site.

Bowdens Silver has held discussions with education providers and job seeker training and employment providers around future traineeship and apprenticeship programs.

4.14 SCHOOL NUMBER ENHANCEMENT / SCHOOL SUPPORT

Representative Comment(s)

The mine supports the local Lue Public School which my three children attend. They are always helping us out with labour or funds to benefit the kids at the school.

Meredith Pennell of Camboon, NSW (Submission SE-8744762)

There is sure to be a major economic impact to the community…increased town population, school enrolments etcetera. There will be an increased sense of personal and community wellbeing and pride.

(Name Withheld) of Hillville, NSW (Submission SE-8714789)

I think it will benifit (sic) *the community with employment, sponsorship for school + sports etc.*

Lois Statham of Lue, NSW (Submission SE-8603699)

More job opportunities for locals + keeps schools open.

Jacqui Shipman of Kandos, NSW (Submission SE-8683547)

Response

Bowdens Silver intends to continue to support the Lue Public School through sponsorship, special project funding and the participation of Company personnel to assist in school events, etc.

Bowdens Silver will also encourage those new employees living within the Lue district to send their infants / primary-aged children to attend the school. Bowdens Silver currently leases company properties with a preference for those families that have school children attending Lue Public School and this will continue as the mine develops and operates. Current enrolment levels at Lue Public School are the highest they have been in years allowing for State Government funding of extra teaching resources rather than being funded by the school.

4.15 USES OF SILVER

Representative Comment(s)

Our metal mining industry supplies the metals needed for products that we use every day such as mobile phones, batteries, cars, solar panels and televisions.

(Name Withheld) of Figtree, NSW (Submission SE-8408827)

The products produced from Bowdens Mine will enable the manufacture of solar technologies and advanced telecommunications products.

Gillian Purcell of Ganbenang, NSW (Submission SE-8609261)

Australia is not able to transition to a more renewable and sustainable society without continued access to minerals such as silver. Silver is also important for medical uses such as bandages and for its anti-microbial effects. The use of silver are wide-reaching and it will continue to be an important mineral to support a growing and more sustainable NSW and Australia.

(Name Withheld) of Hawthorn, NSW (Submission SE-8634204)

Silver is critical to support NSW and Australia's transition to a more sustainable society with a focus on renewable energy.

(Name Withheld) of Hawthorn, NSW (Submission SE-8634204)

I don't see how people can object to a project such as this, the very people that object use cell phones, computers, and drive cars that use silver!

(Name Withheld) of Wantirna, NSW (Submission SE-8687167)

Response

Numerous submitters recognised the beneficial uses of silver, particularly for use in solar panels and emerging technological advances. Silver is the best electrical and thermal conductor among metals and is used in a wide range of everyday electronic devices such as mobile phones, televisions and computers. It is also used in electric vehicles, robotics, industrial automation, aerospace and biosciences. The use of silver is also growing in the medical fields as an anti-bacterial agent in clothing, wound dressings and water purification. This recognition underpinned the submitters' support for the Project. In particular, the use of silver is critically important in substantial growth industries such as solar energy and the electric vehicle industry. In a number of cases, submitters expressed the benefits of mining the silver for use in Australia.

5. RESPONSES TO MATTERS RAISED

5.1 INTRODUCTION

This section presents a response to the matters raised in submissions received from Government agency, organisation and public submissions. The responses take into account the action taken since exhibition of the EIS (as discussed in Section 3) and the review of supportive submissions (as discussed in Section 4).

There is not a response to each comment received in this section, rather comments from a number of submissions that are considered representative of the issues raised have been extracted and incorporated in *italics* in this section, retaining the spelling and grammar provided. A response to the matters raised is provided, however in some cases the specific submission or submitter is responded to. This particularly applies to those members of the public living in Lue and are recognised to be most likely to experience change as a result of approval of the Project.

Appendix 1 provides a register of all submissions and includes a check list of the matters raised in that submission and where they have been addressed in this document. The reference is broad through necessity, however, it may be used by individual submitters to locate where in the document the matters raised in their submission have been addressed. A significant effort has been expended in trying to ensure that each submission and matters raised are accurately reflected in **Appendix 1**. However, it is appreciated that not all submitters will agree with the responses or feel their concerns have been addressed adequately. Bowdens Silver welcomes further contact with the community on these matters, where requests are reasonable.

5.2 ABORIGINAL HERITAGE

5.2.1 Overview

Submissions regarding matters of Aboriginal cultural heritage were received from some registered Aboriginal groups that are stakeholders for the Aboriginal Cultural Heritage Assessment (ACHA) (Landskape, 2020), as well as other Aboriginal groups and from the general public. It is noted that NSW Heritage provided comments on the ACHA and EIS that were generally supportive of outcomes of the assessment and the extent of consultation undertaken.

The matters raised in submissions included general objection to the Project due to impacts to land, the process of assessment and the conclusions of the assessment. It is noted that the submission from the Gallanggabang Aboriginal Corporation (Director Bradley Bliss) is in the most part identical to comments provided by the Wellington Valley Wiradjuri Aboriginal Corporation (CEO Bradley Bliss) and a private submission from Bradley Bliss. These comments have not been addressed separately. It is acknowledged that additional archaeological field survey would be required for the Project to assess those areas of the water supply pipeline corridor for which access has not yet been possible. Regardless, the conclusions and outcomes of the ACHA remain unchanged following consideration of the submissions. That is, although the Project would require the removal and salvage of 25 Aboriginal cultural heritage sites, these sites are indicative of open occupation and are relatively common in the vicinity of the Mine Site. The assessment of significance has indicated that the artefacts and areas recorded by Landskape (2020) are generally of low cultural significance, however Bowdens Silver recognises the high cultural significance for the Aboriginal community of any disturbance of land.

Bowdens Silver acknowledges the need for ongoing management to limit the risk of inadvertent impacts to matters of Aboriginal cultural heritage significance. These measures would be implemented through a Heritage Management Plan that includes protocols for staff training and awareness and for the management of unexpected finds.

5.2.2 Consultation

Representative Comment(s)

The Ibbai Waggan People will object to the Bowden Silver unlawful process, which has been conducted without discussion or consent of the Ibbai Waggan Senior Elders.

Ibbai Waggan-Wiradjuri People of Nguranbang, NSW (Submission SE-126729)

Gallanggabang Aboriginal Corporation (GAC) notes that a Corporation Director is a member of the Bowdens Silver Community Consultation Committee (CCC), and has actively updated community and other Aboriginal Registered Parties, Individuals and groups around the developments and changes of this project.

Gallanggabang Aboriginal Corporation of Orange, NSW (Submission SE-8384568)

Aboriginal Community are of the general opinion that Bowdens Silver has not adhered to the consultation guidelines.

Gallanggabang Aboriginal Corporation of Orange, NSW (Submission SE-8384568)

Response

A comprehensive outline of the process used to identify Aboriginal stakeholders for the Aboriginal Cultural Heritage Assessment (ACHA) is described in detail in Section 2 of Landskape (2020) and Section 4.14.4 of the EIS. The registration and notification of Aboriginal stakeholders and their involvement in the assessment process was undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a).

The Heritage NSW submission to the EIS (dated 23 July 2020) stated: "*HNSW is particularly satisfied with the Aboriginal consultation…*".

Bowdens Silver is therefore confident that Aboriginal community feedback has been comprehensively considered in planning for the Project.

5.2.3 Loss of Aboriginal Cultural Heritage Sites

Representative Comment(s)

This project will result in the loss of Aboriginal cultural heritage sites. Mining in our region has already caused the destruction of a significant number of Aboriginal places. This mine will add to that number and affect our ability to teach our children about their culture.

(Name Withheld) of Mudgee, NSW (Submission SE-8638183)

I am a traditional custodian of this part of Wiradjuri Country… This project will result in the permanent destruction of cultural heritage sites within our region. Our cultural heritage is already significantly impacted by existing mines in the region.

(Name Withheld) of Mudgee, NSW (Submission SE-8656127)

This project adds another 26 sites to the list of those destroyed by mining within our region. Once these places are destroyed they are gone for good - the cumulative affect (sic) *of this is having a devastating impact on the ability of our people to ensure inter-generational cultural transmission.*

Mudgee Local Land Council of Mudgee, NSW (Submission SE-8661524)

Response

Concern in the Aboriginal Community regarding any destruction of Aboriginal heritage sites and values was noted in the ACHA (Landskape, 2020). Given the assessed low-moderate scientific significance of the Aboriginal cultural heritage sites (see Section 6 of Landskape, 2020), the cumulative effect that may result from the development of the Project is considered to be low, and would be mitigated by the ongoing program of archaeological recording/salvage recommended by Landskape (2020).

The Mine Site, relocated Maloneys Road and water pipeline corridor are located within an area that has already been heavily modified by past clearing, primarily for pastoral and agricultural activities. The assessed impacts of the Project are consistent with and of a smaller scale to those that have already occurred. On this basis, it is considered that the Project would not appreciably increase cumulative impacts to Aboriginal cultural heritage in the region.

5.2.4 Significance of Sites

Representative Comment(s)

Whilst the report doesn't consider the Aboriginal Cultural Heritage to be of high scientific or cultural significance we consider all of our Cultural Heritage to be important.

Mudgee Local Land Council of Mudgee, NSW (Submission SE-8661524)

Response

Section 6.1.2 (Aboriginal Social, Cultural, Spiritual and Historical Significance) of the ACHA (Landskape, 2020) recognises that all sites are of high cultural significance to the Aboriginal community. The assessment of scientific significance is a technical process that involves the review of site integrity, structure, contents, representativeness and rarity. It is a separate process to consideration of cultural significance with separate outcomes for assessment and ongoing management.

5.2.5 Sensitive Landform Structures (with Rock Art)

Representative Comment(s)

There is no information within this section of the EIS in regards to the long term effects on sensitive landform structures such as escarpment based cultural rock shelters or others within a short distance that are boulder rock shelters. Some of these cultural sites contain sensitive rock art.

Gallanggabang Aboriginal Corporation of Orange, NSW (Submission SE-8384568)

Response

This comment does not refer to rock shelters within the Mine Site but at other locations that have been identified by Mr Bliss on surrounding private land. Comprehensive assessment of potential risks from blasting and through the generation of noise, vibration and dust has been undertaken for the Project. On the basis of these assessments, it is not considered likely that any impacts to escarpment shelters on surrounding private land would result from the operations. Should the EPA or Heritage NSW consider there may be a risk of harm, Bowdens Silver would undertake monitoring in order to proactively measure impacts and avoid or mitigate them. This would be done through scientific processes involving suitably qualified people.

5.2.6 Pipeline Survey Coverage

Representative Comment(s)

We request that a detailed Aboriginal Cultural Heritage assessment be carried out (sic) *all areas which will be impacted by the project during construction and operation of the mine or ancillary infrastructure prior to Development Consent being sought so that decisions are made with all information present.*

Mudgee Local Land Council of Mudgee, NSW (Submission SE-8661524)

There is a (sic) *area in the pipeline that has not been 100% surveyed this needs to be surveyed before any decision be made…*

Murong Gialinga Aboriginal and Torres Strait Islander Corporation of Mudgee, NSW (Submission SE-8623706)

Community are concerned around sections of this pipeline route not being 100% surveyed by Field Officers and have continually recommended that this occur, as in the Botobolar Area potentially where the water pipeline from Ulan to Bowdens may run, there are significant cultural sites that the Wiradjuri People know of but due to no access by historic and current landowners these cultural site exact locations have been lost, this is why it is imperative that the survey be completed prior to any approvals.

Gallanggabang Aboriginal Corporation of Orange, NSW (Submission SE-8384568)

Response

Bowdens Silver undertakes to engage a suitably qualified archaeologist and members of the registered Aboriginal stakeholders to complete cultural heritage surveys of the proposed pipeline corridor.

Section 4.14.9 of the EIS stated:

> "*Those sections of the water supply pipeline corridor and relocated Maloneys Road, not accessible for field survey as part of the current assessment would be subjected to detailed field survey and Aboriginal cultural heritage assessment prior to any surface disturbance in those locations*."

This has always been a commitment of Bowdens Silver and has been communicated to relevant stakeholders. Due to access constraints, approximately 20% of the water supply pipeline corridor remains to be surveyed. This approach and the constraints on survey has been identified in documentation and accepted by DPIE.

Surveying of the remaining sections of the proposed corridor has not been possible to date due to access considerations. Given the results of assessment to date, it is not considered likely that the remaining survey would identify sites that could not be avoided through a minor change to the alignment of the pipeline corridor. Regardless, the final alignment of the water supply pipeline would be surveyed again before construction commences.

5.2.7 Aboriginal Cultural Heritage Training

Representative Comment(s)

All contractors should be given Aboriginal Cultural Heritage Training we in the community are willing to do this.

Murong Gialinga Aboriginal and Torres Strait Islander Corporation of Mudgee, NSW (Submission SE-8623706)

Response

The effective application of Aboriginal cultural heritage management strategies would rely on an understanding and appreciation of the Aboriginal cultural setting and context for the Project. Bowdens Silver would provide training to all on-site personnel regarding the Aboriginal cultural heritage management strategies relevant to their employment tasks.

Representative Comment(s)

The ACH assessment identified a reasonable number of stone artefacts (particularly cores and flakes) that offer research potential of behavioural trends in tool making for the local area. Heritage NSW request that an artefact research program is developed to analyse the stone artefacts particularly those that will be salvaged as a mitigation to reduce harm from the proposed development, post project approval.

1.1 Develop in partnership with the RAPs an artefact analysis program

1.2 Offer opportunities for interested members of the RAPs to participate in the analysis program

1.3 Offer opportunities for interested members of the RAPs to develop skills in the appropriate methods for storing and cataloguing stone artefacts.

Heritage NSW

Response

Bowdens Silver undertakes to incorporate these requirements into the Heritage Management Plan for the Project.

Section 4.14.9 of the EIS stated:

> *"Bowdens Silver would engage a suitably qualified archaeologist and representatives from the Registered Aboriginal Parties (RAPs) to record and collect the salvaged stone artefacts. These artefacts would be properly curated and stored in an on-site "Keeping Place". The artefacts would be replaced within rehabilitated areas in consultation with representatives of the local Aboriginal community and the Biodiversity and Conservation Division of DPIE."*

Examination of the artefacts and their contexts would form an integral part of the recording program in order to better understand and interpret local and regional patterns of past Aboriginal settlement and resource use. In particular, this would involve investigating lithic technologies and reduction strategies adopted at the Aboriginal cultural heritage sites. These strategies of information collection would complement the salvage program.

5.2.8 Gallanggabang Aboriginal Corporation, Wellington Valley Wiradjuri Aboriginal Corporation and Bradley Bliss Specific Questions/Considerations

It is noted that representative comments in this section are from the Gallanggabang Aboriginal Corporation (Director Bradley Bliss), the Wellington Valley Wiradjuri Aboriginal Corporation (CEO Bradley Bliss) and a private submission from Bradley Bliss. The three submissions are in the most part identical with all groups and Mr Bliss registering separately as stakeholders for the Project.

Comment(s)

On the 2nd August 2019 the following reports were received by email for comment by Dr. Cupper:

- *Draft 42925_Part 13 Aboriginal and Historical Cultural Heritage_02 Aug 2019*
- *Bowdens_Silver_Native Vegetation Extract from Draft Report_20190627*

<u>Neither of these documents are a Draft Survey Report</u> for the recently conducted Bowdens Silver to Ulan Pipeline Aboriginal Cultural Heritage Survey (10th and 12th April 2019). What was supplied, was a draft version of the Aboriginal and Historical Cultural Heritage section of the EIS. This does not meet consultation guidelines specific to the survey conducted.

Response

The draft Aboriginal Cultural Heritage Assessment report for the entire project was provided to all registered Aboriginal stakeholders for review and input on 2 August 2019 in accordance with Section 4.4 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). This report collated the results of all relevant surveys.

In its comments on the EIS, Heritage NSW noted the following "Heritage NSW is particularly satisfied with the Aboriginal consultation…" (23 July 2020).

This comment was raised by Mr Bradley Bliss several times during consultation for the Project and the above response provided. The advice from Landskape and the position of Bowdens Silver has not changed on the matter.

Comment(s)

Aboriginal Field Officers participated in the Bowdens Silver to Ulan Pipeline Aboriginal Cultural Heritage Survey (10th and 12th April 2019). Multiple sites were recorded, however Field Officers have raised concerns that not all Culturally Modified Tree's identified on this

survey were recorded as on Table 8 Continued Page 2/2 on page 65 of the Aboriginal and Historical Cultural Heritage Assessment, there are six cultural sites listed as BLWP1 to BLWP6. The site BLWP 5 refers to a singular Culturally Modified Scar Tree only not two as identified by Aboriginal Field Officers.

Response

Site BLWP5 (AHIMS site number 36-6-1031) was a single culturally modified (scarred) tree. The other culturally modified (scarred) tree identified south of Stoney Creek during the survey is outside the Application Area and is registered as AHIMS site number 36-3-0149.

Comment(s)

Significant concerns have also been raised as the six cultural sites listed as BLWP1 to BLWP6 have not been registered on the Aboriginal Heritage Information Management System (AHIMS) for the Bowdens Silver to Ulan Pipeline Aboriginal Cultural Heritage Survey conducted 10th and 12th April 2019. This has been confirmed through AHIMS online search via GPS Data, Shape File and telephone consultation with Department of Environment – AHIMS Registrar 25 June 2020. It has been over 14 months post survey, these sites should be on the AHIMS database. This raises serious concerns over what else Bowdens Silver has omitted or half completed.

Response

No cultural heritage sites identified in the Application Area during the surveys have been omitted from the assessment. The six cultural sites listed as BLWP1 to BLWP6 are registered on AHIMS in August 2020 as site numbers 36-6-1028, 36-6-1029, 36-6-1030, 36-3-3669, 36-6-1031 and 36-3-3669, respectively.

Comment(s)

The Aboriginal Community have identified in the Aboriginal and Historic Heritage Assessment report, that early responses were during the period of ownership (sic) *by Kingsgate, Dr. Cupper has added large sections showing communication sent out in relation to registration for the project, but there is very little feedback on cultural matters apart from the AHIP application and discussion around a keeping place. There are no comments or recommendations relating to post survey reports, this theme is a long running one and of serious concern to the Wiradjuri Community.*

Response

The registration and notification of Aboriginal stakeholders and their input to the assessment was documented in accordance with Sections 4.1 to 4.4 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). All submissions received from Aboriginal stakeholders were appended to the ACHA.

The Heritage NSW submission to the EIS (dated 23 July 2020) stated: "Heritage NSW is particularly satisfied with the Aboriginal consultation…".

Comment(s)

Aboriginal Community have not agreed to any of the recommendations or conclusions drawn by this Aboriginal and Historic Heritage Assessment report, as we have not been able to make comment or recommendations as to what should occur at each site or if landforms require any sub-surface testing or salvage.

Response

Aboriginal stakeholders were comprehensively involved throughout the assessment and their input to the recommendations was documented in accordance with Sections 4.1 to 4.4 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). All submissions received from Aboriginal stakeholders were appended to the ACHA.

It is also noted that Heritage NSW noted its satisfaction with the Aboriginal stakeholder engagement for the Project.

Comment(s)

It is noted that several Registered Aboriginal Party Field Officers who participated in Cultural Heritage Surveys onsite have since died, it is unknown if the current Directors or other Field Officers of those affected RAP's are aware of various survey details in which their members participated.

Response

Landskape consulted with registered Aboriginal stakeholders throughout preparation of the ACHA. Where cultural information and knowledge was offered, it was used to inform the assessment. All registered Aboriginal stakeholders were provided with a draft Aboriginal Cultural Heritage Assessment report on 2 August 2019 in accordance with Section 4.4 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). Bowdens Silver send its sympathy and condolences to those in the Aboriginal community that have lost family members or friends. Their contributions to the Project are considered particularly valuable.

Comment(s)

It is for the above reasoning that we the Wiradjuri Aboriginal Community seek the entire Aboriginal Cultural Heritage Assessment for this project be re-assessed.

- *This should be conducted utilizing current Registered Aboriginal Parties all present not on a rotating schedule.*
- *The project area should be divided into various sections as per the proposed project plan and Draft reports issued for each section for Community to give feedback and recommendations on as per the consultation guidelines.*

Response

Aboriginal stakeholders were comprehensively involved throughout the assessment in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). There is no requirement in the *Aboriginal Cultural Heritage Consultation*

Requirements for Proponents (DECCW 2010a) that all registered Aboriginal stakeholders be present on every day of the survey. Several meetings were held with RAPs that discussed and agreed to survey methodologies. Representatives of the Gallanggabang Aboriginal Corporation and Wellington Valley Wiradjuri Aboriginal Corporation were present at these meetings.

A draft Aboriginal Cultural Heritage Assessment report was provided to all registered Aboriginal stakeholders on 2 August 2019 in accordance with Section 4.4 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). There is no requirement that the Project be divided into multiple reports.

Again, it is noted that the Heritage NSW submission stated the Department's satisfaction with consultation processes for the ACHA.

Comment(s)

Aboriginal Community put a higher value on our cultural and artefact sites which is in stark opposition to the scientific value which is recorded as Low for the majority of artefact sites in the EIS. The reason for this is that it is our heritage, our ancestral links and projects such as this keep destroying them and we have less and less physical traditional sites and it is a significant loss to our heritage with the damage to or collection at each AHIMS registered site. Anthropologically these sites tell our ancestor's story across the landscape and the loss of physical sites to show future generations is becoming dangerously high within this Traditional Clan area.

Response

The Cultural value of the land and identified sites has not been dismissed or ignored. Section 6.1.2 (Aboriginal Social, Cultural, Spiritual and Historical Significance) of Landskape (2020) states the sites are of high cultural significance to the Aboriginal community. Scientific significance is assessed through review of site integrity, structure, contents, representativeness and rarity.

Comment(s)

Where an Aboriginal Cultural Heritage site can be avoided, that is the optimal outcome, even if changing the project design by 10m to avoid impacts and loss.

If this project is approved, there needs to be conditions set where the Proponent or Developer changes proposed infrastructure layouts to avoid sites or significant environmental features.

Response

The potential areas of disturbance associated with the Project have been selected following a careful and thorough assessment of options and feasibility. Therefore, there is limited opportunity to avoid impacts on the Aboriginal cultural heritage sites within the Mine Site.

All six identified sites within the water supply pipeline corridor have been avoided by selected adjustments to the corridor.

Comment(s)

That any Registered Cultural Site be completely salvaged where it is to be impacted, as this has not occurred on various projects and has caused cultural sites to be partially collected and site integrity has been lost.

Response

The Project would require the salvage of items of Aboriginal cultural heritage significance from 25 identified sites within the Mine Site, one of which (the rock shelter identified as site BL44) would require test excavation. Two sites have already been salvaged under Aboriginal Heritage Impact Permit No. 1132211, issued by OEH in May 2013. All salvaged items would be properly curated and stored in an on-site "Keeping Place". A further 31 identified sites within the Mine Site, whilst not directly impacted, would be protected from inadvertent disturbance via the installation of protective barriers.

Comment(s)

A safe Keeping place has been discussed and historically agreed upon, however this is only for the life of the mining operation and rehabilitation phase. Post mining what is to happen with the total artefacts as from everything being proposed there will be no rehabilitation of the land back to a reasonable condition as it currently is pre-mining That means that culturally any collected artefacts cannot be returned to the landscape in which they were collected and the site integrity and cultural value has been lost.

Response

Bowdens Silver would engage a suitably qualified archaeologist and representatives from the RAPs to record and collect the salvaged stone artefacts. These artefacts would be properly curated and stored in an on-site "Keeping Place". The artefacts would be replaced within rehabilitated areas in consultation with representatives of the local Aboriginal community and the Biodiversity Conservation Division of DPIE.

Comment(s)

All workers including sub-contractors who enter the site must undertake and pass Aboriginal Cultural Heritage Induction Training, this is to be presented by the combined Registered Aboriginal Parties for this project, and this is to avoid another incident where a site is destroyed by a worker knowingly or by accident.

Response

The effective application of Aboriginal cultural heritage management strategies would rely on an understanding and appreciation of the Aboriginal cultural setting and context for the Project. Bowdens Silver would provide training to all on-site personnel regarding the Aboriginal cultural heritage management strategies relevant to their employment tasks.

5.2.9 Tom Combes Specific Questions/Considerations

Comment(s)

I am genuinely concerned about the scope and detail of the report.

An example is explained on the introduction page 13-9 that a Rock Shelter with Rock art is described from records from 1899.... but could not be identified.

There is a simple reason why it could not be found. They did not ask anyone! The people listed that were consulted in the report do not come from Lue. Yes, they may be Aboriginal, but they do not live here. Aboriginal culture was not recorded in libraries and books, it is recorded by word of mouth. If you have not been in Lue for a hundred years, the system fails. Sadly, the Aboriginal people were moved out of this area long ago by white settlement. As a white man with heritage back to early settlement I am not proud of how the early settlers treated the Aboriginal people. However, they are not forgotten here at Lue and although there are few aboriginal people residing in the valley, their culture is cherished, we will protect and honour them. Past, present, and emerging. The locals know the sites and places of significance. I have been on many exploratory trips in the local area and have seen some of these sites firsthand.

Response

Aboriginal cultural knowledge was obtained via a thorough process consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a), including public advertisements giving relevant knowledge holders the opportunity to share information and be involved in the preparation of the report. A comprehensive outline of the process used to identify Aboriginal stakeholders for the Aboriginal Cultural Heritage Assessment (ACHA) is described in detail in Section 2 of Landskape (2020) and Section 4.14.4 of the EIS.

It was acknowledged in Section 5.5 of Landskape (2020) that the historical reference to rock art is described as a "guessed very general location" on the AHIMS register, recorded as occurring "half way between Mudgee and Rylstone".

Landskape and Bowdens Silver has been proactive in engaging with the local community and incorporating knowledge that has been generously passed on in the process. The ACHA considers those cultural sites and values that may be impacted by the Project and concludes the outcome is acceptable in light of the commitments made to management. This process does not deny the knowledge or values held by the Aboriginal Community and is well advanced on the practices of historic local development.

Comment(s)

Lue was a significant place for Aboriginal people. Known as Loowee or Louee or now spelt Lue this is the Aboriginal word for "chain of waterholes" the Aboriginal people thrived in this valley. This is not even mentioned in the EIS. I am unclear on what they studied in the EIS. The report reads like it was copied and pasted from another mine report.

Response

Section 4.1.2 of Landskape (2020) states:

> *"In Wiradjuri, Lawsons Creek was called Loowee, meaning a chain of waterholes, and gives its name to the town of Lue".*

The ACHA was focused on the history, including past use, of the land that would be impacted for the Project. It is important in developing a predictive model to inform archaeological field survey that this be the case. It is noted that Heritage NSW and DPIE have not raised any concerns with the processes used for the ACHA.

Finally, in its comments on the EIS Heritage NSW noted the following "Heritage NSW is particularly satisfied with the Aboriginal consultation…" (23 July 2020).

5.3 ACID MINE DRAINAGE (LEACHATE) MANAGEMENT

5.3.1 Overview

The following subsection responds to submissions that requested clarity and more detailed information on leachate management. The EIS and various assessments (GCA (2020), Jacobs (2021) and Advisian (2020a and 2020b)) comprehensively described the presence, extraction and management of potentially acid forming (PAF) ore, waste rock and tailings together with the non-acid forming (NAF) waste rock. Throughout the EIS, the liquid draining from the PAF ore, waste rock and tailings was consistently referred to as leachate, a term reflective of its origin as a product of interaction between water, oxygen and reactive sulphide minerals. The term leachate is therefore synonymous with acid mine drainage (AMD) which was the subject of a number of submissions.

Submissions that commented on leachate generation generally or the proposed management of leachate have been reviewed by Bowdens Silver and its consultants. Following this review, no changes to leachate management were considered to be necessary. However, Bowdens Silver has elected to include additional seepage management measures for the TSF (see Section 3.3). Further consideration of leachate management measures would be a key component of detailed design processes, with the management approach to be refined and implemented throughout the Project life.

5.3.2 General

Representative Comment(s)

The United Nations has labelled acid mine drainage as one of the biggest problems our world is facing second only to global warming.

(Name Withheld) of Austral, NSW (Submission SE-8640033)

Response

Gaining an understanding of the potential for AMD generation as a result of mining activities was a key objective of the Materials Characterisation Assessment undertaken for the Project by Graeme Campbell & Associates Pty Ltd (GCA, 2020). The management implications of potential

AMD generation identified in GCA (2020) were subsequently used to inform the preliminary design of Mine components proposed to store PAF materials, such as the WRE (Advisian, 2020a) and TSF (ATC Williams, 2020) as well as the proposed closure strategy for each of these components (Advisian, 2020b). These designs were presented in the EIS and would be subject to detailed design in the event approval is granted for the Project and subsequent management over the life of the Project. In this process, the current designs would be refined and the specific details of construction and management developed. This is a standard process for all mining projects in NSW and Australia.

Representative Comment(s)

Given acid waste could potentially remain active for hundreds of years, it is critical to understand how this will be monitored and maintained for such a long period, and what the consequences are should there be any failure in containment measures.

A thorough assessment of the risks and implications of acid forming material leaching out of containment areas or being placed on the non-acid forming material stockpile in error should be undertaken.

Mid-Western Regional Council

How is PAF to be managed during and post closure?

How will the leachate dam and the leachate it receives be managed post closure? (Section 4.4.2.2)

Lue Action Group, NSW (Submission SE-8654995)

The Bowden EIS seeks to avoid the topic of acid mine drainage totally. It is only mentioned in Table 3.2 as a topic that government and the community had identified (Bowden Silver in the EIS ignores the topic completely despite questions raised by government and the community). The EIS fails to discuss acid mine drainage at any level.

Haydn Washington of Nullo Mountain, NSW (Submission SE-8514832)

Response

The term "leachate" was used to describe AMD in the EIS. As noted above, the potential for AMD generation, its management and mitigation measures were key to the development of preliminary designs for relevant mine components. Leachate and its management was addressed in the following detailed project information and technical assessments that accompanied the EIS.

- Section 2.5 and Appendix 5 of the EIS: Waste Rock Management.
- *Materials Characterisation Assessment* - Part 3 of the *Specialist Consultant Studies Compendium* (GCA, 2020).
- *Tailings Storage Facility Preliminary Design* - Part 16a of the *Specialist Consultant Studies Compendium* (ATC Williams, 2020).
- *Preliminary Design of PAF Waste Rock Emplacement, Oxide Ore Stockpile and the Southern Barrier* - Part 16b of the *Specialist Consultant Studies Compendium* (Advisian, 2020a).
- *TSF and WRE Closure Cover Design* - Part 16c of the *Specialist Consultant Studies Compendium* (Advisian, 2020b).

As noted in EIS Section 2.5.4.1, PAF waste rock would be placed in a WRE designed to provide for the long term storage and encapsulation of compacted PAF waste rock in a constructed landform. The WRE would be progressively developed and rehabilitated and would include the following design elements included for the purpose of long term waste rock encapsulation.

- A 1.5mm low permeability HDPE liner underlying the waste rock for the interception of any leachate.
- Store and release cover/barrier system overlying the waste rock and progressively placed over completed sections of the WRE.

Numerous studies have been conducted to estimate the "half-life" of HDPE liners, which is the point at which 50% of the liner has degraded under harsh conditions. Durability testing completed in laboratory and field conditions estimates that an HDPE liner can achieve a service life (50% degradation) of >475 years.

Cover systems/barriers for encapsulated waste have been used for decades and, given the importance of such systems, joint ventures between governmental agencies, regulators, industries and universities have been conducting extensive, long-term assessments of various cover systems installed over a range of materials in a variety of site conditions.

As the vegetated store-and-release capping and cover system would limit rainfall ingress into the stored PAF waste rock, it would also reduce leachate generation. The effectiveness of this system would be monitored and evaluated regularly during operations, as the WRE is progressively rehabilitated. Assuming these measures are effective, the need for seepage and leachate collection would be eliminated following a period of time after mine closure and the leachate management dam would then be removed (as noted in EIS Section 2.16.5). The small volumes of leachate collected in the dam during this rehabilitation period would be transferred to the final void.

The cover system is not only designed to prevent the ingress of the water and provide a medium for the establishment and development of vegetation. One of the most important functions of the barrier is to limit the ingress of atmospheric oxygen, which ultimately oxidizes the potential reactive iron sulphide minerals that would generate acid leachate.

The proposed cover system is considered "state of the art" when assessed against current industry practice, as can be seen in the Australian Government Department of Industry, Tourism and Resources publication named *"Preventing Acid and Metalliferous Drainage - Leading Practice Sustainable Development Program for the Mining Industry"* published in September 2016.

Progressive development and rehabilitation of the WRE would enable monitoring to establish the effectiveness of the encapsulation design elements. This monitoring would include the volume and quality of leachate generated in rehabilitated WRE sections. The results of this monitoring would inform any adaptive management strategies should performance of the encapsulation measures be compromised.

As noted in Section 4.1 of the Surface Water Assessment (WRM, 2020), a key objective of the surface water management system for the Project would be the protection of downstream waters from potential contaminants in Mine Site runoff. This would be achieved by:

- capturing contaminated seepage from the WRE, tailings decant water, or runoff that may be in contact with potentially reactive material within the site water management system for recycling and reuse in the processing circuit; or

- directing sediment-laden disturbed-area runoff (that has not come into contact with PAF waste rock or other potentially reactive material) to sediment dams for containment on site unless the water quality is adequate for release to the receiving waters after sediment removal.

During operations, the identification of ore and waste rock zones is critical to optimal economic outcomes for the Project. This would include the identification and demarcation of NAF and PAF waste rock to inform mine planning and scheduling. Notwithstanding this, should the inadvertent placement of PAF material onto a NAF stockpile occur, any runoff from the stockpile would be captured by water management infrastructure and not allowed to enter downstream waters.

Representative Comment(s)

Bowden Silver seems to be relying on 'kinetic' testing of ore samples, where this relied on a number of columns run for 30 weeks and a mere 4 columns for 128 weeks with water being passed over the crushed ore in the columns. We are never told if the columns are inoculated with Acidithiobacillus to mimic a real life situation.

Haydn Washington of Nullo Mountain, NSW (Submission SE-8514832)

Response

It is assumed that this comment intended to refer to waste rock as opposed to "ore" which is material of economic grade that would be processed. As noted in GCA (2020), whilst the environmental geochemistry of both ore and waste rock within the Mine Site is relatively complex, the investigations to date enabled a thorough understanding of the weathering behaviour of these materials. Kinetic testing is widely recognised in AMD management guidance and literature (e.g. "*Preventing Acid and Metalliferous Drainage - Leading Practice Sustainable Development Program for the Mining Industry*" (DFAT, 2016)) as a critical step in understanding the reaction rates and products of materials with the potential to generate AMD. As noted in Section 3 of GCA (2020), the duration of the kinetic testing program for a given sample was determined by the time from which the test commenced until the leachate analysis established steady time trends sufficient to inform proposed waste rock management measures. With regards to the four weathering-columns subjected to longer duration kinetic testing, these samples were devoid of sulphides. The objective of this extended testing program was to assess the behaviour of trace alunites within the clayey matrix and quantify how these interactions would affect the aluminium solution acidity.

The kinetic testing program was conducted in controlled conditions and the columns were not specifically inoculated with Acidithiobacillus or related microbial forms. The testing laboratory (equipment, etc.) has been in operation since 1995 and during this time numerous samples of mine-waste and tailings, with a wide range in mineralogy, sulphur and base-metal content, have been tested. It is likely that the contents of any weathering-column would be 'alive' with an array of autotrophic and heterotrophic microbes that would reflect real world conditions and contribute to the reaction rates and products. Therefore, it is considered that the kinetic testing represents a close approximation to realistic scenarios (as much as may be established in a laboratory setting) and would provide sufficient information to guide assessment and ongoing management.

Representative Comment(s)

Given the history of almost all heavy metal mines, water quality is at risk long after the mine closes and Bowden Silver ceases to become legally responsible for the mine.

As with most other heavy metal mines, society - rather than the company - will inherit the long-term damage of polluted waterways due to the Bowden Silver mine operation.

Haydn Washington of Nullo Mountain, NSW (Submission SE-8514832)

Response

Whilst there are many historical instances of environmental issues arising from AMD, it must be recognised that many arose due to limited (or in some cases no) understanding of AMD processes. Technological advances in the pre-mining assessment of AMD potential and refined understanding of measures to limit generation and to enable capture and treatment mean that historical examples act as a warning but in no way reflect the likelihood of the same issues occurring within the Mine Site.

Bowdens Silver recognises the implications of extracting ore and waste rock with the potential to generate AMD. Comprehensive assessment has been commissioned by Bowdens Silver including a Materials Characterisation Assessment (GCA, 2020) to understand the geochemical behaviour of the extracted material over time, to inform preliminary design of the WRE, TSF and their capping and closure strategy (store-and-release cover system). The proposed management and closure strategies are not new and have been used for decades with success.

Given the importance of cover systems, long-term assessment programs testing the efficacy of various cover systems installed over a range of materials and in a variety of site conditions have been undertaken. These include the Australian Alternative Covers Assessment Program (A-ACAP), the Contaminated Site Clean Up Database and the Alternative Cover Assessment Program (ACAP) from the U.S. Environmental Protection Agency (USEPA) and others.

The proposed Bowdens Silver cover system is considered "state of the art" when assessed against current industry practice, as can be seen in "*Preventing Acid and Metalliferous Drainage - Leading Practice Sustainable Development Program for the Mining Industry*" (DFAT, 2016).

In addition, numerous studies have been conducted to estimate the "half-life" of HDPE liners, which is the point at which 50% of the liner has degraded under harsh conditions. Durability testing completed in laboratory and field conditions estimates that an HDPE liner can achieve a service life (50% degradation) of >475 years.

As a result of its focus on managing AMD, Bowdens Silver is confident that the historical issues from AMD at legacy mining operations would be avoided for the Project. Regardless, monitoring and testing in preparation for rehabilitation would occur over the life of the mine. In addition, the liability of Bowdens Silver only ceases when the relevant Government authorities recognise that rehabilitation is satisfactorily completed. This is a thorough process given that the Government does not take on liabilities lightly.

5.3.3 Leachate Management Dam

Representative Comment(s)

A brief desk-top review by this author has not found any mine sites where the use of this design and technology at this scale has been successfully employed in either the short term or the long term for a TSF or WRE.

This proposed Project is using predictive modelling and small area field trials to claim its containment designs will manage and prevent AMD impacts on the surrounding environment during the project lifespan and for generations to come. There is no certainty that it will be effective.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

As noted in Section 3.1 of Advisian (2020b), one of the main objectives of placing a cover system over reactive waste material is to protect the downstream receiving environment following closure of the mine. This is achieved by reducing the net percolation of water into the reactive mine waste materials, thereby reducing effluent seepage volumes. In addition to limiting contaminant release via seepage, the aims of cover systems includes chemical stabilisation of the waste material by limiting the ingress of atmospheric oxygen, limiting the upward movement of process water into the cover, and provision of a suitable medium for the establishment of sustainable vegetation.

Whilst the author of this submission notes that a brief desktop review could not identify the use of the proposed cover system, attention is drawn to Section 5.3.1, which identifies numerous technical studies undertaken and that the cover system proposed by Bowdens Silver is considered "state of the art" when assessed against current industry practice (e.g. DFAT, 2016).

Predictive modelling is a valid and robust means to inform the preliminary design of the cover system to achieve long-term (modelled) performance. As the WRE would be progressively developed and rehabilitated, the effectiveness of the proposed closure and rehabilitation measures would be trialled and monitored during operations, with the performance of these measures evaluated via comparison with modelled results. This would provide Bowdens Silver with the opportunity to apply adaptive management strategies, if required, to improve the effectiveness of the proposed closure and rehabilitation measures.

5.3.4 Leachate Collection

Representative Comment(s)

The method of intercepting contaminated groundwater leaching from the TSF is not defined. The level of confidence in the proposed approach to capture contaminated groundwater before it travels 40 m beyond the mine site boundary is low.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

ATC Williams (2020) presents the preliminary design of the TSF which includes the following measures to intercept and collect seepage.

- Nominal 40m deep grout curtain beneath the upstream face of the TSF embankment.

- Seepage drainage system beneath the downstream foundation of the TSF embankment.
- Seepage collection drain along downstream toe of TSF embankment (connected to seepage drainage system).
- Seepage collection ponds receiving discharge from seepage collection drain.
- Pump return system to decant pond from seepage collection ponds.

These seepage management measures are shown on Figures 1, 4, 5, 6, 14, 15, 16, 17 and 18 of ATC Williams (2020).

Section 29 of ATC Williams (2020) notes that further work would be undertaken during detailed design of the TSF to refine seepage interception and collection measures. However, as described in Section 3.3, Bowdens Silver has elected to include additional seepage mitigation measures via a BGM liner underlying the TSF. The full extent of this BGM liner would be defined during detailed design. It is anticipated that specific conditions of Development Consent relating to lining of the TSF (and other relevant structures) to be included in any Development Consent for the Project should it be approved.

5.4 AGRICULTURE

5.4.1 Overview

The agricultural history and productivity of the locality and the wider Mid-Western Regional LGA is acknowledged, and several submissions expressed concern at the potential loss of high value agricultural land and the potential for lead exposure of agricultural produce. Human health risks associated with lead exposure are also considered in Section 5.15. The Agricultural Impact Assessment for the Project confirmed that the land within the Mine Site is not high value agricultural land and has thoroughly assessed the predicted changes in land use and concluded that adverse impacts on agriculture in the region would be negligible. Review of the submissions and comments provided by DPIE Agriculture and the community has not changed the proposed management or commitments relating to agricultural land and the conclusions relating to agricultural impacts have not changed. That is, given the design of the Project and the mitigation measures to be adopted, adverse impacts on agriculture would be negligible. The proposed progressive return of land to productive uses and following rehabilitation of the Mine Site are an important element of this conclusion.

5.4.2 Agricultural Land Capability

Representative Comment(s)

The Lue region is prime agricultural land.

Sharelle Fellows of Gulgong, NSW (Submission SE-8624131)

Desecration of Prime Farmland is a definite.

(Name Withheld) of Camboon, NSW (Submission SE-127656)

This mine is proposed in a greenfields area, surrounding by prime agricultural land, include some land classified as BSAL land.

Susannah White of Mudgee, NSW (Submission SE-8631516)

The effects on soils and land capability is limited to the mine site and does not consider risks outside the mine site. This includes changes to ground and surface water and its effects on salinity and soil acidity.

Hunter White of Havilah, NSW (Submission SE-8658633)

STOP this silver mine before it destroys a basin of rich culture and agricultural heritage.

Peter Combes of Lue, NSW (Submission SE-127779)

Response

The Agricultural Impact Statement (RWC, 2020) prepared for the Project determined potential impacts on agriculture including impacts on agricultural resources such as groundwater, surface water and soils. This assessment recognises the rich agricultural heritage and ongoing use of land within and surrounding the Mine Site. However, it is noted that the land is not classified as Biophysical Strategic Agricultural Land (BSAL) and therefore its value for agricultural productivity is not the same as other land in the locality.

The Project would remove a maximum of approximately 1 498ha of land currently used for agriculture (principally low value grazing) out of production throughout the Project life due to land use changes. This area represents approximately 0.3% of the total 500 458ha of land available for agricultural use within the Mid-Western Regional LGA. This land would comprise approximately 901ha of land within the Mine Site, 20ha of land within the footprint of the relocated Maloneys Road and a further 577ha in the area immediately surrounding the Mine Site which would be set aside as part of the Project's biodiversity offset area. Beyond the end of the Project life, it is anticipated that approximately 1 170ha of land within and immediately surrounding the Mine Site would be either retained or returned to agricultural production following the completion of rehabilitation as part of the "Bowdens Farm". The total amount of land that would be permanently removed from agricultural production after rehabilitation would be approximately 865ha, or 0.17% of the total land used for agriculture within the Mid-Western Regional LGA. No agricultural land within the water supply pipeline corridor would be permanently removed from production.

Following a comprehensive assessment, RWC (2020) concluded that the Project would have a negligible to minor impact upon agricultural resources (including groundwater, surface water and soils) and enterprises through the Mid-Western Regional LGA. Whilst the Project would marginally reduce the availability of agricultural land throughout the Project life, the continued operation of the Bowden Farm and the proposed progressive rehabilitation schedule, would ensure that the Project would only have minor impacts on agricultural lands. Furthermore, the commitment from Bowdens Silver to provide a range of part-time jobs throughout the Project life would provide an opportunity for local farmers to acquire off-farm income, which in turn would benefit a number of agricultural enterprises within the Mid-Western Regional LGA.

5.4.3 Impacts of Lead on Agriculture

Representative Comment(s)

Our wine grapes are irrigated from water from our dam…. If there is lead dust in the dam we will be unable to irrigate as there is little tolerance for lead in wine.

(Name Withheld) of Pyangle, NSW (Submission SE-8602093)

As a grape grower relying on ground water in the Mudgee area, our farm & livelihood is threatened.

(Name Withheld) of East Ryde, NSW (Submission SE-8628093)

I am concerned that any airborne contaminants, particularly lead will affect my olive grove and render the business unviable.

Philip Carkagis of Pyangle, NSW (Submission SE-8640592)

My 8,000 tree olive grove will be effected by the heavy metal dust deposition on their leaves, flowers and fruit. There is a Zero level of heavy metal uptake tolerance in extra virgin and virgin olive oils.

Our Organic Certification which we have been certified since 2001 (19years) for processing organic olive oil and organic bottling will be stripped from us.

(Name Withheld) of Rylstone, NSW (Submission SE-8642238)

the clients and friends, tourists, of the Rylstone Olive Press will not visit us or our cellar door or buy our beautiful extra virgin olive oil, due to the risk of contamination.

(Name Withheld) of Rylstone, NSW (Submission SE-8642238)

I have a rosemary and lavender plantation for distilling of essential oils, but this project would not be able to continue if mining commenced due to heavy metals and dust affecting plants.

Lyn Coombe of Lue, NSW (Submission SE-8621920)

What possible contamination of meat produced by nearby farmers can be expected?

Barbara Duff of Mount Frome, NSW (Submission SE-8624058

The dust, which we believe will contain lead - will negatively affect our pasture and we are concerned about increased lead levels in our livestock as well as our own health.

Elizabeth Brown of Lue, NSW (Submission SE-8627238)

I am very concerned as if there is any trace of lead in their blood, they will be deemed unsalable.

Richard Nagel of Bara, NSW (Submission SE-8637859)

Fleece from sheep and alpacas will be contaminated.

(Name Withheld) of Camboon, NSW (Submission SE-8713227)

Response

Lead is a naturally occurring element within the earth's crust and is present in soil and water bodies. Different regions, with different geology, have different background or natural levels of lead in the soil and water. It is, therefore, important to be aware that lead is already present in areas surrounding the Mine Site, including agricultural areas. There is no such thing as a "zero level" of lead in any media as lead is naturally occurring and will always be present at some level in the environment. When undertaking any analysis, the laboratory method can only achieve a specified level or limit of reporting (LOR). Where lead is not detected by a laboratory, this just means it is lower than the LOR and cannot be detected by the analytical method used. This does not mean it is zero.

The contribution of lead from the Project to soil in the area would be negligible. This impact was quantified in the Human Health Risk Assessment (enRiskS, 2021) which assessed that, based on the outcomes of air quality modelling and predictive analysis, the total concentration of lead in agricultural soil at the maximum impacted receptor would be below the detection limit for lead in soil (i.e. <1 mg/kg)[4]. This concentration is negligible and would not be measurable in any soil analysis. The deposition of lead to soil and accumulated concentrations would also decrease with increasing distance away from the Mine Site.

It is noted that lead, particularly from mineralised materials, is poorly taken up into plants, so no mine-related impacts upon crops (including grapes, olives and lavender) would be expected. Similarly, the deposition of dust from the Mine Site to dams would be very low or negligible with any small amount of dust deposited mixing with the water in dams rather than deposited on land to accumulate in the top 15cm of soil. Due to the very low concentrations of dust deposited on the surfaces of dams, and the fact that mineralised materials are poorly taken up by plants, it is considered that irrigation water sourced from surrounding farm dams would not be adversely impacted by the Project.

EnRiskS (2021) also assessed the potential impacts of lead on livestock. This assessment assumed that cattle consumed pasture (that had taken up lead from the soil) and the soil to calculate levels of lead that may accumulate in the cattle and, subsequently, be present in meat and milk. In relation to meat, lead levels would be so low that it would be unable to be measured. The calculated levels in meat would be >5000 times lower than the maximum levels of metal contaminants for produce in the Australia New Zealand Food Standards Code. These levels would not impact on livestock health or result in any change to blood chemistry for livestock. Similarly, levels that may accumulate into fleece would be negligible and not measurable.

5.4.4 Contingency Measures

Representative Comment(s)

Whilst both estimated surface water and groundwater impacts are dealt with, the remedial actions should consider a contingency should the impacts on ground or surface water be greater than those modelled. Both ground and surface water are identified as being high and medium agricultural risks in the assessment (Section 1.8 Page 14-33, AIS).

NSW DPI - Agriculture

[4] The assessment conservatively estimated that the Project would continuously operate for 70 years which is significantly longer than proposed

Response

Bowdens Silver would regularly revisit predicted impacts for comparison with actual monitoring data as part of its Annual Review of the Project that would be provided to NSW regulatory agencies. With specific regard to groundwater, during operations Bowdens Silver would regularly monitor groundwater levels and inflows to the open cut pit for comparison with the predictions of the groundwater model. As previously noted, a conservative approach was undertaken to groundwater modelling and operational monitoring results would be utilised to inform periodic updates and refinement to the groundwater model, where required.

Should monitoring identify impacts beyond those predicted, Bowdens Silver would undertake adaptive management strategies and measures to limit these impacts in consultation with the relevant stakeholders.

5.4.5 Consultation

Representative Comment(s)

A commitment is needed to future consultation with landholders in the locality, with specific attention to complaint management around groundwater/surface water changes. Communication strategies should also detail how the surrounding landholders will be informed of any modelled or un-anticipated changes.

NSW DPI - Agriculture

Response

Bowdens Silver would continue to foster its "open door policy" in the development of a structured "Good Neighbour Program" that affords further development of Company-community relationships through regular and effective engagement and communication. In implementing this program, Bowdens Silver would continue to employ a dedicated Community Liaison officer within the operational team to manage the ongoing engagement and monitoring and management commitments relating to social and environmental impacts.

Part of Bowdens Silver's ongoing environmental management commitments includes a complaints protocol. This would ensure that all complaints are registered, reviewed by the appropriate person and investigated before a response is given to the complainant. In addition to this, Bowdens Silver would be required to report on the progress of the development, compliance issues and the outcomes of environment management on an annual basis. In addition, the regular Community Consultative Committee meetings would provide an opportunity for community members to discuss their concerns and experiences of the Project. An existing CCC has been successfully run during the development application process and would be continued post-approval. State significant developments in NSW are also subjected to independent and governmental audits that comprehensively review compliance and environmental performance of the Project.

5.5 AIR QUALITY

5.5.1 Overview

Submissions relating to air quality included a range of queries and requests for clarification on the assumptions used for predictive modelling and the outcomes of the assessment. The EPA requested additional clarification on metal concentrations in dust / particulates and confirmation

that best practice management and mitigation would be implemented. Bowdens Silver has also elected to include a sensitivity analysis of metal concentrations assumed for assessment to further test the outcomes of modelling. Submissions relating to health risk and lead are addressed in Sections 5.12 and 5.15 of this document and are closely related to the outcomes of the Air Quality Assessment (AQA). An updated AQA has also been prepared (see **Appendix 6)** to include clarification and additional statistical summary of metal concentrations in source materials, provide the detailed emissions inventory tables, and correct some clerical errors.

The following responses to air quality-related matters raised within the submissions provides further clarification and information, where necessary. The key matters and responses in relation to air quality are as follows.

- Predicted metal concentrations within particulates at surrounding receivers have been determined by application of the median metal concentration for three source groups, namely soil, waste rock and ore.
- The median metal concentrations from each source group have been determined from an extensive baseline sampling program.
- A sensitivity analysis was undertaken for the metal concentration with the analysis determining that, regardless of whether the median, mean or 90^{th} percentile of the metal contents is used, the predicted concentrations are below the impact assessment criteria for all metals.
- The sensitivity analysis demonstrates that proposed management and mitigation practices which focus upon reducing overall dust emissions remain the most effective measure to minimise metal concentrations at surrounding receivers.
- The emission reduction factors applied within the AQA can be readily achieved and have been demonstrated in peer-reviewed literature and through standard industry practice to be effective and achievable.
- NO_2 emissions and blast fume risk would be managed in accordance with a Blast Management Plan incorporating blast management practices and blast fume prevention measures consistent with those demonstrated within the industry to be effective in controlling blast fume.

Importantly, none of the outcomes or conclusions from the AQA have changed. In particular, the AQA continues to predict that there would be no exceedance of the relevant air quality criteria for particulate matter (TSP, PM_{10}, $PM_{2.5}$) at any privately-owned residences or receivers, either from the Project alone or cumulatively. It is also predicted that there would be no exceedance of the impact assessment criteria at any receivers (Project-related or private) for metal dust concentrations, respirable crystalline silica or HCN.

An extensive range of proactive management measures are proposed to minimise potential for impacts most of which are incorporated into the predictive modelling assessment. In addition, a range of reactive / adaptive management measures have been proposed but which cannot be modelled in the assessment and therefore should be considered further mitigation to likely risks and predicted impacts.

5.5.2 Area of Air Quality Impacts

Representative Comment(s)

…the Bowdens silver project will cover over a 5km radius from the mine site with a continuous layer of lead dust. Contaminating our land, houses, and drinking water sources.

Charles Combes of Lue, NSW (Submission SE-8631571)

Professor Mark Taylor from Macquarie University stated it is possible that residents and the environment out to 5km from the mine would be affected by lead due to dust blowing from the mine site

Colleen Farrow of Lue, NSW (Submission SE-8642069)

Where is the scientific evidence to say that toxic lead bearing dust won't blow into the Towns of Lue, Rylstone and Mudgee and surrounding rural areas? To say it won't doesn't make sense.

Mudgee District Environment Group of Mudgee, NSW (Submission SE-8622333)

Response

The assessment of air quality impacts cannot be made through generalised application of buffers or a radius. The concentration of dust from a source generally decreases with distance from the source with the rate and pattern of dispersion influenced by a range of factors including the surrounding topography and meteorological conditions.

In assessing the potential air quality impacts, the Air Quality Assessment (Ramboll, 2021) has utilised air quality dispersion modelling in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016). In simple terms, this modelling accounts for surrounding topography and meteorological conditions and assesses the emissions from the proposed activities for every hour over a modelled year. Based on the results of this modelling, metal concentrations, including lead, were also calculated for surrounding residences. No exceedances of the impact assessment criteria for metal concentrations are predicted at any Project-related or private residence.

Utilising the results from the air quality modelling, the Human Health Risk Assessment (HHRA) (EnRiskS, 2021) also considered the potential health effects of metals within dust from multiple exposure pathways, including ingestion and dermal contact with dust depositing onto topsoil, in household dust or onto roofs where it may then be washed into rainwater tanks, as well as inhalation of suspended particulates. In short, no physical health risk issues of concern resulting from the Project were identified at any surrounding non-project related residences.

5.5.3 Wind Directions

Representative Comment(s)

The big picture is regional prevailing wind. Those winds are largely westerly and north westerly i.e. blowing from Lue/Bowdens dust-creating development to Rylstone, Kandos and Clandulla.

Annabel Combes of Rylstone, NSW (Submission SE-8589723)

Response

The AQA utilised local and regional meteorological data sources including the following regional Bureau of Meteorology weather stations.

- Mudgee Airport AWS – approximately 25km northwest of the Mine Site.
- Nullo Mountain AWS – approximately 35km east of the Mine Site.
- Merriwa (Roscommon) AWS – approximately 60km northeast of the Mine Site.
- Bathurst Airport AWS – approximately 80km southwest of the Mine Site.

Local meteorological data was sourced from two meteorological monitoring stations which were installed within the Mine Site in 2012 (Lue Met01) and within Lue in 2013 (Lue Met02).

The AQA acknowledges and demonstrates that there is significant regional variation in wind patterns and that the local observation sites, Lue Met01 and Lue Met02, are strongly influenced by local topography. Neither the local or the regional sites record a high frequency of winds from the west or northwest.

For the purposes of dispersion modelling, meteorological modelling was undertaken incorporating the recorded meteorological data and surrounding topography to create a spatially varying wind field for each hour of the simulation. This methodology, which is in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016) provides a more robust assessment than simply applying the prevailing regional winds across the entire model area.

5.5.4 Background Levels for Lead, Arsenic and Heavy Metals

Representative Comment(s)

The 'Adopted Background for Cumulative Assessment (Bowdens Silver Project Executive Summary Report No. 429/24 P ES-20-21; Ramboll (2020) Table 5.3) are as follows:

- *Air PM10 (24-hour average) Daily varying with a maximum of 43.7 µg/m^3; Annual average 13.6 µg/m^3*
- *Air PM2.5 (24-hour average) Daily varying with a maximum of 15.4 µg/m^3; Annual average 3.9 µg/m^3*
- *TSP Annual average 30.7 µg/m^3*
- *Lead Annual average Negligible (i.e. 0.2% of the impact assessment criteria; 0.5 µg/m^3)*
- *Dust deposition Annual average 1g/m^2/month (or 33 mg/m^2/day cf* (sic) *NSW guideline 120 mg/m^2/day)*

No dust deposition details or guidelines are listed here for lead, arsenic and other heavy metals.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

This comment relates to Section 5.8 of the AQA (adopted background for cumulative assessment). Impact assessment criteria, including for lead, arsenic and other heavy metals are detailed in Section 2.3 of the AQA. The impact assessment criteria for all metals (except lead) relate to the incremental impact (i.e. predicted impacts due to the pollutant source alone). No background concentrations therefore need to be specified for these metals. The exception is lead, which is classified as a common or 'criteria' pollutant and is assessed against the cumulative concentration (sum of existing ambient background concentration and predicted increase). However, the existing ambient levels of lead measured within suspended particulates in the Lue area are negligible (i.e. 0.2% of the impact assessment criteria), therefore no background for lead was specified. It is noted that the predicted annual average lead concentration from the Project was less than 1% of the impact assessment criterion at all residences, therefore the predicted cumulative concentration, if a background had been specified, would be less than 1.2% of the impact assessment criterion at all residences.

The Air Quality Assessment (AQA) predicts that there would be no exceedance of the relevant air quality criteria for particulate matter (TSP, PM_{10}, $PM_{2.5}$) at any privately-owned residences or receivers, either from the Project alone or cumulatively.

Representative Comment(s)

The existing data for air lead and other metals returned negligible concentrations (p. 4-82 of the EIS): maximum measured lead in air - 0.002 µg/m^3; average of 0.001 µg/m^3. The dates of sampling are also not clear. Footnote 5 on p. 4-80 of the EIS states "HVAS monitoring was halted in November 2014 and restarted in October 2016" but the text on the same page only provides dates for dust deposition gauge monitoring of between 2012 - 2018, not the HVAS air monitoring data.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The monitoring dates as reported in the EIS are clarified as follows. Alterations from the EIS text are made in red.

- Two tapered element oscillating microbalance (TEOM) monitors for PM_{10} and $PM_{2.5}$, namely:
  - BAM1 – located in the southeastern corner of the Mine Site. Continuous PM_{10} concentrations were monitored at this location between 2012 and 2018; and
  - BAM2 – located in Lue. Continuous PM_{10} and $PM_{2.5}$ concentrations were monitored between 2013 and 2018.
- Two high volume air samplers (HVAS[5]) principally measuring TSP concentrations on a one-in-six day run cycle, namely:
  - BHV1 – located in the southeastern corner of the Mine Site and recording TSP data from 2 May 2012 to 24 November 2014 and 8 October 2016 to 12 June 2018; and

[5] HVAS monitoring was halted in November 2014 and restarted in October 2016

– BHV2 – located in Lue and recording TSP data from 15 April 2013 to 18 November 2014 and 8 October 2016 to 12 June 2018.

Zinc, lead and arsenic were also analysed for 70 TSP samples from BHV1 and 19 TSP samples from BHV2 between 2012 and 2014. A further 12 TSP samples from both BHV1 and BHV2 were collected between August 2017 and February 2018 and analysed for arsenic, cadmium, chromium, copper, nickel, lead, zinc and selenium.

Samples from both locations for PM_{10} and $PM_{2.5}$ (a total of six samples for each location for each particle size fraction) were also collected between 11 July and 6 August 2017 for the purpose of comparing metal concentrations in different size fractions. These samples were also analysed for arsenic, cadmium, chromium, copper, nickel, lead, zinc and selenium.

The samples collected from the HVAS were utilised to establish lead concentrations in the ambient air.

- Twelve dust deposition gauges for recording monthly dust deposition rates between 2012/2013 (commencement dates are variable for each gauge) and 2018. Between six and 18 samples from each gauge were analysed for arsenic, lead and zinc between 2012 and 2015. An additional sample for August 2017 was collected for ten of the gauges and analysed for arsenic, cadmium, chromium, copper, nickel, lead, zinc and selenium.

As noted in the submission, the background monitoring identified that the assessed metal concentrations within the ambient / existing dust are very low.

Representative Comment(s)

Analysis of HVAS samples for concentrations of arsenic, cadmium, chromium, copper, nickel, zinc and selenium are from a very short period during July and August 2017 and February 2018. It is not clear if this data is representative of long-term averages. These analyses reported ambient concentrations of arsenic, cadmium and selenium below the respective limits of detection. Mean concentrations of chromium, copper, nickel and zinc were 0.001 µg/m3, 0.007 µg/m3, 0.001 µg/m3 and 0.009 µg/m3, respectively.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The impact assessment criteria for these metals are assessed against the incremental impact (i.e. predicted impacts due to the pollutant source alone). Therefore, background concentrations are not used in the assessment of air quality impacts for these metals and were therefore not relevant for the AQA.

Notwithstanding, it is noted that a more significant period of collection and number of samples was undertaken for lead as well as zinc and arsenic (a total of 113 TSP samples between the two high volume air samplers were analysed for these metals) which are the metals of greatest concern in relation to the mineralogical nature of the ore body. It is evident from the analysis of a

significant number of ore and waste rock samples from exploration drilling that the concentration of other metals is very low compared to lead and zinc (see Section 5.5.5 of this document for further discussion on the concentrations of metals within waste rock and ore). For example, the median concentration of zinc in waste rock and ore is 200ppm and 2 500ppm respectively, whilst the concentration for chromium, nickel and cobalt varies from 1ppm to 3ppm and cadmium between 1ppm to 10ppm.

5.5.5 Metals Concentrations in Dust

Representative Comment(s)

Some assumptions relating to emissions from individual metals have not been adequately justified and it is unclear if the selected methodology is representative of worst-case expected metals emissions.

EPA requests that the proponent:

a) Revises the AQIA to transparently justify assumed and adopted input variables used to calculate expected metals emissions.

b) Revises the AQIA to ensure waste rock, ore and soils composition used for modelling is representative of worst-case metal concentrations.

c) Provides a detailed data distribution analysis to justify the selected metal concentrations for the calculation of expected emissions.

d) Presents the metal sampling reports as well as a summary table showing the sampling location, the number of samples and the minimum, average, median and maximum concentration for each metal for each material type.

e) Revise the AQIA to include the assessment of all expected metal concentrations.

NSW Environment Protection Authority

Response

Approach to Modelling Metal Content of Dust

Modelling of emissions for metals was based on the metal content (%) of soil, waste rock and ore that would be handled for the Project and therefore become a potential source of dust emissions. Emissions were estimated for each activity involving soil, waste rock and ore (extraction, handling and movement), with a different metal content applied for each source group, depending on the type of material handled. For example, the metal contents for ore were used to scale emissions for activities occurring within the open cut pits and at stockpile areas (i.e. ore extraction, handling, loading), whereas the metal contents for waste rock were used to scale emissions for activities occurring at waste rock emplacement areas and for the TSF embankment construction (i.e. handling, placement, spreading). Metal contents for soil material were used to scale emissions for activities including soil stripping, stockpiling and placement.

Each activity shown in the emissions inventories are assigned to a source group for modelling, with the combined contribution providing the total metal concentration at each receiver. Source groups are used in modelling to group together similar activities or activities occurring in a similar area. A summary of the source groups included in the modelling and how these were modelled is provided in **Table 5.1**.

Table 5.1
Summary of Source Groups Included in Modelling

Source group included in modelling	Example of activities/emissions assigned to source group	Material assumed for metal content scaling	How source group was modelled
Haulage of NAF	Hauling NAF to TSF embankment	Waste Rock	Emitted from a line volume source aligned along the relevant haulage routes
Haulage of Ore	Hauling to ROM pad and low-grade ore stockpile	Ore	Emitted from a line volume source aligned along the relevant haulage routes
Haulage of Waste Rock	Hauling to waste rock emplacement, southern barrier, NAF stockpile	Waste Rock	Emitted from a line volume source aligned along the relevant haulage routes
Low Grade (LG) Ore stockpile area	Trucks unloading to LG ore stockpile, wind erosion from LG ore stockpile	Ore	Emitted from the various volume sources located across the LG ore stockpile area
Oxide Ore stockpile area	Trucks unloading to oxide ore stockpile, wind erosion from oxide ore stockpile	Ore	Emitted from the various volume sources located across the oxide ore stockpile area
Open Cut Pit	Drilling, blasting, excavators, dozers, loading trucks in pit, wind erosion from open pit	Ore	Emitted from the various volume sources located across the pit area
ROM/Processing area	Dozers/FEL on stockpiles, trucks unloading, crushing, screening	Ore	Emitted from the various volume sources located across processing area
Southern Barrier	Dozers, trucks unloading, wind erosion from southern barrier	Waste Rock	Emitted from the various volume sources located across the southern barrier area
Soil	Stripping, trucks unloading and wind erosion from soil stockpiles	Soil	Emitted from the various volume sources located across soil stockpile areas
TSF	TSF earthworks and raises (material handling), wind erosion from TSF surface	Waste Rock	Emitted from the various volume sources located across TSF area
Waste Rock Emplacement	Dozers, trucks unloading, wind erosion from waste rock emplacement	Waste Rock	Emitted from the various volume sources located across waste rock emplacement area

Each predicted hourly concentration would have a different percentage contribution from each of the material types handled (soil, waste rock, ore). For example, a receiver that is closer to the open cut pit may receive a higher contribution from the ore source group compared to a receiver that is closer to the waste rock emplacement which may receive a higher contribution from the waste source group. Notably, the contribution would also depend on the dispersion conditions for that hour.

The metal contents (expressed as a %) were used as factors to scale relative concentrations in emissions for each particle size fraction (TSP, PM_{10}, $PM_{2.5}$) and applied for each source group included in the modelling. By scaling emissions for each particle size fraction by the percentage metal content for each material type (source group), the transport, dispersion and deposition of metal in dust is determined as a percentage of modelled TSP, PM_{10}, or $PM_{2.5}$ predictions.

Data Sources and Distribution

The data used to estimate emissions for metals in soil materials was collected during a soil sampling program completed in 2012 (as reported in Section 4.3 of the HHRA). The volumes of waste rock and ore to be handled are significantly greater than soil material and are therefore the overall largest contributors to particulate matter emissions. Consequently, waste rock and ore material has been subject to extensive sampling and detailed review.

In addition, a resource block model has been developed by using measured sample concentrations and sampling spacing to form a model of spatial variability, and thus provide a best estimate of metal content in ore and waste rock that was not sampled directly. The results are assigned to waste rock or ore based on a 30g/t Silver Equivalent value (that is, >30g/t AgE is assumed ore and <30g/t AgE is assumed waste rock).

The resource block model was developed for those elements which have a greater economic importance to the Project. The data for waste rock and ore was prepared in a format consistent with a JORC (Joint Ore Reserve Committee) Resource Estimate for the elements arsenic, cadmium, copper, manganese, lead, zinc and silver. For all other elements tested (cobalt, chromium, iron, mercury, lithium and nickel) the raw sample data are used (downhole assay data).

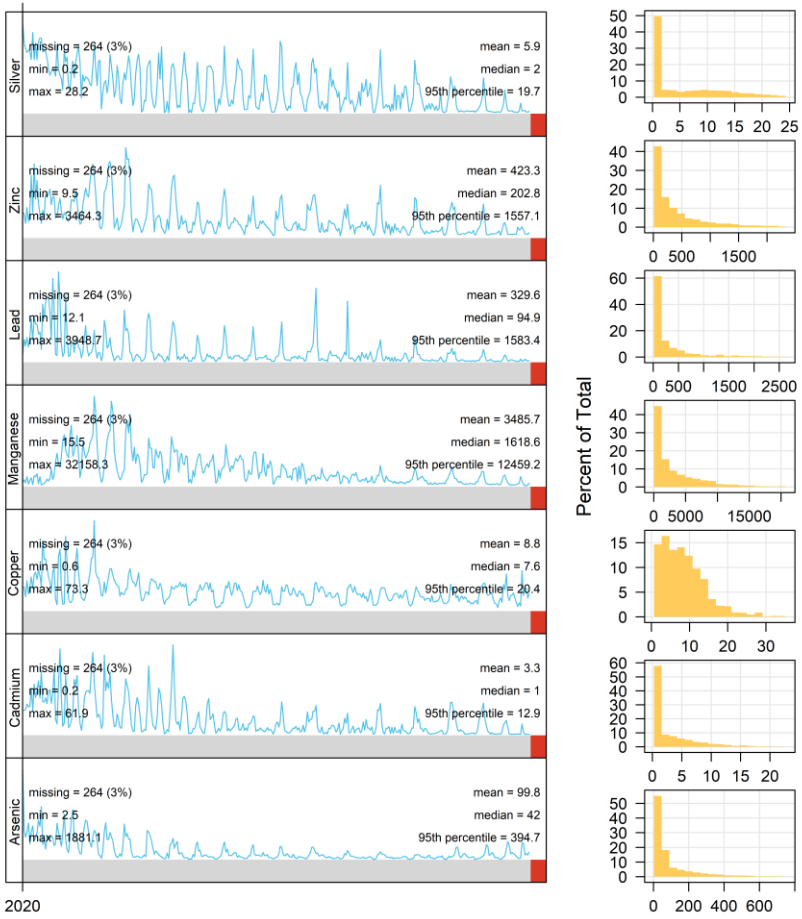
Summary statistics from the resource block model and downhole assay data were provided to Ramboll and the median metal content was selected as a representative statistical value to use for emissions estimation.

The resource block model contains 8 530 individual results for each metal for waste rock and 9 570 individual results for each metal in ore. The number of sample results in the downhole assay dataset varies for each metal and is summarised as follows.

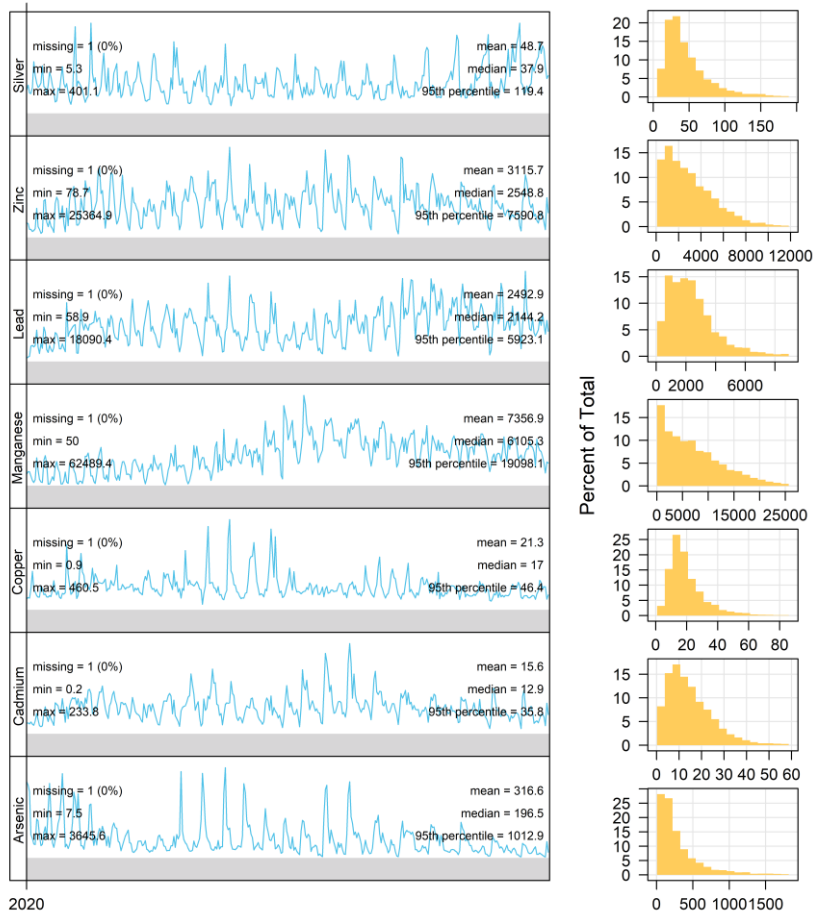
- Cobalt – waste rock 3 374, ore 5 550
- Chromium – waste rock 3 892, ore 5 777
- Iron – waste rock 4 396, ore 7 050
- Mercury – waste rock 1, ore 32
- Lithium – waste rock 116, ore 622
- Nickel – waste rock 3 501, ore 5 003

Summary statistics from the resource block model and downhole assay data were closely examined and the median metal content was selected as a representative statistical value to use for emissions estimation. The individual sampling reports are too numerous to attach to this document and cannot reflect the resource block model, therefore a graphical summary of the metal sampling results is provided in the figures below (presented using the open air summary Plot function). The left panel plots all the data with key descriptive statistics (in ppm) and the right panel presents frequency plots, showing the distribution of the samples. The results from the resource block model are presented in **Figure 5.1** for arsenic, cadmium, copper, manganese, lead, zinc and silver. The results from the downhole assay data for other metals are shown in **Figure 5.2** for cobalt, chromium, iron, lithium and nickel.

Figure 5.1 Summary plot of the metal sampling results for resource block model (statistics shown in ppm)

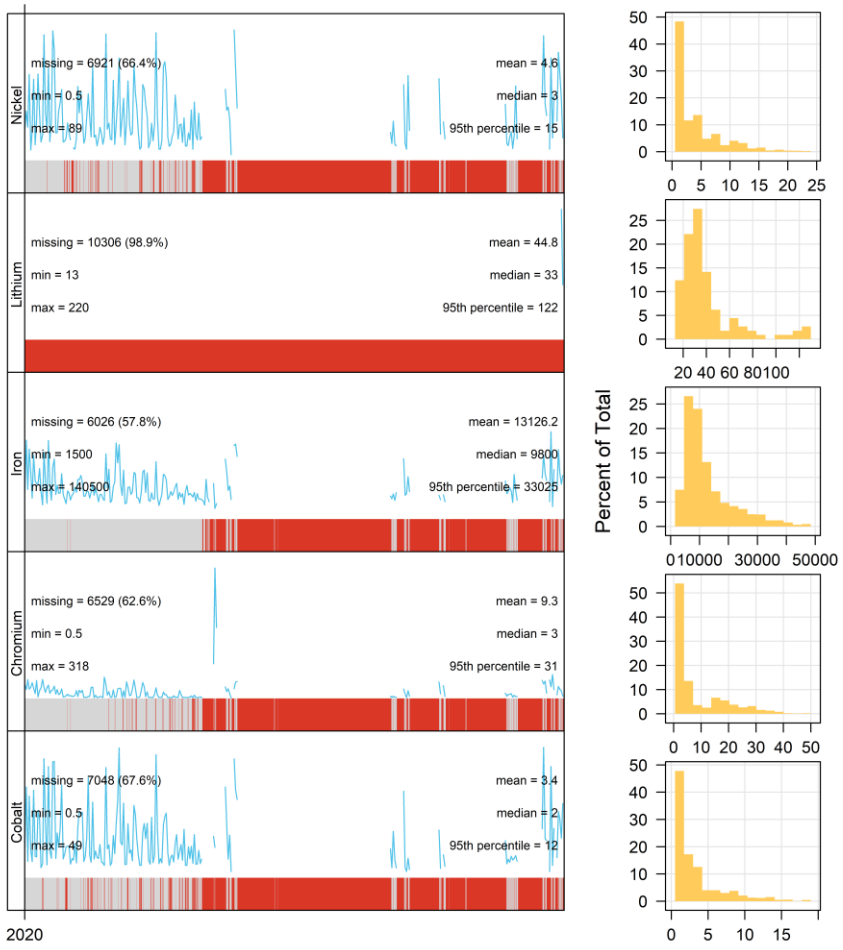


Waste Rock (resource block model)

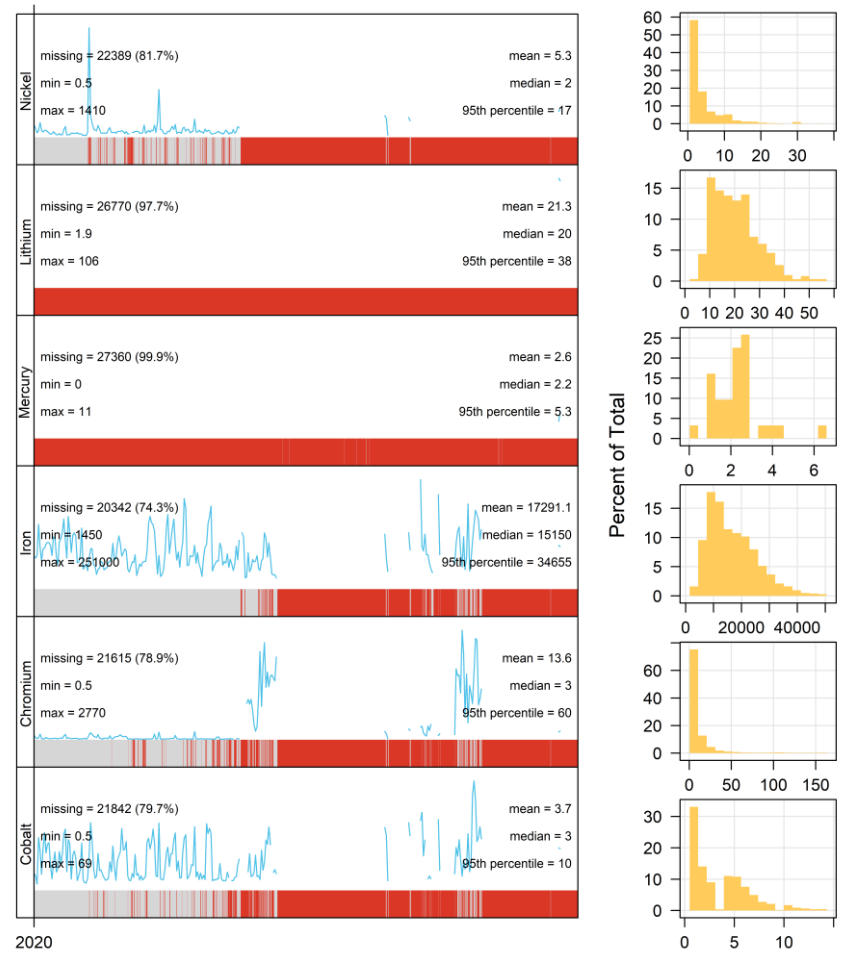


Ore (resource block model)

Figure 5.2 Summary plot of the metal sampling results for waste and ore downhole assay data (statistics shown in ppm)



Waste Rock (downhole assay data)



Ore (downhole assay data)

The resource block model provides an estimate of the entire volume of material that would be mined, whereas the downhole assay data are effectively point samples when compared to the mined volume. There are gaps, therefore, shown in **Figure 5.2** where samples were not assayed (shown by red blocks in the plot). For example, for Mercury[6] only one sample was recorded for waste rock (not shown on the plot) and only 32 samples recorded for ore (shown on the plot).

The descriptive statistics shown in **Figure 5.1** and **Figure 5.2** include the minimum, maximum, median and mean for each metal. The median (used for modelling) is lower than the mean for all metals and for both waste rock and ore (except mercury – for waste rock there was only 1 result, so the mean, median, minimum and maximum are all the same).

The frequency plots (right panel in **Figure 5.1** and **Figure 5.2**) show that, generally, the data displays a right skewed distribution (for elements with sufficient samples). For elements with very few samples (mercury, lithium), the distribution shown in the frequency plots is less meaningful.

The more skewed the distribution, the greater the difference between the median and mean and where outliers or a small number of high values can skew the mean, the median is considered a better representative of the central location of the data.

A statistical summary is also presented **Table 5.2** and **Table 5.3** using the same data as presented in **Figure 5.1** and **Figure 5.2**. For comparison, the values used for modelling (as presented in Table 6.3 of the AQA) are also shown. **Table 5.2** and **Table 5.3** show that the median value derived from the resource block model and downhole assay data reflects what was reported in Table 6.3 of the AQA, with the following exceptions.

- The values for copper and manganese differ to what was reported in Table 6.3 of the AQA, as the units were initially provided to Ramboll as ppm instead of %. It is clear from **Table 5.2** and **Table 5.3** that the ppm value reported in the AQA is the same numerical value as the % value reported from the resource block model and downhole assay data. The modelling results for copper and manganese have therefore been updated with the correct units for this report.
- The values for lead and zinc in **Table 5.2** and **Table 5.3** differ to what was reported in Table 6.3 of the AQA, but are the same as what was used for modelling (i.e. values in Table 6.3 of AQA were a typographical error and the correct values from the sampling were used for modelling). In both cases, the value used is lower.
- The values for silver in **Table 5.2** and **Table 5.3** differ to what was reported in Table 6.3 of the AQA. The AQA modelling was based on the resource estimate for ore reported in the Project Description (0.0069%), which is higher (more conservative) than the value from the resource block model (0.004%). The value measured for soil was used for modelling emissions from waste rock handling (0.000005%), which is lower than the value from the resource block model (0.0002%).

[6] The absence or barely detectable concentrations of Mercury has been substantiated from the measured weight percent within mineral species considered representative of the deposit.

Table 5.2
Summary statistics for metal content in waste rock

Element	As reported in AQA (Table 6.3)		Summary statistics from resource block model and downhole assay data (%)					
	ppm	%	Mean	Median	90th percentile	Maximum	Skewness	Kurtosis
Cobalt	2.0	0.0002	0.0003	0.0002	0.001	0.005	3.3	16.8
Chromium	3.0	0.0003	0.0009	0.0003	0.003	0.03	7.2	102.6
Iron	9 800	1.0	1.3	1.0	2.7	14.1	2.5	12.1
Mercury	7.0	0.0007	0.0007	0.0007	0.0007	0.0007	ID^	ID^
Lithium	33.0	0.003	0.004	0.003	0.01	0.02	9.3	2.9
Nickel	3.0	0.0003	0.0005	0.0003	0.001	0.009	3.6	26.3
Arsenic	42.0	0.004	0.010	0.004	0.027	0.010	3.7	20.5
Cadmium	1.0	0.0001	0.0003	0.0001	0.0009	0.0006	3.2	17.1
Copper	0.0008	0.0000001*	0.0009	0.0008*	0.002	0.007	2.4	11.5
Manganese	0.2	0.00002*	0.3	0.2*	0.9	3.2	2.3	6.4
Lead	-*	0.02*	0.03	0.01*	0.1	0.4	2.9	9.4
Zinc	-*	0.02	0.04	0.02	0.11	0.3	2.1	4.6
Silver	-*	0.000005*	0.0006	0.0002*	0.002	0.003	1.0	0.0

Note: * Elements where the median value derived from the resource block model and downhole assay data differ from was reported in Table 6.3 of the AQA
^ Insufficient Data for statistical analysis
# Concentration reported as a percentage only

Table 5.3
Summary statistics for metal content in ore

	As reported in AQA (Table 6.3)		Summary statistics from resource block model and downhole assay data					
Element	**ppm**	**%**	**Mean**	**Median**	**90th percentile**	**Maximum**	**Skewness**	**Kurtosis**
Cobalt	3.0	0.0003	0.0004	0.0003	0.001	0.007	4.5	54.0
Chromium	3.0	0.0003	0.0014	0.0003	0.003	0.3	34.9	9 1932.8
Iron	15 150	1.5	1.7	1.5	2.9	25.1	3.4	43.6
Mercury	2.2	0.0002	0.0003	0.0002	0.0004	0.001	3.1	11.9
Lithium	20.0	0.002	0.002	0.002	0.003	0.01	2.7	13.7
Nickel	2.0	0.0002	0.0005	0.0002	0.001	0.1	49.4	3 001.4
Arsenic	196.5	0.020	0.03	0.02	0.07	0.36	2.9	11.6
Cadmium	12.9	0.001	0.002	0.001	0.003	0.023	3.4	29.4
Copper	0.002	0.0000002*	0.002	0.002*	0.004	0.05	7.2	88.7
Manganese	0.6	0.00006*	0.7	0.6*	1.6	6.2	1.2	2.5
Lead	3 200	0.32*	0.25	0.21*	0.5	1.8	2.0	7.5
Zinc	4 400	0.44*	0.31	0.25*	0.6	2.5	1.8	5.9
Silver	69.1	0.0069*	0.005	0.004*	0.009	0.04	2.6	10.8

Note: * Elements where the median value derived from the resource block model and downhole assay data differ from was reported in Table 6.3 of the AQA

Worst Case Considerations

The relatively large values for skewness[7] and kurtosis[8] in **Table 5.2** and **Table 5.3** signal a skewed distribution and the presence of outliers, where the small number of comparatively high results misrepresent the centre of the data distribution. As the adopted value is applied across the entire site, the median is considered a better representation of the data.

It is also noted that the highest metal concentrations measured within each source group do not occur at the same depth or lateral extent, so there is no possibility that all areas of highest metal concentrations for each or any one source group would be exposed / the source of emissions at the same time. The modelling scenarios assume that all material extraction, handling and processing activities occur simultaneously across all active areas of the Mine Site for every hour of the modelled year. Therefore, using the maximum metal concentration for each source group or even from the higher percentiles of the monitoring data is an unrealistic representation of potential impact. Furthermore, it would not be possible to produce a conceptual model, on an hour-by-hour basis, that accounts for spatially and temporally varying concentrations of metals in the soil, waste and ore material. Rather, a reasonable worst-case modelling scenario is adopted through the following modelling assumptions.

- Maximum areas of disturbance are assumed every day of the year.
- All activities are assumed to occur at full intensity.
- Modelling is completed for every hour of the year and the worst-case outcome used as the result for assessment.
- Modelling results in the AQA are presented as the highest 1-hour average for the full year of modelling, whereas the 1-hour average criteria for metals are expressed as the 99.9th percentile (i.e. the 9th highest).

Notwithstanding this, a sensitivity analysis has been performed on the modelling results to demonstrate theoretical outcomes if the mean or the 90th percentile of the metal sampling results were used for scaling, instead of the median.

As discussed previously, the results presented in the AQA (Table 7.7) are the maximum 1-hour average for each metal, whereas the 1-hour average criteria for metals are expressed as the 99.9th percentile (i.e. the 9th highest). For the sensitivity analysis, modelling results are updated to the 99.9th percentile, for direct comparison with the impact assessment criteria. It is noted that the results for copper and manganese have also been updated using the correct units for the metal content (updated from ppm to %).

Comparing the value for the mean with what was used for modelling (the median) across each of the metals, the ratio (mean/median) for waste rock ranges between 1.0 for mercury to 131 for silver (indicating heavy skew for silver, as is evident in **Figure 5.1**). This indicates that the mean is less representative of the centre of the data distribution than the median. For ore, the ratio (mean/median) ranges between 0.8 for Silver to 4.5 for chromium[9].

[7] Skewness, in statistics, is the degree of asymmetry observed in a probability distribution. Distributions can exhibit right (positive) skewness or left (negative) skewness to varying degrees. A normal distribution (bell curve) exhibits zero skewness.

[8] Kurtosis is a statistical measure that defines how heavily the tails of a distribution differ from the tails of a normal distribution. In other words, kurtosis identifies whether the tails of a given distribution contain extreme values.

[9] It is noted that the scaling factor for silver does not represent a ratio of the measured mean/median from the resource block model, as is the case for all other metals. It is actually a ratio of the measured mean from the resource block model to the resource estimate for ore reported in the Project Description (0.0069%) and the value for soil applied to waste rock (0.000005%) (as described previously, the values adopted for modelling).

Comparing the value for the 90th percentile with what was used for modelling (the median) across each of the metals, the ratio (90th percentile/median) for waste rock ranges between 1.0 for mercury to 367 for silver. Similarly, for ore, the ratio (90th percentile/median) ranges between 1.3 for Silver to 8.9 for chromium.

Using the ratio of the mean to median and ratio of the 90th percentile to median, a sensitivity analysis has been performed on the modelling results by scaling each modelling result by this ratio. Whilst the ratio varies between waste rock and ore, the sensitivity analysis uses the highest scaling factor (across waste rock and ore) to scale the total modelling results (i.e. the scaling does not account for whether the source group represents waste rock, ore or soil handling). Therefore, the sensitivity analysis provides an overstated assessment of potential impacts, which is illustrated with the example of silver. The measured mean from the resource block model for ore is less than what was modelled, while the measured mean from the resource block model for waste rock is greater than what was modelled. The scaled result presented in **Table 5.4** for silver uses the higher scaling factor for waste rock (131) and applies this to the total concentration predicted from all activities, even though scaling factor for ore is actually less than 1 (0.8) and would lower emissions if the mean had been used.

The original modelling results (99.9th percentile) and scaled modelling results are presented in **Table 5.4**, also expressed as a percentage of the relevant impact assessment criterion. The analysis shows that, regardless of whether the median, mean or 90th percentile of the metal contents is used, the predicted concentrations are below the impact assessment criteria for all metals at all times.

Therefore, notwithstanding the fact that the median is considered the most appropriate value to represent the received metal concentrations, the ability to achieve compliance with the applicable criteria is not sensitive to the source material's metal concentration. As a result, the proposed management and mitigation practices, which focus upon reducing overall dust emissions rather than specific management of materials that have elevated metal concentrations, remain the most effective for minimisation of metal concentrations at surrounding receivers.

Additional Comments

Finally, it is noted that the row headings for PM_{10} and $PM_{2.5}$ were incorrectly reversed in Table 7.7 of the AQA; that is, for each metal the first row of results is for PM_{10}, not $PM_{2.5}$ as labelled, and as expected PM_{10} concentrations are higher than $PM_{2.5}$ concentrations. This is a relatively minor clarification as compliance against the criteria for metals assessed against the modelling predictions were presented for the TSP size fraction. In summary, a response to each of the EPA's request is provided in **Table 5.5**.

Table 5.4
Predicted 1-hour Average Metal Concentration

Element	Impact assessment criteria (µg/m^3)	99.9th percentile 1-hour average* using median metal content		Scaled 99.9th percentile 1-hour average using mean metal content			Scaled 99.9th percentile 1-hour average using 90th percentile metal content		
		Concentration (µg/m^3)	% of impact assessment criteria	Maximum scaling factor	Concentration (µg/m^3)	% of impact assessment criteria	Maximum scaling factor	Concentration (µg/m^3)	% of impact assessment criteria
Silver	1.8	0.003	0.1	131	0.35	19.5%	367	0.91	50.6
Lead*	0.5	0.001	0.3	3.7	0.005	1.1%	10.6	0.02	4.0
Arsenic	0.09	0.01	10.4	2.4	0.02	25.0%	6.4	0.06	66.7
Cadmium	0.018	0.001	3.0	3.5	0.002	10.5%	9.7	0.006	31.4
Copper	18	0.001	0.01	1.2	0.002	0.01%	2.1	0.003	0.02
Manganese	18	0.334	1.9	2.2	0.74	4.1%	5.6	1.9	10.4
Zinc	18	0.107	0.6	2.1	0.22	1.2%	5.7	0.8	4.4
Cobalt	18^	0.0003	0.002	1.7	0.0006	0.003%	4.5	0.002	0.01
Chromium	9	0.003	0.03	4.5	0.01	0.13%	8.9	0.02	0.3
Iron	18^	1.59	8.8	1.3	2.1	11.5%	2.7	4.3	23.9
Mercury	0.18	0.0003	0.2	1.2	0.0004	0.23%	1.7	0.0006	0.3
Lithium	18^	0.003	0.02	1.4	0.005	0.03%	2.4	0.01	0.04
Nickel	0.18	0.0004	0.25	2.6	0.001	0.65%	5.5	0.003	1.4

Note: * Modelling results for lead are presented as an annual average. All other metals presented as 99.9th percentile 1-hour average.

^ There are no criteria for these metals therefore modelling predictions for these metals are compared against the impact assessment criteria for copper, manganese, zinc (18ug/m^3), which are considered to be of a higher or equivalent toxicity as those metals without an impact assessment criterion.

Table 5.5
Summary of Response to EPA's Request Regarding Metal Emissions

EPA request	Response
a) Revises the AQIA to transparently justify assumed and adopted input variables used to calculate expected metals emissions	A summary of the methodology for estimating emissions of metals and the approach used for modelling is provided, including a transparent summary of all data used for estimating the metal contents for waste rock and ore.
b) Revises the AQIA to ensure waste rock, ore and soils composition used for modelling is representative of worst-case metal concentrations	Additional information is provided to justify the selection of the median as the best measure of central tendency for the dataset, due to the skewed nature of the distribution. Notwithstanding, sensitivity analysis was presented to show that, using the higher mean or even the 90th percentile value, compliance with impact assessment criteria would be achieved. Notwithstanding, it is considered inappropriate to use a higher statistical value to estimate emissions for modelling, based on the skewed nature of the distribution, as the value is applied to all activities across the entire mine site. It is noted that the AQA already provides a worst-case assessment for many reasons, i.e.: • maximum areas of disturbance are assumed every day of the year; • all activities are assumed to occur at full intensity for every hour of the year; and • results for metals are reported as the 100th percentile instead of the 99.9th percentile.
c) Provides a detailed data distribution analysis to justify the selected metal concentrations for the calculation of expected emissions.	Summary plots are provided for each metal, for both ore and waste rock. The summary plots show each measurement and the distribution of the samples.
d) Presents the metal sampling reports as well as a summary table showing the sampling location, the number of samples and the minimum, average, median and maximum concentration for each metal for each material type	There would be too many sampling reports to attach to this report, however, a summary plot of all measurements is provided as well as detailed statistical summaries, showing the minimum, mean, median and maximum concentration for each metal for ore and waste rock.
e) Revise the AQIA to include the assessment of all expected metal concentrations	Although the NSW EPA do not prescribe impact assessment criteria for cobalt, iron and lithium, they nevertheless requested that these pollutants are assessed against criteria used by other jurisdictions. There are no appropriate criteria for any other jurisdiction in Australia, therefore, we have compared modelling predictions for these metals against the impact assessment criteria for copper, manganese, zinc, all of which have an impact assessment criteria of 18ug/m$^{3.}$ These metals are of a higher or equivalent toxicity as those metals without an impact assessment criteria.

Representative Comment(s)

The monitoring of metals and arsenic in dust needs to be performed more reliably as the currently available data is not at sufficiently low detection limits to compare against international metal dust guidelines.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

The international metal dust guidelines referenced in this submission are taken from a document downloaded from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. These guidelines have not been adopted by any Australian or NSW agencies and are not considered applicable to this assessment.

Notwithstanding, the HHRA considers the background level of metals within dust and people's exposure to this dust, including via ingestion and dermal contact with dust depositing onto topsoil, in household dust or onto roofs where it may then be washed into rainwater tanks, deposition affecting homegrown produce that is then ingested. The HHRA then adds the predicted increase in metal exposures due to the Project and compares this cumulative exposure to applicable health standards. Therefore, in the event that the detection limit for existing metal concentrations in dust results in higher background levels than are present in practice, this provides a conservative assessment with less 'buffer' remaining to the applicable health standards.

Representative Comment(s)

The EIS should include total projections of dust deposition (in µg/m2/day) for trace elements of concern, primarily lead inside and outside of homes. The evidence shows that lead in deposited dust, rather than soil, is the most reliable predictor for blood lead in children, which arises predominantly via ingestion (e.g. Sydney city: Gulson et al. (2014); Mount Isa: Noller et al. (2017); Broken Hill: Dong et al. (2020)).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The AQA reports deposited dust and corresponding metal concentrations at locations that correspond to residences. There is no reliable method to predict how much of this dust would enter a residence, however, it can reasonably be expected that the rate of dust deposition within residences would be substantially lower. Therefore, application of the external deposited dust rate is not only more robust but also a more conservative approach.

The HHRA then considers multiple exposure pathways including both ingestion and dermal contact with dust depositing onto topsoil, in household dust or onto roofs where it may then be washed into rainwater tanks, deposition affecting homegrown produce that is then ingested, as well as inhalation of suspended particulates.

5.5.6 Emission Estimates and Assumptions

Representative Comment(s)

The EIS does not use concentrate or mine ore materials as a source of dust and it doesn't analyse the effect of peak wind events on dust movements.

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

The EIS…fails to take into account community dust exposure levels from stockpiles, ore grinding and handling, concentrate plant and tailings facilities.

Clare Hamilton of Rylstone, NSW (Submission SE-8628154)

This assessment has also only evaluated those metals and arsenic modelled in the Air Quality Assessment based on elemental analysis of the ore to be mined; it does not include oxide ore, concentrates and tailings.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

The EIS underestimates community exposure levels because it doesn't use concentrate, mine ore materials including stockpiled oxide material and tailings as sources of dust and also does not analyse the effect of peak wind events biannually with change of seasons on dust movements – this omission is required to enable independent validation of community exposure. More effort is needed to examine community exposure to lead from mined materials by taking drill core samples and tailings from pilot trials.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Emissions of dust were estimated for all activities as described in Section 4.4.2.4 of the EIS and in detail in the emissions inventory that is included as Annexure 4 of the updated AQA. Each activity was assigned a source group of either soil, waste rock or ore, with a different metal content applied for each source group based on extensive sample analysis for each group. Dust from blasting, loading, transport, crushing, screening, handling and stockpiling of ore has been included in the emissions assessed. Dust emissions from concentrate are not considered as the concentrate is in liquid form. Whilst tailings would be wet when discharged to the tailing storage facility, provision has been made for wind erosion from the surface of the tailing storage facility, with the area increasing over time as the facility is progressively filled.

As discussed in Section 5.5.3 of this document, for the purposes of dispersion modelling, meteorological modelling was undertaken which creates a spatially varying wind field for each hour of the simulation. This methodology is in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016) and provides for varying wind speeds and direction.

In relation to obtaining data from drilling, Section 5.5.5 of this document provides a detailed summary and statistical analysis of the thousands of samples and analyses completed for ore and waste rock collected during exploration drilling.

Representative Comment(s)

The information needed to assess dust transmission to the village is quite hidden or excluded and insufficient to validate the conclusion drawn in the EIS that people living in Lue village will not be affected – consequently more data is required to enable independent validation of community exposure.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Information regarding the dust emissions, modelling and other data and assumptions is provided within the AQA and is assessed through both the AQA and HHRA. The EIS only provides a summary of these assessments and should be read in conjunction with the specialist reports. In relation to independent validation, both the AQA and HHRA were independently peer-reviewed. A copy of those peer-reviews is attached to the respective reports.

5.5.7 Emission Reduction Factors

Representative Comment(s)

Some of the air quality *controls have been applied as a reduction factor (see table below) in the calculation of the emissions inventories for each scenario.*

Control	Emission reduction factor (%)	Reference stated in the AQIA
Surface watering for hauling operations	**90**	Australian Coal Association Research Program (ACARP) project C20023 (Cox & Laing, 2014)
Surface stabilisation	**95-99**	NSW Coal Mining Benchmarking Study: International Best Practice Measures to prevent and/or Minimise Emissions of Particulate Matter from Coal Mining, Katestone Environmental Pty Ltd, June 2011
Minimising drop heights	**30**	**No reference is provided.**
Enclosure of dump hopper	**70**	**No reference is provided.**
Water sprays during crushing and screening operations	**50**	**No reference is provided.**

It is the EPA's understanding that ACARP C20023 has not been peer reviewed and these emissions reduction factors are not endorsed under the NPI framework.

Given that some of the adopted reduction factors have not been peer-reviewed or are outdated, the use of these emission reduction factors adds uncertainty to the results and conclusions presented in the assessment.

EPA Request:

a). The AQIA needs to be revised to include an additional modelling scenario which adopts alternate emission reduction factors for hauling operations and surface stabilisation from published peer reviewed documents.

NSW Environment Protection Authority

Response

Hauling

The emissions inventory assumes a control efficiency for hauling of 80%, as documented in Table A4-3 of the AQA. Although reference is made to the ACARP study (Cox and Laing, 2014), other peer-reviewed literature demonstrates that >80% control can be achieved through watering, provided the moisture content of the surface is maintained at a certain level.

Typically, modelling assessments for mining operations assume a minimum control efficiency of 75%, based on control using 'Level 2 watering' defined as >2 litres per m^2 per hour in the NPI Emission Estimation Technique Manual for Mining. This application rate is not an upper limit and is calculated from the equation provided in (Buonicore & Davis, 1992), as follows.

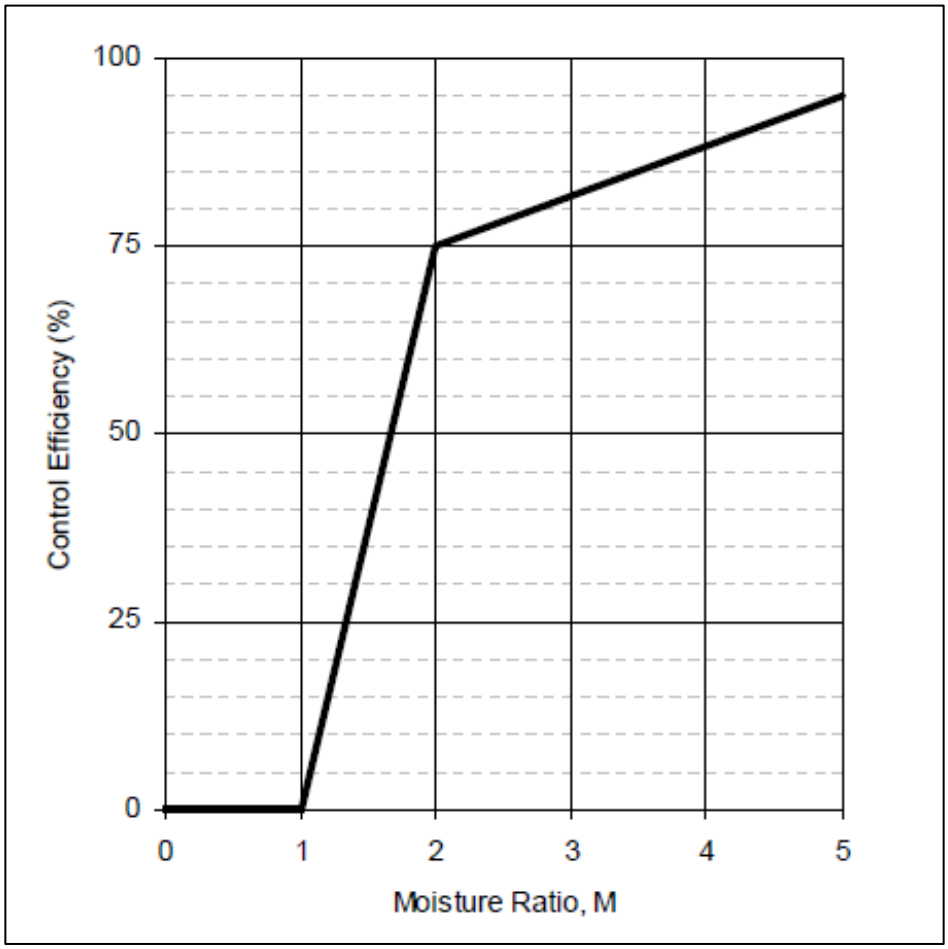
$$C = 100 - \frac{0.8pdt}{i}$$

Where:
C = average control efficiency (%);
p = potential average hourly daytime evaporation rate, millimetres per hour (mm/hr);
d = average hourly daytime traffic (h-1);
i = application intensity (litres per square metre); and
t = time between applications.

The 75% control for Level 2 watering is based on arbitrary input data, including an assumption of high summertime evaporation (2mm/hr) and 30 truck movements per hour. Using the same assumptions, a control efficiency of 80% can be achieved by increasing the application rate to >2.5 litres per m^2 per hour. The achievement of 80% control from watering is supported in US EPA (1985), which plots the relationship between watering control efficiency and moisture ratio (defined as the ratio of moisture content for watered and unwatered roads). As shown in **Figure 5.3**, 80% control can be achieved if the moisture ratio is maintained between 2 and 3.

Finally, it is noted that in 2012/2013 the NSW EPA developed a series of pollution reduction programmes (PRPs) for coal mines, referred to as the "Dust Stop" PRPs, and issued guidelines for best management practice (BMP) determinations for operating coal mines. The dust stop PRPs included wheel-generated dust, and required operating coal mines in NSW to achieve and maintain a dust control efficiency of 80% or more on its haul roads and required the licensee to prepare a Monitoring Program to assess compliance with this condition. This indicates that the EPA accepts that 80% control is achievable for wheel-generated dust on haul roads and in responding to these PRPs, mining operations have demonstrated that it is achievable.

Figure 5.3 Watering control effectiveness for unpaved travel surfaces (US EPA, 1985)



In summary, Bowdens Silver commits to achieving 80% control of wheel generated dust on haul roads, primarily through watering and, if required, additional surface treatments. No additional modelling for alternative emission reduction factors is therefore proposed.

Performance indicators used to demonstrate the effectiveness of haul road watering would be documented in the Air Quality Management Plan. The ability of the Mine Site to achieve an effective level of control (i.e. 80% or higher) may be evaluated as follows.

- Daily visual assessment of haulage to ensure that wheel generated dust does not extend higher than the wheel rim (consistent with the 2019 EPA *Dust Assessment Handbook*).
- Daily visual assessment of road condition to confirm that maintenance requirements are not causing the generation of dust (i.e. the presence of pot holes).
- Role-specific training of staff (recorded in personnel profiles) to educate them of what is or is not acceptable.
- Real-time air quality monitoring results would demonstrate if off-site dust impacts are not occurring. Triggers for management would be built into the monitor to provide advance warning of the need for additional management.

Should there be numerous substantiated complaints received that relate to wheel-generated dust, a program of monitoring would be commissioned and involve testing the moisture ratio of the road surface to ensure it is maintained between 2 and 3 (as presented on **Figure 5.3**) or locating monitors at sensitive locations to directly monitor dust being generated.

The Air Quality Management Plan would also document the triggers and response to be applied when performance indicators for wheel generated dust are not met. For example, if dust is seen to extend higher than the truck wheel rim or the moisture ratio is too low, the rate or frequency of water application may be increased, particularly on haulage routes that are close to the site boundary and sensitive receptors. If increasing the rate or frequency of water application does not fully address the issue, or if air quality monitoring results indicate that off-site impacts are occurring, additional surface treatments would be applied.

Surface Stabilisation

The emissions inventory assumes a control efficiency of 95% for soil stockpiles and 99% for rehabilitated areas, based on the reported reductions in Katestone (2011). The EPA notes that the latest version of the NPI Emission Estimation Technique Manual for Mining, published following Katestone (2011) reports a control efficiency of 90% for rehabilitated land. However, for this assessment, the rehabilitated areas are considered to be fully rehabilitated (which is given a 100% control efficiency in the NPI Emission Estimation Technique Manual for Mining). A summary of the areas assumed for wind erosion is presented in **Table 5.6**. It is important to note that the rehabilitated area in Year 1 (SE&CS) is zero, but from Year 3 onwards, it is assumed that the rehabilitated areas are fully vegetated, hence the assumed 99% control. The 95% control factor applied to soil stockpiles, including from Year 1, is considered appropriate given the rapid establishment of vegetative cover on soil stockpiles due to both the soil seedbank and requirements to stabilise soil against water and wind erosion.

Notwithstanding the appropriateness of the control factors, it is noted that the exposed areas that have a control applied for surface stabilisation represent between 21% (Year 1) and 40% (Year 9) of the total exposed areas modelled. As a percentage of total emissions, the areas that have a control applied for surface stabilisation represent 0.2% of total emissions. If the control efficiency for soil stockpiles and rehabilitated areas was reduced to 90%, this would increase to ~1% of total

emissions. Therefore, even if the control factors are disputed, based on this relatively small percentage of total emissions, no additional modelling for alternative emission reduction factors is considered necessary.

Table 5.6
Summary of wind erosion areas included in the AQA

Source	Year 1 (ha)	Year 3 (ha)	Year 8 (ha)	Year 9 (ha)
Pre-strip	32.6	6.4	6.4	6.4
Active open cut pit	10.4	23.3	32.3	44.3
WRE - Active areas	10.2	24.2	23.7	23.6
TSF embankment	17.6	17.6	17.6	0.0
TSF surface	95.0	25.0	35.0	45.0
NAF stockpiles	3.4	3.4	3.4	0.0
Southern barrier	3.8	16.4	16.4	16.4
ROM stockpile	3.6	3.6	3.6	3.6
Crushed ore stockpile	0.0	2.0	2.0	2.0
Low grade ore stockpile	4.9	4.9	17.3	17.3
Oxide ore stockpiles	1.5	5.2	5.4	5.4
Soil stockpiles (95% control factor)	49.0	4.2	8.3	3.7
Rehabilitated area (99% control factor)	0.0	73.0	81.0	107.0
Total area of wind erosion	**232.0**	**209.2**	**252.4**	**274.7**
Exposed area that is controlled through surface stabilisation	**21%**	**37%**	**35%**	**40%**

Despite the total emission outcomes not being sensitive to the control efficiencies applied for rehabilitated areas, it is noted that rehabilitation progress as indicated in **Table 5.6** is consistent with the rehabilitation progression specified within the EIS and therefore the proposed progress is considered a reasonable estimate of what would occur in practice. Furthermore, prior to commencement of operations, a Mining Operations Plan / Rehabilitation Management Plan and Forward Plan would need to be prepared. These documents specify both the progression of rehabilitation (consistent with the EIS) and performance indicators / completion criteria against which the success of rehabilitation is to be measured and progress reported annually. The required rehabilitation works must also be costed through a Rehabilitation Cost Estimate and this cost secured through a bank guarantee in favour of the NSW Government. As such, there can be high confidence that progressive rehabilitation would be undertaken and completed to the required standard.

5.5.8 Air Quality Controls

Representative Comment(s)

It is stated in the Air Quality Assessment *that a Best Management Practice (BMP) determination has been undertaken, however, it is still unclear if all practicable means to minimise air emissions from the premises are being implemented as required under section 128(2) of the Protection of the Environment Operations Act, 1997. Identifying all significant controls that could be implemented to reduce potential emissions or any future impacts from the proposed operations (once operational) will help minimise the likelihood of adverse air quality impacts due to the operation.*

EPA Requests:

a) The proponent confirms the viability of the adopted level of controls (i.e. sufficient water is available) to reduce expected emissions.

b) The proponent should confirm whether or not there are any additional practicable mitigation controls or measures that could be implemented to minimise air emissions or reduce any future impacts once operational.

NSW Environment Protection Authority

Response

Water Availability for Dust Suppression

A detailed site water balance is presented in the EIS and Section 5 of the Surface Water Assessment which outlines the various water demands for the Project. The water balance has been modelled using GoldSim which provides a varying daily timestep for rainfall / meteorological and site conditions throughout the life of the Project. The most significant water requirement for dust suppression is application of water to haul roads. A varying watered road area is provided for each year of operations within the water balance. These areas exceed the area of roads for which dust suppression has been provided for within the Air Quality Assessment emissions inventory (using a 10m wide application area). As such the water balance allows for greater volumes of water for dust suppression than is assumed in the Air Quality Assessment.

Application of Best Practice Measures

A best management practice (BMP) determination for the Project is presented in Appendix 4 of the AQA, based on the NSW EPA's Benchmarking Study (Katestone, 2011). Table A4-3 outlines the BMP relevant to each activity for the Project and lists the measures that are considered reasonable and feasible for implementation on the Project.

In determining what controls are reasonable and feasible for the BMP determination, reference is made to EPA Victoria (2013), which states that:

> *"Decisions with regard to practicability, when assessing best practice, should have regard to technical, logistical and financial considerations and be proportional to the environmental risk".*

This definition is supported by NSW EPA (2014), who cite Taralga Landscape Guardians Inc. vs. Minister for Planning and RES Southern Cross Pty Ltd (2007) NSWLEC 59 for an appropriate definition of what is reasonable and feasible, as follows.

> *"Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements".*

Some examples of how the potential controls are determined to be reasonable/feasible in the BMP determination are as follows.

- For wheel-generated dust, Katestone (2011) lists a potential management practice as replacement of hauling with conveyors. For open cut mine sites, however, this is not practical from an engineering point of view, due to the constantly changing footprint of the site.

- For wind erosion from exposed areas, the application of water sprays is generally not practical across large areas of a waste rock emplacement but may be practical across a ROM pad and product stockpile area. However, taking into account the mitigation benefit from watering stockpiles, which represent only 3% of total emissions, this management practice was not proposed from a cost/benefit perspective, while also taking into account water availability at the site.

Following review of the Project and proposed controls, it has been concluded that air quality would be managed and potential impacts mitigated to the extent considered reasonable and feasible. Ongoing air quality monitoring would demonstrate the performance of these measures throughout the life of the Project.

Whilst all reasonable and feasible measures have been adopted within the AQA, management of air quality would remain adaptive with best practice measures revisited and augmented (as required) and documented within the Air Quality Management Plan that would be prepared for the Project and reviewed regularly (at least annually as part of the Annual Review process) throughout the life of the Project in consultation with the EPA and DPIE.

Representative Comment(s)

The AQIA for the proposed Bowdens Silver Project does not provide a detailed discussion of the methodology used to calculate the emissions inventories for any of the four modelling scenarios.

Consequently, there is a lack of clarity regarding the calculated emissions and therefore the results and conclusions presented in the AQIA cannot be verified.

EPA Request:

The AQIA be revised to include a detailed emissions inventory for each modelling scenario and transparently justify all assumed and adopted input variables. Emissions calculations should be checked and confirmed addressing as a minimum the issues a-d raised in the comments section above.

NSW Environment Protection Authority

Response

The detailed emissions inventories were inadvertently not attached to the final Air Quality Assessment. The inventories are provided in Annexure 4 of the updated AQA provided with this document. It should be noted that the information provides the detailed assumptions used for predictive modelling and demonstrate the detailed assessment undertaken by Ramboll Australia on behalf of Bowdens Silver.

5.5.9 24-hour PM_{10} Concentrations

Representative Comment(s)

The largest predicted cumulative impact (predicted project related emissions plus background levels) is 48.1 µg/m3 at Receptor R4. Failing to achieve in practice the proposed high levels of emissions control stated in the AQIA will increase the risk of adverse air quality impacts.

NSW Environment Protection Authority

Response

As noted above, the proposed emission controls are considered achievable, including an 80% control for watering (not the 90% control inadvertently assumed in EPA's submission). Bowdens Silver is committed to achieving the proposed levels of control and would develop an Air Quality Management Plan for review and approval by the Department. The management plan would outline how the Project's performance on emissions control would be measured and assessed through performance measures.

It is also noted that on the day of the highest cumulative impact (48.1µg/m^3 at Receptor R4) the Project contribution is only 11.6µg/m^3 with the background being the dominant contributor to the cumulative impact. When reviewing Project only contributions, only one receiver would experience a contribution >10µg/m^3 during the Site Establishment and Construction Stage and Year 3 scenarios, three during the Year 8 scenario and four receivers during the Year 9 scenario. For all other receivers, the Project contribution remains less than and generally well below 10µg/m^3. Therefore, the risk of adverse air quality impacts is considered to be low.

5.5.10 Larger Particle Assessment

Representative Comment(s)

The assessment does not appear to include particles >10 micron up to <250 micron that can be ingested, and are the most common size range found with mining operations including this Project.

All materials produced in the mining and mineral processing of the Project need to have measured particle size distributions. This data can then be related to likely exposure pathways for health risk assessment.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

As described in Section 2.3 of the AQA, emissions were assessed for three particle size metrics including "total suspended particulate matter" (TSP), PM_{10} and $PM_{2.5}$. TSP typically refers to particulate matter (PM) smaller than 30 to 50 micrometres (µm) in diameter. Particles larger than this would not remain suspended long enough to be considered air pollutants (from an inhalation exposure pathway point of view). Furthermore, any particles >50µm would invariably deposit in close proximity to the emitting source and would not contribute substantially to deposited dust beyond the Mine Site.

The ingestion of particles and the associated metal content, has been considered within the HHRA, based on the modelled deposition of particles via multiple exposure pathways including ingestion and dermal contact from soil, dust and drinking water in tanks affected by the deposition of dust as well as the ingestion of food affected by the deposition of dust.

In relation to particle size distributions, the key data for the HHRA are the particle sizes that can disperse from the Mine Site, i.e. TSP, PM_{10} and $PM_{2.5}$. The particle size distributions used to estimate emissions of TSP, PM_{10} and $PM_{2.5}$ were taken from the literature, principally the US EPA AP-42 emission factor documentation for mining and material handling (US EPA 1995). It is noted that particle size distributions and emission factors are also published by the Australian

Government for their National Pollution Inventory (NPI) (e.g. NPI 2011). However, the NPI emission factors are largely based on the AP-42 documentation and the use of the AP-42 emission factors for fugitive dust emission inventories is therefore accepted by the NSW EPA for use in NSW.

The particle size distributions (PSD) are not correlated with the type of material handled (ore or waste rock) for the majority of sources in the inventory. The PSD is more strongly influenced by the type of activity, with sources that have a grinding action, such as bulldozers ripping waste rock, producing a higher proportion of particles in the finer size fraction than other sources. For example, fine particles ($PM_{2.5}$) comprise approximately 11% of TSP for bulldozers, approximately 8% for crushing and approximately 4% for wheel generated dust.

5.5.11 Odour

Representative Comment(s)

We will smell the odour of the Tailings Storage Facility from our property (N°91).

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

The tailings would have no odour as it composed primarily of crushed rock and there would be no substances used in processing of the ore that would create any off-site odour issues.

5.5.12 Hydrogen Cyanide

Representative Comment(s)

On the basis of the above, there are no health risk issues of concern in relation to community exposures to hydrogen cyanide derived from Project operations.

More data is needed on the estimated Hydrogen cyanide (HCN) gas level for the Project to confirm calculated values from a reported 1% of total loss through volatilisation within processing areas of gold operations.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

The use of sodium cyanide in mineral processing is a common and well understood practice. The concentrations of cyanide used for the Project would be significantly lower than other existing and approved mining operations in NSW such as the Tomingley Gold Mine and Hera Gold Mine, which have not reported unexpected levels of Hydrogen Cyanide gas levels. Therefore, cyanide use has been concluded to be a low-risk activity for the Project.

Notwithstanding, the Project would operate under an approved Cyanide Management Plan, which would include requirements for sodium cyanide monitoring from the Project. Section 5.9 of this document provides more detail on the proposed management of cyanide for the Project.

It is predicted that there would be no exceedance of the impact assessment criteria at any receivers (Project-related or private) for HCN.

5.5.13 Respirable Crystalline Silica

Representative Comment(s)

Dispersion of respirable crystalline silica (as $PM_{2.5}$ annual average) derived from Project operations will require regular monitoring to ensure that appropriate levels are met in the community based on 3 $\mu g/m^3$ now applied in Victoria.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Bowdens Silver is committed to ongoing air quality monitoring. The Air Quality Management Plan developed for the Project in consultation with the EPA and DPIE would incorporate a range of monitoring commitments, the results of which would demonstrate achievement of predicted air quality impacts. The Air Quality Management Plan would outline how the performance of the Project would be monitored and how compliance assessed for all key pollutants. Given the low levels of predicted risk related to respirable crystalline silica within the community surrounding the Mine Site, specific monitoring of respirable crystalline silica beyond the Mine Site is not proposed.

Bowdens Silver recognises that management of respirable crystalline silica would be required for its workforce and would involve a program of on-site monitoring consistent with industry standards.

It is predicted that there would be no exceedance of the impact assessment criteria at any receivers (Project-related or private) for respirable crystalline silica.

5.5.14 NO_2 Emissions from Blasting

Representative Comment(s)

The AQIA does not assess the potential impacts of gaseous pollutants from blasting activities. NO_2 emissions for blasting were not assessed.

EPA Request:

a). The AQIA is revised to include potential impacts from all expected air pollutants from blasting operations. In addition, modelling should be used to investigate and propose conditions for blasting in order to minimise potential impacts.

NSW Environment Protection Authority

Response

In order to assess the received concentration of NOx, emission modelling would be required. Dispersion models, such as used for the AQA, are intended to model and assess routine operations, where the operational conditions and intensity of the operation are well understood and defined. When adverse impacts occur from blast fume, it is a result of an upset condition (i.e. something has gone wrong) analogous to an explosion or emergency release. As such, there are limitations in utilising dispersion models for blast fume modelling, including the following.

- Emissions from blasting are effectively generated instantaneously, and dispersion is likely to be sub-hourly, whereas dispersion modelling can generally only model in hourly timesteps for hourly averaged emissions.

- Blast fume is only generated under sub-optimal conditions, therefore worst-case emissions are estimated and then modelled for every hour that blasting may occur and for every day of the year. Blasts would only occur once a day and not on every day, therefore modelling assessments can significantly overstate potential impacts.
- CALPUFF has plume memory, meaning the predicted concentrations from the previous hour can be added to the predicted concentrations for the subsequent hour, which can again overstate potential impacts (as blasts would not occur on consecutive hours).
- In order to assess the impacts of NOx from blast fume, it is necessary to deal with the atmospheric transformation of NOx to NO_2, which requires background concentrations of ozone and NO_2. For this project, the closest available background data would be over 100km away in the Hunter Valley, which would add uncertainty in any predictions.

Therefore, the AQA dispersion model would be unable to appropriately model and assess blast fume. Notwithstanding, as outlined in Section 2.5 of the AQA, assessment of blast fume was not undertaken given that it has been demonstrated within the industry that adoption of measures outlined in the Code of Practice effectively controls blast fume. As a result, it is considered that modelling of NOx concentrations would not provide value to the assessment.

However, it is not disputed that impacts from blast fume may potentially occur under sub-optimal conditions and appropriate blast management practices are required to prevent these conditions occurring. The blast management practices and blast fume prevention measures that would be implemented for the Project include the following.

- Best practice blast design and drill and blast practice in accordance with Australian Standard AS 2187.2 2006 'Storage and Use of Explosives.
- Ensure all drill and blast crew are adequately trained.
- Ensure that the manufacturer and supplier of explosives have appropriate quality control systems to ensure formulation specifications are met, in particular, explosive type and optimum fuel content for damp/wet holes.
- Review geological conditions in the formulation of blast designs.
- Review ground conditions (e.g. presence of clay or loose/broken ground).
- Minimise the time between drilling and loading, and loading and firing the shot (i.e. ignition of the blast).
- Ensuring shot sleep times (i.e. duration explosives remain within the holes prior to blasting) are within the technical guidelines of the bulk explosive.

Prior to each blast, a pre-blast assessment would be undertaken to ensure meteorological conditions are suitable and to determine/review the blast exclusion zone and fume management zone.

While the EPA has suggested modelling should be used to investigate and propose conditions for blasting, any outcomes from modelling would directly reflect the input meteorological conditions, i.e. the highest impacts would be predicted under low wind speeds, stable atmospheric conditions and low mixing heights. A review of meteorological conditions by hour of the day is therefore provided to inform suitable blasting hours.

Wind roses by hour of the day are presented in **Figure 5.4**, while **Figure 5.5** and **Figure 5.6** show diurnal mixing height atmospheric stability. Between the hours of 4:00pm and 6:00am, the dominant wind direction is blowing from the Mine Site towards Lue and the wind speed is low (generally below 2m/s). There is a shift in wind direction from about 7:00am and wind speeds also increase to above 3m/s. Between 8:00am and 4:00pm, the mixing heights remain above 500m and the atmosphere is unstable, thereby promoting mixing in the atmosphere and aiding the dispersion of particulates in the air.

In summary, based on the analysis of meteorology, conditions between 8:00am and 4:00pm would be ideal for blasting with limited potential for suboptimal conditions. Notably, blasting is proposed to occur between 10:00am and 4:00pm and is therefore very unlikely to occur during meteorological conditions that would exacerbate impacts from blast fume.

Figure 5.4 Wind roses for Lue01 by hour of the day

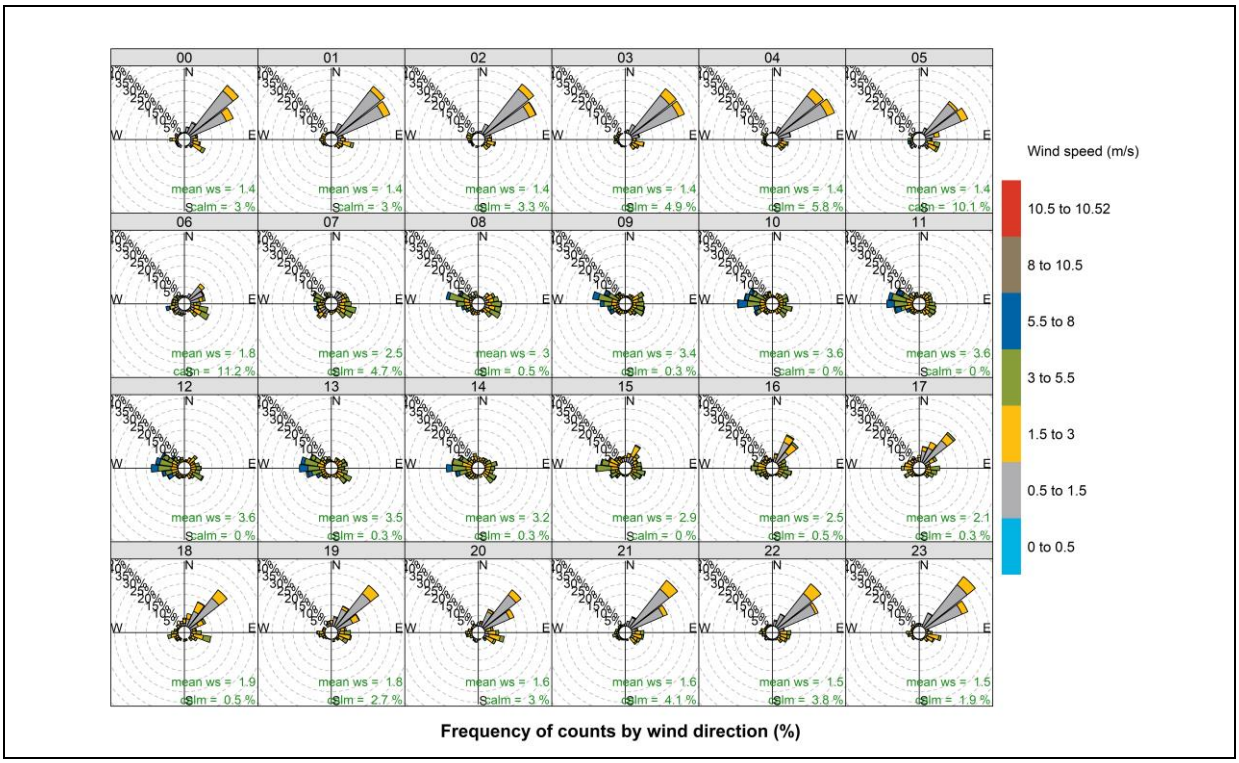


Figure 5.5 Mixing height by hour of the day

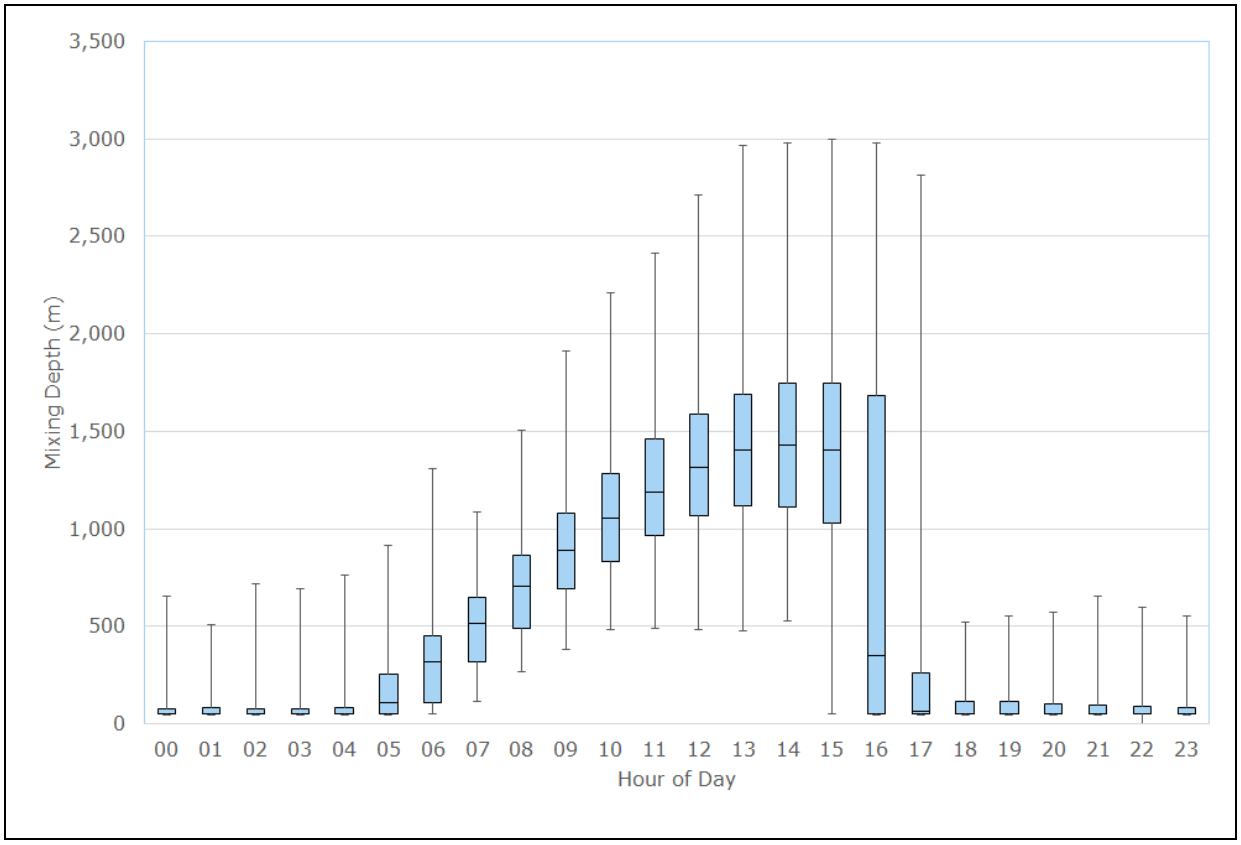
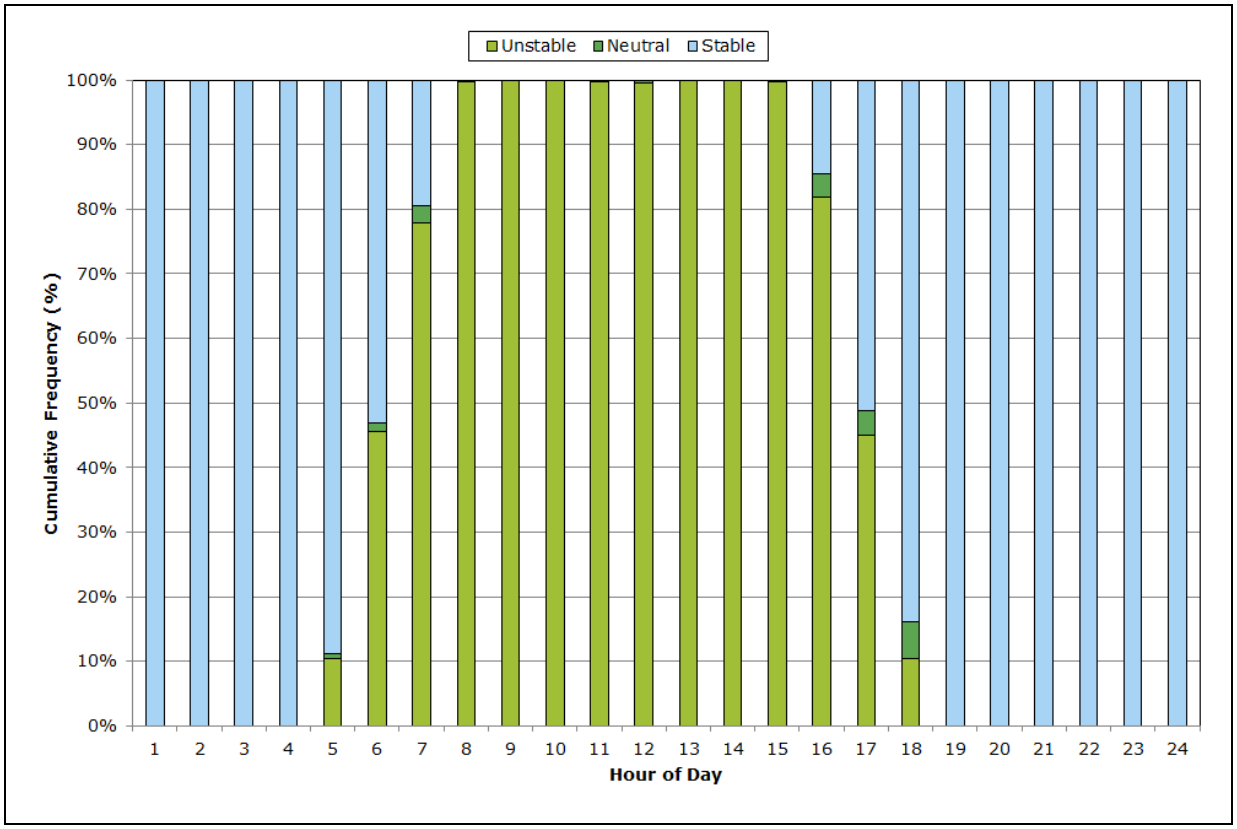


Figure 5.6 Stability class by hour of the day



5.5.15 Blast Fume Risk

Representative Comment(s)

When water affects non-waterproof explosives in the blast hole blasting can produce toxic orange fume…MDEG is of the opinion that the EIS does not adequately address this issue on how they will manage this problem.

Mudgee District Environment Group of Mudgee, NSW (Submission SE-8622333)

Blasting can produce toxic orange fume when water affects non-waterproof explosives in the blast hole. Given the proximity of the mine to Lue managing this risk is inadequately dealt with in the EIS.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The potential impact from wet/damp holes is a well-known issue in the mining industry and can be readily managed through selection of correct explosives and minimising the time between drilling and loading and loading and firing the shot (i.e. ignition of the blast). These and other measures (see Section 5.18.13 of this document) would be included within the Blast Management Plan committed to within the EIS.

5.5.16 Air Quality Monitoring

Representative Comment(s)

Tailings exposure from dust shows a projected gaps in monitoring before the end of the Project and potential for shutdown following economic decline. There is also a gap in air monitoring because the Project monitoring schedule ceases before the change in guideline conditions is finalised.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Once mining and processing ceases, there would no longer be active areas of the TSF (with the TSF being capped and rehabilitated). Emissions would therefore be limited to windblown dust from soil surfaces. Progressive rehabilitation of the Mine Site is proposed, therefore the potential for erodible surfaces once mining and processing ceases is limited. Notwithstanding, Bowdens Silver would continue air quality management until the Mine is fully rehabilitated (including the TSF).

5.5.17 Modelling Predictions

Representative Comment(s)

The modelling of project impacts in the EIS predicts very low values of lead in air along with deposited lead in dust. Given that all mine sites generate significant fugitive emissions and that operations extracting lead will inevitably cause surface contamination (as evidenced by dust emissions from fugitive sources at Broken Hill, Port Pirie and Mount Isa), it seems inconceivable

that the predicted aerosol emissions of dust (Table 7) and its lead concentrations will be so low (Table 8) during the active phase of operations. Indeed, these low values estimated during operations versus existing values results in a conclusion that the impact of the operations will be trivial (e.g. Figure 5.4, 7-80 of the EIS).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The modelling documented in the AQA was conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2017). Emissions are estimated using widely accepted emission estimate techniques and the % content of lead in dust emissions is based on a comprehensive sampling program (see Section 5.5.5 of this document for further detail on the derivation of metal concentrations from the different source groups). Both the emission inventory and the modelling approach have been independently peer-reviewed by an experienced air quality practitioner with over 20 years' experience.

Finally, it is noted that Lue is located ~2 km from the closest edge of the open cut pit and therefore direct comparison with the nominated mining or smelting operations that are adjacent to residential areas cannot be made. Comparison to these large lead mining operations is erroneous particularly as Bowdens Silver has a much lower lead grade and would not be undertaking smelting operations as part of the Project. This comparison is discussed in greater detail in Section 5.15.2 of this document.

5.6 AQUATIC ECOLOGY

5.6.1 Overview

Submissions commenting on the Aquatic Ecology Assessment (Cardno (2020)) were provided by NSW DPI – Fisheries and the Lue Action Group.

The Aquatic Ecology Assessment for the Project was undertaken by Cardno (NSW/ACT) Pty Ltd (Cardno, 2020) based on comprehensive field survey and assessment.

The outcomes of the assessment relating to aquatic habitats and stygofauna remain unchanged as a result of additional review and consideration of the submissions. It has been confirmed that suitable watercourse crossings would be incorporated into the minor unsealed access road that crosses Price Creek to ensure passage for fish and other aquatic biota, although the relevant watercourses are ephemeral in nature and provide limited aquatic habitat.

It is also noted that there would be no direct disturbance at Hawkins and Lawsons Creeks and the un-named and ephemeral watercourses that would be removed have limited aquatic habitat value. The current poor condition of riparian vegetation in the vicinity of the Mine Site is the result of historic land use practices which would not be exacerbated by the Project.

Given the design of the Project and the mitigation measures to be adopted, adverse impacts on the aquatic environment would be unlikely. Any risk of impacts on aquatic ecology associated with operations within the Mine Site would be mitigated and/or minimised through the adoption of the proposed mitigation measures. The Project is expected to have limited impact to aquatic ecology in the context of the local and regional area within which comparable habitat is highly abundant.

5.6.2 Price Creek Crossings

Representative Comment(s)

An internal haul road is indicated to cross Price Creek twice north of the Waste Rock Emplacement, however there is no mention of this waterway crossing in the EIS…Ideally the internal haul road should be redesigned to avoid crossing the creek twice.

NSW DPI – Fisheries

Response

The internal haul road that crosses Price Creek is already in place and has historically been used for access at the property. One of the existing crossings has a culvert in place that would continue to be used (see **Plate 5.1**). Given the ephemeral flow in Price Creek and intermittent use, the second crossing has not been upgraded to include a culvert. This would be upgraded in accordance with the NSW DPI (Fisheries) guideline *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge, 2003) to ensure fish passage is maintained. Crossings appropriate for Class 3 waterways include culverts and fords.

Plate 5.1 Crossing of Price Creek

5.6.3 Riparian Buffer Zones

Representative Comment(s)

…the minimum riparian buffer zone of 50 metres for a TYPE 2 CLASS 3 waterway such as Price Creek evidently has not been established…

It is recommended that the proposed toe of the waste rock emplacement on the mine layout site is shifted away from the Price Creek riparian buffer zone in order to maintain a 50 metre buffer zone.

NSW DPI – Fisheries

Response

It is recognised that the Aquatic Ecology Assessment (Cardno, 2020) identifies Price Creek as a Type 2 Class 3 waterway due to apparent intermittent flow and wetland plant species being present. However, as noted in Section 3.2.4.2 of Cardno (2020), the aquatic ecology of Price Creek upstream and adjacent to the WRE was limited. This is consistent with the findings of the BAR (EnviroKey, 2021) which found that, in general, riparian vegetation within the Mine Site had either been previously removed or significantly altered by past agricultural activity. Riparian vegetation throughout the proposed Mine Site is largely dominated by introduced grasses with little or no native vegetation present. Furthermore, historical agricultural activity in the Price Creek valley adjacent to and downstream of the WRE has significantly altered the flow path and floodplain of Price Creek. The physical alteration of the Price Creek floodplain and its connection to the Hawkins Creek floodplain has removed the Price Creek watercourse such that there is no continuous channel hydraulically connecting Price Creek and Hawkins Creek. Subsequently, as there is no longer a riparian zone in this location, there is no environmental benefit to maintaining riparian buffers. In addition, the lower sections of the WRE including the toe of the WRE would be constructed early in the development and would be stable and consistent feature of the Mine Site. Therefore, it would not be a risk to riparian vegetation.

5.6.4 Significant Ecosystems

Representative Comment(s)

The locations of significant ecosystems should be identified to enable maximal and residual risk assessments and development of a monitoring plan along with triggers and planned remediations that will be effective.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The occurrence of significant aquatic species, populations and communities in the Study Area was assessed in Section 3.3.2 of the Aquatic Ecology Assessment (Cardno, 2020). Murray cod, purple spotted gudgeon and the Murray-Darling Basin population of eel tailed catfish were identified as possibly occurring in the Study Area. The relatively recent occurrence of purple spotted gudgeon and eel tailed catfish in the Macquarie River catchment suggests that these species could be present in the Study Area. Although habitat within sections of Hawkins and Lawsons Creeks is likely to provide at best sub-optimal habitat for Murray cod, there is a relatively recent record of this species just downstream in the Cudgegong River which is approximately 10km from the Mine Site.

As discussed in Section 4.11.7 of the EIS, monitoring of aquatic ecology in surface waters would be undertaken at a selection of sites within Hawkins and Lawsons Creeks and suitable reference creeks within the area. Monitoring would be initiated prior to the commencement of construction activities to supplement the existing comprehensive baseline data against which any future changes can be measured in the context of natural variability. Further details of monitoring requirements would be described in an Aquatic Ecology Monitoring Plan which would form a section within the Biodiversity Management Plan for the Project. This plan would detail monitoring requirements before, during and, if necessary, following the Project life.

5.6.5 Macroinvertebrate Fauna

Representative Comment(s)

It is stated that there is a diverse macroinvertebrate fauna in Hawkes (sic) *and Lawsons Creeks with mainly disturbance tolerant species but does not mention the sensitive taxa that are strong indicators of persistent high water quality and water levels. These are also indicators of water permanence within the pools and therefore a definite groundwater connectivity. If the proposed drawdowns of groundwater along each creek is realised these aquatic refugia will be lost and a significant component of biodiversity within the surrounding valleys will be lost.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Section 3.2.7.1 of Cardno (2020) describes the results of AUSRIVAS macroinvertebrate surveys undertaken in Hawkins and Lawsons Creeks in December 2011, April 2013, March 2017 and December 2018. This section also describes the relative pollution tolerance of identified taxa, including sensitive taxa, based on SIGNAL2 grades. All taxa sampled, excluding Leptophlebiidae (grade 8) and Telephlebiidae (grade 9) have been assigned SIGNAL grade values of 6 to 1 (i.e. relatively pollution tolerant).

Notwithstanding the presence of pollution sensitive taxa and the persistence of pools, impacts to aquatic habitat and biota due to groundwater drawdown are assessed as minor. The small volumes of groundwater drawdown over short lengths of these watercourses would be offset by the nature of bedrock along the watercourse and groundwater in alluvial sediments or at the soil-rock interface. The assessment of impacts to aquatic ecology in Hawkins and Lawsons Creeks includes consideration of consequences due to reduced water availability following predicted impacts on surface flows provided by WRM (2020). It is predicted that during operations, the maximum impact of the Project on surface flows would be to decrease flows by no more than 4.4% in Hawkins Creek and 2.2% in Lawsons Creek. These reductions would be well within the natural variability of flows, when the creeks are flowing. The Project's impacts in Lawsons Creek would be negligible when daily flows in Lawsons Creek exceed approximately 1ML/day (WRM, 2020). Based on these relatively minor predicted changes in stream flow, there would be associated minor changes in the availability of aquatic habitat in Hawkins and Lawsons Creeks, which are naturally intermittent watercourses. Thus, significant impacts to aquatic ecology in watercourses due to groundwater drawdown and reduced surface flow are not expected.

5.6.6 Threatened Invertebrate Species

Representative Comment(s)

The listing and discussion of the potential threatened invertebrate species is inadequate as the methods used (with the exception of the Murray Crayfish) to sample for macroinvertebrates i.e. the AUSRIVAS methodology is insufficient to collect the listed species as they have very specific habitat requirements that require more specialised collecting techniques. The authors therefore cannot make an assessment of their likely occurrences in the area.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

It is considered that Cardno (2020) provides an accurate assessment of the likely occurrence of threatened invertebrate aquatic species in the Study Area. Aside from Murray crayfish, two other threatened invertebrate species were considered in detail in Cardno (2020) including the Darling River Snail (*Notopala sublineata*) (Section 3.1.3.8) and Hanley's River Snail (*Notopala hanley*) (Section 3.1.3.9). These species have restricted ranges that do not overlap the Study Area used for the assessment. The Darling River Snail is restricted to the Darling River and its tributaries (DPI, 2018) with their predicted distribution over 200km from the Study Area (DPI, 2016). Hanley's River Snail survive in artificial habitat at three locations: Banrock Station and Kingston Squatters Tank in South Australia and an irrigation pipeline at Dareton in NSW (DPI 2020) with their predicted distribution over 200km from the Study Area (DPI, 2016). Further, the apparent preferred habitat requirements of these species (flowing water, and well oxygenated water in the case of Hanley's River Snail, at least) (DPI, 2018 and 2020) does not occur in the Study Area. The presence of carp (*Cyprinus carpio*) in Hawkins and Lawsons Creeks (identified during field studies) would also limit the habitat value of the Study Area, as carp is identified as a threat of predation to these snails. Thus, it is considered unlikely that these species occur in the Study Area.

Groundwater modelling predicts maximum drawdown beneath Hawkins Creek of between 1m and 2m, with some localised areas of 3m to 4m (Jacobs, 2021). Predicted maximum drawdown beneath Lawsons Creek is typically of the order of 1m or less.

It is unclear what impact predicted drawdown in the vicinity of Hawkins Creek and Lawsons Creek would have on the stygofauna populations present within the alluvium aquifers associated with these creeks. However, a complete loss of stygofauna habitat is not expected. The thickness of Hawkins Creek alluvium is reported to be between 4m and 6m (Jacobs, 2021) with alluvium in Lawsons Creek assumed to be of similar thickness. This suggests that suitable habitat would remain for stygofauna following the predicted drawdown, albeit with reduced availability. Any reduction in habitat availability would be expected to be associated with a reduction in the population size of stygofauna. It is predicted that a complete loss of stygofauna from the alluvium associated with Hawkins and Lawsons Creeks would not occur.

Similarly, Cardno (2020) identifies that the predicted distribution of Murray crayfish includes only the Murray River and Murrumbidgee River and not the Macquarie River catchment (Section 3.1.3.11). Based on existing records, predicted distribution (DPI, 2016) and the results of the field surveys, this species is considered unlikely to occur in Hawkins and Lawsons Creeks and significant impacts due to the Project are not expected.

5.6.7 Stygofauna

Representative Comment(s)

The section on stygofauna is completely incorrect as it states that the stygofauna were not endemic to the area as they were typical of fauna found in alluvials. As there has been no stygofaunal (sic) *officially described and officially named from this area it can be certain that they are new species and highly likely to be endemic.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

It is considered that Cardno (2020) provides an appropriate assessment of stygofauna distributions. As part of the stygofauna assessment, Cardno engaged Dr Peter Hancock (Ecological Australia Pty. Ltd) to undertake stygofauna identifications and provide commentary on the distribution of identified taxa. Information provided in Section 3.2.9 of Cardno (2020) is based on the information provided by Dr Hancock, which indicated that all taxa identified in the samples were typical of alluvial aquifers in eastern Australia. It is unclear how, in the absence of detailed information on stygofauna taxonomy as highlighted in the submission, the author of the submission can be certain of the presence of new and highly endemic species.

Representative Comment(s)

The aquifers associated with the Hawkes (sic) *and Lawsons Creek are stated to have two unique taxa. This is incorrect. They are two unique orders/families however if the identifications had been done to species for the fauna collected there are likely to be more 'unique or endemic' species.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Section 3.3.1 of Cardno (2020) refers to taxa being unique to individual bores and does not state that any stygofauna taxa are unique to either Hawkins or Lawsons Creeks or local springs. Stygofauna identifications were completed by an external expert based on taxonomic knowledge available at the time of the identifications. Regardless, groundwater modelling (Jacobs, 2021) suggests that suitable habitat should remain for stygofauna following the predicted drawdown, albeit with reduced availability. Thus, a complete loss of stygofauna from alluvial aquifers within the Study Area is not expected.

Representative Comment(s)

The family level of identification of the macroinvertebrates does not allow for any comment on the species distribution i.e. potential endemicity of the fauna, which is a major failing of the AUSRIVAS approach.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Family level identification was undertaken as described in the AUSRIVAS manual. This is appropriate to the rapid assessment methodology upon which it is based.

Representative Comment(s)

There is a statement quoting Dr Peter Hancock (EcoLogical) alluding that although Copepoda (alone apparently) can be endemic to an aquifer the fauna found here are "common" and "widespread" and therefore of no significance. This was repeated in the groundwater report as well. This statement is correct in that these Orders of stygofauna are commonly found in aquifers in eastern Australia. It is however a completely incorrect assertion to make that that (sic) *they are common and widespread at the genus and particularly the species level. The fact is that all evidence has demonstrated that stygofauna in general are highly restricted in their distributions and the species are highly endemic to individual aquifers. The level of identification was completely inadequate to make these statements. The statements are an attempt to mislead the reader and completely downplay the significance of the findings.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

It is considered that the material presented in Cardno (2020) represents an accurate assessment of stygofauna taxonomy based on the data available. No attempt was made to mislead the reader and the section provides a detailed objective assessment based on the facts available.

Notwithstanding the potential presence of any endemic taxa within the Study Area, based on predicted groundwater drawdown suitable habitat should remain for stygofauna in Hawkins and Lawsons Creeks, albeit with reduced availability. Drawdown would also be expected to occur within a limited extent of creek alluvium. For Hawkins Creek, such effects were considered from the confluence with Lawsons Creek to approximately 6km to the northeast of the Mine Site in the upper catchment of Reedy Creek and Horse Gully tributaries. For Lawsons Creek, such effects were considered from approximately 3.5km southeast of the Mine Site to 4km west of the Mine Site.

Sections 3.2.9 and 4.3.3.1 of Cardno (2020) also indicate that aquifers within the open cut area support a relatively depauperate stygofauna assemblage. One stygofauna species was present in the open cut area (a total of two individuals from two bores). This species was also present in bores associated with Hawkins and Lawsons Creeks alluvium where it was also far more abundant (27 individuals from two bores). Thus, the potential direct loss of some individuals during the development of the open cut pit represents a relatively minor impact to stygofauna populations within and surrounding the Study Area.

Representative Comment(s)

Section 4.3.3.1 This section states that: The creation of the pit will "displace" the stygofauna present and implies that the fauna is this area is the same as that in Hawkes (sic) *Creek and Lawsons Creek yet they have only identified the taxa to family. It is therefore too much of an assumption without having identified them to species. The one species collected (The Psammaspididae) is also considered as a flagship taxon that indicates the possible presence of a greater biodiversity. It is important to acknowledge that unless there is a direct hydrological connection between the aquifers on site associated with the pit and those associated with the alluvials once the groundwater has been removed there will be a complete loss of subterranean biodiversity that will not be restored following mine closure and rehabilitation because there would be no area it could recolonise from. This report does not adequately confirm this connectivity either hydrologically or biologically.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

In this context 'displace' refers to the loss of stygofauna from an area. For the basis of the Aquatic Ecology Assessment, Cardno (2020) assumed conservatively that no hydraulic connection was present between the open cut area and alluvium within Hawkins and Lawsons Creeks and that all stygofauna present in the open cut area would be lost (i.e. would not migrate to connected aquifers). The loss of stygofauna from this area is considered a relatively minor impact to stygofauna within and surrounding the Study Area (Section 4.3.3.1 of Cardno (2020)). This was due to the apparent depauperate stygofauna assemblage present within the open cut area. Only one stygofauna species (Psammaspides sp.) was present in the open cut area (a total of two individuals from two bores). This taxon was also present in bores associated in alluvium within Hawkins and Lawsons Creeks where it was also far more abundant (27 individuals from two bores).

Representative Comment(s)

There is little to no discussion of the ecosystem health significance of the fauna found which demonstrates the authors lack of knowledge on the subject.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Important ecosystem roles of stygofauna are outlined in Section 3.1.6.1 of Cardno (2020). The assessment of impacts to stygofauna was based on their apparent distribution and biodiversity within the Study Area and regionally. Given ecosystem health / roles would be expected to be correlated with biodiversity, this metric provides an adequate proxy of ecosystem health/role for the purpose of the impact assessment.

Representative Comment(s)

There is no discussion of the Amphipoda Paramelitidae, which is a significant stygofauna taxon in NSW.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

The distribution of *Amphipoda Paramelitidae* within the Study Area was discussed in Section 3.2.9 of Cardno (2020). This information was subsequently used to inform the impact assessment on stygofauna due to reduced groundwater availability in the open cut area and in the alluvium of Hawkins and Lawsons Creeks (Section 4.3.3.1). Impacts to stygofauna due to open cut extraction were considered to be relatively minor due to the apparent depauperate assemblage present here. There would also not be a complete loss of stygofauna habitat within the Hawkins and Lawsons creek alluvium associated with the Project.

5.6.8 Further Surveys

Representative Comment(s)

Significant species, especially fauna in springs and water courses, should be surveyed and identified.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Surveys of aquatic biota undertaken to support the Aquatic Ecology Assessment are described in Section 3.2 of Cardno (2020). Surveys were undertaken at the following locations and included surveys for macroinvertebrates, fish, aquatic habitat and aquatic plants. It is considered that the fish survey method (back-pack electrofishing) is appropriate for detection of the threatened (significant) fish species that may possibly occur in the Study Area.

- Hawkins Creek and Lawsons Creek (Sites 1 to 11).
- Walkers Creek, Blackmans Gully and Price Creek.
- Eight springs (BSW17, 18, 23, 24, 25, 27, 29 and the spring associated with BGW16).

A total of 22 groundwater bores within the Study Area were surveyed for stygofauna. The methods and results of these surveys are described in Section 3.2.3.5 and Section 3.2.9 of Cardno (2020).

5.7 BIODIVERSITY OFFSETTING

5.7.1 Overview

Submissions were received from the Mid-Western Regional Council, NSW Government agencies and the public in relation to the outcomes of biodiversity assessment and the biodiversity offsetting obligations for the Project. Specific comments relating to biodiversity in general have been addressed in Section 5.6 (Aquatic Biodiversity) and Section 5.26 (Terrestrial Biodiversity – including the assessment of impacts to vegetation communities and threatened species).

Biodiversity offsetting is required to account for residual Project-related impacts to native vegetation and threatened flora and fauna. One outcome of the Biodiversity Assessment Report (BAR) (EnviroKey, 2021 – **Appendix 4**) is the re-calculation of the offsetting obligations in accordance with the NSW Biodiversity Offsetting Scheme under the *Biodiversity Conservation Act 2016*. Updated calculations of biodiversity offsetting obligations are presented in Section 3.5 of this document.

The Biodiversity Offsetting Strategy has been prepared by Niche Environment and Heritage (Niche, 2020) and outlines how Bowdens Silver intends to satisfy its biodiversity offsetting obligations and demonstrates that this is achievable under the relevant legislation and guidelines. Biodiversity offsetting is a common and standard practice for State Significant Development mining projects such as the Project. It is a technical and highly regulated process intended to ensure that residual impacts to biodiversity are offset by equivalent conservation in a manner that is transparent and accountable. Bowdens Silver has followed all relevant legislation and guidelines in its assessment of biodiversity impacts and in determining the offsetting obligations of the Project. Final strategies for offsetting would be subject to approval by DPIE.

The outcomes for biodiversity and the proposed Biodiversity Offset Strategy remain unchanged as a result of the review of submissions. That is, it is proposed that offsetting obligations would be satisfied in a staged manner consistent with the progressive development of the Project and would involve:

- establishing a Biodiversity Stewardship Site on land owned by Bowdens Silver in proximity to the Mine Site;

- purchase and retirement of credits generated by other parties on private property; and
- payment to the Biodiversity Conservation Trust.

Each of these options is available to Bowdens Silver in accordance with the *Biodiversity Conservation Act 2016*. The final Biodiversity Offset Strategy would be approved by DPIE prior to the commencement of vegetation clearing. It is currently unlikely that Bowdens Silver would need to rely upon credit generation following rehabilitation of the Mine Site to meet its offsetting obligations.

5.7.2 General

Representative Comment(s)

MEG requests that Bowdens Silver consider potential resource sterilisation in relation to any offsite biodiversity offset areas or any supplementary biodiversity offset measures.

DRNSW Mining, Exploration and Geoscience

Response

Bowdens Silver's approach to the consideration of resource sterilisation within any of the off-site biodiversity offset areas within the exploration licences held in the Kandos-Gulgong area would involve:

a) a review of geological maps and Bowdens Silver's more detailed interpretation and knowledge of the respective geological units; and

b) a review of the airborne magnetic survey results within Bowdens Silver's exploration licences.

In the event there is a potential for resources within the area being considered as a biodiversity offset area, Bowdens Silver would expedite the exploration activities within the subject area to establish whether resource sterilisation would be a factor that needs to be considered further.

Representative Comment(s)

…the proposed compensatory mitigation measures and off sets [sic] *detailed in the EIS are inadequate. Despite proposed mitigation measures and off-sets, there will be a significant net loss of critically endangered 'Box-Gum Woodland'.*

Blue Mountains Conservation
Society Inc of Springwood, NSW (Submission SE-8422283)

Response

It is acknowledged that when considered alone, the disturbance of approximately 180ha of Box-Gum Woodland may seem a large and inappropriate impact to some community members. However, when considering this area, it should be noted that approximately 88ha (48%) of the Box-Gum Woodland to be disturbed comprises only derived grassland and not trees and shrubs which have already been cleared by past agricultural activities.

The overall impacts of land disturbance for the Project on the identified Box-Gum Woodland are assessed in Annexure 6 of the BAR (EnviroKey, 2021). This includes consideration of the quantum of disturbance of this ecological community including the areas comprising only derived grassland. EnviroKey (2021) concluded that, "*in the absence of any mitigation measures and biodiversity offsets"* there would be a significant impact on Box-Gum Woodland. However, EnviroKey (2021) also notes that all reasonable attempts have been made to avoid impacts to Box-Gum Woodland, where possible, through a substantial planning and design phase and that a series of detailed mitigation measures are also proposed to minimise potential impacts to Box-Gum Woodland.

Furthermore, impacts would be mitigated through the NSW Biodiversity Offsetting Scheme which, in accordance with the NSW calculation tools, EnviroKey have calculated a requirement for offsetting of 11 179 ecosystem credits associated with Box-Gum Woodland. This would be a substantial conservation outcome for the vegetation community.

It is also noted that in the order of 344ha (approximately 153ha woodland and 191ha native grassland) would be revegetated with native vegetation using species consistent with the existing plant communities. While not formally accounted for with the biodiversity offset or assessment of impact, in the long term, the areas rehabilitated to native vegetation would further reduce impacts.

5.7.3 Species Credits

Representative Comment(s)

Koala credits will be created after survey of on-site and off-site offset areas. Any shortfall in the number of credits required will be addressed through purchase of credits from the market.

There is no discussion of Squirrel Glider credits under this section. This is an omission that needs rectification.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

The species credit obligations of the Squirrel Glider would be treated in the same manner as that required for the Koala. This includes utilising on-site or off-site offset areas where appropriate and addressing any shortfall through the credit market or through payments to the Biodiversity Conservation Trust in accordance with the Biodiversity Offset Scheme.

Representative Comment(s)

Evidence of consultation between the NSW BCD and (then) Commonwealth DoEE in regard to the process for credit conversion for the Regent Honeyeater should be supplied.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

The process of credit conversion (to account for changes in the credit calculation processes since commencement of the Project investigations) is an administrative step that would occur post-approval. This does not affect the outcomes of assessment but only ensures that the appropriate quantum of credits is satisfied by Bowdens Silver.

5.7.4 On-Site Biodiversity Offsets

Representative Comment(s)

There needs to be some certainty that the mine will not have any indirect effects on the proposed offset sites, including that of lighting to ensure the offset sites are appropriate.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

…onsite offsets are not ideal when there is clearing of threatened ecological communities and no buffer zones allocated.

Sonia Christie of Monivae, NSW (Submission SE-8638252)

Response

In the event the Project is approved, Bowdens Silver would be required to prepare a Biodiversity Stewardship Application that must be supported by a Biodiversity Stewardship Site Application Report. The report must assess the condition of vegetation within the proposed Stewardship Site and present proposed management of the site in perpetuity. The condition and measures presented must be agreed with the Biodiversity Conservation Trust before a Biodiversity Stewardship Application is approved. Therefore, the approach to management and potential impacts would be scrutinised by the NSW Government in determining how many credits would be generated by the Stewardship Site and how the site should be managed.

Bowdens Silver would be required to provide for both management of the Mine Site to limit indirect impacts to the surrounding land (irrespective of its conservation status) and the management of the proposed Stewardship Site. The management of the Mine Site would be described in a Biodiversity and Rehabilitation Management Plan while the Stewardship Site would have its own plans of management to guide conservation and maintenance actions.

The use of land adjacent or in close proximity to the areas of associated disturbance is considered ideal as the conserved vegetation is more likely to closely match that which is disturbed. The conservation benefit of the Stewardship Site is therefore enhanced for the vegetation communities and species impacted.

5.8 BOWDENS SILVER

5.8.1 Overview

A number of submissions included questions or statements regarding Bowdens Silver and its capabilities to develop and operate a silver mine, the general attitude of the Company towards local residents and approach to the community and becoming part of the Lue community.

The overwhelming support shown in the community for the Project is a testament to the manner in which Bowdens Silver has continued to engage with the local community in the planning and assessment of the Project. Bowdens Silver is a company committed to the Bowdens Silver Project as it is its main focus to obtain all necessary approvals to enable it to establish and operate the Project. Bowdens Silver is fully committed to establishing and operating the Project in a manner that is environmentally responsible, compliant with all conditional requirements and proactively working with the local community to support Lue residents, businesses and the surrounding rural community.

Bowdens Silver is also fully committed to work with its immediate neighbours to ensure that the changes likely to be experienced as a result of the Project are acceptable to the neighbours, i.e. through the adoption of a range of neighbour-specific measures. It is important to Bowdens Silver that the concerns that have been expressed by Lue and district residents are responded to and managed through the adoption of the practical mitigation measures recommended throughout the comprehensive range of environmental studies prepared for the Project.

Bowdens Silver is proud of its interactions with the community to date and would continue to consult widely with the Lue and district community and surrounding rural areas and towns to ensure factual information is provided and any potential concerns are promptly addressed.

5.8.2 Bowdens Silver's Credentials

Representative Comment(s)

…this applicant has never developed a mine fully and would be expected to sell on the development most likely to an overseas company with little regard for our environment, their lack of experience and the uncertainty of who would be running this highly dangerous and toxic project…

David Chandler of Lue, NSW (Submission SE-127745)

Silver Mines have zero experience in operating a mine.

(Name Withheld) of Witta, NSW (Submission SE-8622347)

The operator of the Bowdens Silver Project is not an experienced mining company….Its current share price of $AU 0.1625 is typical of a speculative mining company. It is a concern that Silver Mines Limited, if approval to mine and process is granted, may sell the Bowdens Silver Project to another entity which may not adhere to the conditions attached to the approval.

Aivars Rubenis of Flynn, NSW (Submission SE-8623287)

Response

Bowdens Silver is a wholly owned subsidiary of Silver Mines Limited (Silver Mines). Silver Mines is an Australian publicly listed company trading on the Australian Securities Exchange. The Company currently has a market capitalisation of approximately $375 million. Silver Mine's interest in the Bowdens Silver Project, when it took over in 2016, was as a sole purpose company for the development of the Project. Continued mineral exploration is also a priority.

The board and management of Silver Mines have substantial technical and operational experience in exploration, delineation, financing, development and management of minerals projects in Australia and abroad. Of particular note are the Palmarejo Silver and Gold Mine in Mexico, the Hengjaya Nickel Mine in Indonesia and the Cosmos Nickel Project in Western Australia. The board and management have considerable Australian and global expertise in the assessment and financing of precious metals and other metals projects and mines.

Despite any speculations on future ownership of the Project, to suggest that environmental and other conditions would not be adhered to is incorrect. There are a multitude of legislative requirements that must be adhered to while developing and operating the mine and compliance would be justly scrutinised by DPIE. For example the mine would operate in accordance with a

Development Consent, mining lease and an Environment Protection Licence as well as other licences, approvals and permits. In addition, the NSW Resources Regulator would regularly review reporting and audits on mine operations and the Environment Protection Authority would regulate pollution risks. The regulatory environment for mining developments in NSW is very different to what some community members may expect.

5.8.3 Bowdens Silver's Environmental Performance

Representative Comment(s)

Bowdens have already demonstrated an alarming disregard for the landscape in which they wish to operate by breaching a number of environmental regulations during their initial testing.

(Name Withheld) of Havilah, NSW (Submission SE-8642118)

Response

In July 2020, the NSW Resources Regulator conducted a compliance audit of activities associated with the Bowdens Silver Project within Exploration Licences 5920 and 6354, i.e. the two exploration licences that cover the Mine Site. Outcomes from that audit demonstrated Bowdens Silver's strong attention to environmental compliance as "*it was concluded that Bowdens Silver has achieved a high level of compliance with the requirements of the exploration licences, exploration activity approval and the exploration codes of practice"* and "*No non-compliances or observations of concern were identified during the audit."*

5.8.4 Bowdens Silver's Attitude to Lue Residents

Representative Comment(s)

Lue may be a small town, and the people who are proposing this mine and will directly benefit from it obviously don't care about the people living there.

Maddison O'Brien of Gulgong, NSW (Submission SE-8641028)

Response

Bowdens Silver maintains that one of the most important aspects of its proposal is the ongoing viability of Lue – a place where people want to live, work and socialise within. With considerable community input, the Project has been designed, so that the local impacts of the Project are avoided or substantially reduced to the highest extent possible.

Also, as part of Bowdens Silver's commitment to the local community, a Community Investment Program is active and would continue to expand providing support and investment into a range of community-led initiatives and programs that focus upon Lue and surrounding areas contributing to community wellbeing and sustainability.

The success of Bowdens Silver's engagement with the community in Lue is evident in the level of support for the Project from residents in Lue and surrounds.

5.8.5 Bowdens Silver's Employees

Representative Comment(s)

Is the rumor (sic) *true that Bowdens employ a Mid-Western Council Member, as part of their Public Relations team? If this is correct would it not be a matter for the ICAC?*

(Name Withheld) of Camboon, NSW (Submission SE-127656)

My daughter, who lives in Rylstone, is being intimidated by an employee of Bowdens who is also a local councillor and she may be forced to leave her home and the district.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

Bowdens Silver does employ a staff member who is also a Councillor with the Mid-Western Regional Council (MWRC). The role of all Councillors requires stringent regulations and actions around participation in Council matters and the declaration of interests. This indeed applies fully to this Councillor in terms of matters relating to the Bowdens Silver Project. The implication that merely because a staff member performs two particular roles that they are corrupt, is wrong and potentially defamatory.

It is to be noted that the MWRC is not the consent authority for the Project and therefore the input of a single councillor on assessment matters and the Project outcomes is negligible. Responsibility for decisions relating to the grant of Development Consent for the Project rests with the Independent Planning Commission with assessment and recommendations provided by the NSW Department of Planning, Industry and Environment.

Suggestions of intimidation by a Bowdens Silver employee are unsubstantiated and have never been raised with the Company. Discussions and interactions do occur between Bowdens Silver and members of the public who oppose the Project. It is important to note that expressing differing opinions do not mean intimidation.

5.8.6 Mine Workforce

Representative Comment(s)

I am not sure about the number of jobs and how many will go to local people in the MWRC area.

Hunter White of Havilah, NSW (Submission SE-8658633)

Adjoining land holders, people in the village of Lue and the broader community are unlikely to fill most jobs.

Clare Hamilton of Rylstone, NSW (Submission SE-8628154)

Bowdens Silver Project predicts that there would be between 73 – 129 net direct FTE jobs, and 74 – 131 net indirect FTE jobs. Such predictions are often exaggerated. It is likely that some of these positions would be taken by FIFO workers who do not contribute significantly to local economies, and nothing to local volunteer organisations such as RFS, Emergency Services, and sporting clubs i.e. to the social fabric of the community.

Aivars Rubenis of Flynn, NSW (Submission SE-8623287)

There is no guarantee that locals will get a job despite what the proponents are suggesting in their promotional material.

(Name Withheld) of Havilah, NSW (Submission SE-8649105)

Response

Bowdens Silver is committed to employing local employees wherever possible. This not only encapsulates Lue and its immediate surrounds but also the wider Mid-Western Regional Local Government Area (LGA). This commitment is reflected in the Company's current employment policy and would continue through the development and operational stages of the Project. All employees would be encouraged to live in the local towns and villages. The Project would not be a Fly-in Fly-out (FIFO) operation. It is acknowledged that there would be a need to source employees with specialist skills and knowledge throughout all phases of the Project who may not be available locally, but again, these employees and their families would be encouraged to reside locally.

A Local Procurement and Employment Strategy would be developed to maximise the economic and subsequent social impacts of the project in the LGA. Focus areas within the strategy would include but not be limited to education and training, local employment and local business procurement. In real terms, this would include training and education pathways, traineeships and apprenticeships, graduate programs, maximising local procurement through proactive provision of information and company led assistance where needed, engagement with local Chambers of Commerce and work providers. Bowdens Silver has already proven that employees would either be sourced locally or required to live locally and sees no reason why this successful approach would not continue.

5.8.7 Silver Mine Terminology

Representative Comment(s)

Bowdens have mislead the community on the true origins of what the mine will entail. Silver will not be the main commodity of the mine and in fact Lead and Zinc will be predominately sourced.

(Name Withheld) of Camboon, NSW (Submission SE-8645581)

…only 1% of production is going to be silver but 42% is lead.

Nicole Hendy of Hayes Gap, NSW (Submission SE-8358931)

…this project is really a lead (42%) and zinc (57.5%) mine the risk is critical and real.

Cameron Scott Fell of Rylstone, NSW (Submission SE-8626394)

Silver has a public perception of being a relatively clean when compared the zinc and particularly lead.

Thomas Gordon of Milroy, NSW (Submission SE-8622297)

Response

The Bowdens Silver Project is a silver mine which has by-product credits of zinc and lead.

Table 5.7 lists the percentages of revenue predicted from the sale of the concentrates produced within the Mine Site.

Table 5.7
Bowdens Silver Project – Estimated Production and Revenue

Life of Mine	Production	Revenue (A$)	Revenue (%)
Silver	66.3 million ounces	1,341.0 million	70.6%
Zinc	130 kilotonnes	337.2 million	17.8%
Lead	95 kilotonnes	221.3 million	11.7%
	Total	1,899.5 million	100.0%

Given the predicted mining revenue is almost 71% from the production of silver, it is beyond doubt that the Project is a "Silver Project". The zinc and lead are present in concentrations that by themselves would not be economically recoverable. It is noted that the reference to the Bowdens Silver Project is consistent with the terminology used by the world mining industry as it is not common for metals and metalloids to be recoverable without other heavy metals or minerals. The main exception to this is the occurrence of gold.

Notwithstanding the terminology for the Bowdens Silver Project, Bowdens Silver has comprehensively addressed all health and environmental issues associated with the mining, processing and waste management for the zinc and lead minerals within the Bowdens deposit.

5.8.8 Project Consultation

Representative Comment(s)

The most questionable point they (Bowdens Silver) *raised is that the majority of Lue residents support the mine, which I can highly argue as being a resident myself and knowing how the community does not marginally support it. Not so sure where they are getting this information.*

(Name Withheld) of Lue, NSW (Submission SE-8641995)

The consultation process did not include local farmers or the Aboriginal community, instead focusing on the towns of Mudgee, Gulgong and Rylstone.

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

Consultation during the preparation of the EIS and as part of the normal course of business for the Bowdens Silver Project has been extensive across all local communities including Lue, Rylstone, Kandos, Mudgee and surrounds including throughout the Mid-Western Regional LGA. Approximately 950 stakeholders have participated in the Social Impact Assessment engagement program in addition to consultation undertaken for the broader EIS process. These stakeholders included but are not limited to landholders (including farmers) and residents in Lue and its surrounds, community and special interest groups, indigenous groups and representatives, local businesses and business chamber representatives, local schools, community service providers, local and State government agencies and general members of the public.

A summary of the support received for the Project is provided in Section 4. It is noted that a significant level of support exists within the Lue community (39 submissions in support compared to 44 objections). This level of support is consistent with the outcomes of engagement for the Social Impact Assessment including a regional community random telephone survey conducted between 19 and 28 August 2019. The outcomes of the survey are described in detail in Section 6.11 of the Social Impact Assessment (Umwelt, 2020) and demonstrate an average support rating of 5.5 out of 10 for the Bowdens Silver Project from residents of Lue (55% support).

Total local support for the Project has been resounding. From the local postcodes of 2848, 2849, 2850 and 2852, being mostly the Mid-Western LGA area, a total of 924 submissions were received with a total of 682 (74%) in support of the project, 230 (25%) objecting and 12 (1.2%) with comments only.

A review of the matters raised in the 1909 submissions from the public and organisations confirms the comprehensive local and State-wide support for the Project.

Consultation with the indigenous community has been ongoing and collaborative. This is separate to the consultation initiated by Bowdens Silver as part of Aboriginal and historical cultural heritage assessment undertaken as part of the EIS in accordance with:

- *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010)
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011)
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010)

Registered indigenous groups involved in the Aboriginal and historical cultural heritage assessment include:

- Murong Gialinga Aboriginal and Torres Strait Islander Corporation;
- Mudgee Local Aboriginal Land Council;
- Warrabinga Native Title Claimants Aboriginal Corporation;
- North East Wiradjuri Company Limited;
- Wellington Valley Wiradjuri Aboriginal Corporation;
- Mingaan Wiradjuri Aboriginal Corporation;
- Gallanggabang Aboriginal Corporation; and
- two separate individual representatives.

Further to this, the Social Impact Assessment was informed by Registered indigenous groups, Native Title and Aboriginal Land Council claimants and Aboriginal service providers and groups.

Heritage NSW (HNSW), in their response to the EIS noted that *"HNSW is particularly satisfied with the Aboriginal consultation and the proposed mitigation actions to be further developed post project approval for the Heritage Management Plan process."*

5.8.9 Voluntary Land and Mitigation Policy (VLAMP)

Representative Comment(s)

Bowden's has offered us nothing in return for releasing them from liability for nuisance for 23 years, so we have NOT signed a VLAMP agreement…If the mine went ahead we would want to have the option to be bought out by Bowden's and financially compensated to the true potential replacement of Wyuna with equivalent size, beauty and potential.

Phillip Cameron of Lue, NSW (Submission SE-8624052)

Response

Bowdens Silver continues to work with each of a small number of landholders who are predicted to periodically experience elevated noise levels based on the modelling of potential impacts. A range of mitigation measures are committed to by Bowdens Silver and are being offered to landholders and which in some cases exceed the requirements set out in the NSW Government's policy for voluntary land acquisition and mitigation (VLAMP).

For landholders that fall into the "moderate" range for impacts under the VLAMP, Bowdens Silver would provide an option for them to enter into a purchase agreement with Bowdens Silver within the first 5 years of development. Similarly, for landholders that fall into the "negligible" category, Bowdens Silver would provide an individual plan for the installation of mitigation measures based on inspections from an acoustic engineer and licensed builder. These offerings are over and above the requirements of the VLAMP.

It is understandable that some landholders are unsure of this process and the potential impacts of owning property near an operating mine site. Bowdens Silver would ensure that the opportunity to enter into a VLAMP agreement is available as long as there is a risk of impact or where impact occurs in order to provide a level of certainty for them and their properties.

5.8.10 Lue Hotel Ownership

Representative Comment(s)

I believe the CEO of Bowdens has bought the Lue Hotel. I can only guess that The Lue Hotel complex will become a mining camp.

Judith Brown of Camboon, NSW (Submission SE-8624625)

Response

The Lue Hotel is owned by a separate entity and is not related to the Bowdens Silver Project. Bowdens Silver would not be developing a mining camp under any circumstances.

5.9 CYANIDE

5.9.1 Overview

The concern and uncertainty reflected in public submissions regarding the potential risks associated with cyanide transportation, storage, use and the management of residual cyanide in tailings is acknowledged. Bowdens Silver is also aware that opponents of the Project have focused on this issue in their objections both formally through the development assessment process and publicly in the media and other avenues.

It should be clear that the use of cyanide in mining processes is a common and well understood process. The risks of potential adverse outcomes are well understood and managed, including in waste materials (tailings). It should be stressed that the concentrations of cyanide used for the Project would be significantly lower than other existing and approved mining such as the Tomingley Gold Project (Tomingley) and the Hera Gold Project (Nymagee) which have not reported pollution outcomes associated with cyanide over many years of operations.

Regardless, Bowdens Silver would ensure the safe transportation and storage of cyanide on site and that its use and management would be consistent with world's best practice. Bowdens Silver reiterates that the management of cyanide use in mining is a common and well understood practice and therefore the risk of pollution impacts are minimal.

5.9.2 Use and Storage of Cyanide

Representative Comment(s)

A deadly cyanide processing plant is proposed to operate on site.

Sally Nagle of Bara, NSW (Submission SE-8639269)

A deadly cyanide processing plant will operate on site.

David White of Edgecliff, NSW (Submission SE-8599402)

Concerns have been raised with me about the storage and transport of dangerous and hazardous materials to the site. This includes cyanide chemicals.

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

Contrary to claims in submissions opposing the Project, there would be no cyanide processing plant on site. Rather, sodium cyanide would be used, as delivered, in only one part of the overall processing operation in order to suppress the zinc minerals present within the lead flotation circuit. Its delivery, storage and use on site is described on Page 4-333 of the EIS i.e. within Section 4.16.1.3 Preliminary Hazard Analysis, an extract of which is reproduced below.

> *"Sodium cyanide would be delivered to the Mine Site by truck in purpose-built sparge isotainers which would be unloaded and stored in the processing area adjacent to the reagent store. The isotainer would then be connected to the on-site sparging tank which would circulate water through the sparge isotainer to dissolve the solid sodium cyanide briquettes in batches. The cyanide solution would then be fed from the sparging tank to the conditioning tank prior to the flotation circuit to enhance metal separation from other substances. The concentration of cyanide in the slurry at the point of addition in the processing plant would be approximately 66 milligrams per litre (mg/L) or parts per million (ppm)."*

Should be Project be approved, cyanide would be transported, stored, utilised and disposed of in a safe, efficient and secure manner. The use of isotainers and sparging for transport and transfer to the Mine Site is considered best practice. Sparging involves dissolving the transported cyanide in a closed system so it is ready for use.

Cyanide has been used in the mining industry for over 100 years. Approximately 1.1 million tonnes of cyanide is produced annually worldwide with approximately 6% utilised in mining for gold and silver processing. The other 94% is utilised for industrial applications such as the production of nylon, plastics, adhesives, fire retardants, pharmaceuticals, food processing, cosmetics and an anti-caking agent in salt.

Cyanide also naturally occurs within over 3 000 species of plants known to synthesise cyanogenic compounds (apples, cassava, lima bean and almonds). It is not toxic in all forms or concentrations and does not persist / accumulate in the environment.

There are currently 66 operating gold mines operating in Australia, including 14 of the world's largest. Approximately 98% of the gold extracted in Australia uses cyanide as part of processing operations. Total consumption of sodium cyanide for gold mining in Australia is over 100 000 tonnes per annum. The transport, storage and use of cyanide is therefore well understood and carefully managed by mine operators.

Representative Comment(s)

I would like to know what is the size of the cleared buffer zone between the processing area and any vegetation? The concern is raised as the solid cyanide briquettes are to be stored in the processing area.

Olivia Armitage of Lindfield, NSW (Submission SE-8659990)

Response

The sodium cyanide would not be delivered in a form that needs to be opened and transferred for use but would rather be transported in isotainers that are directly connected to sparging tanks (as discussed above). The Mini Sparge storage tanks would be located within the hardstand area of the processing plant at least 100m from the closest native vegetation to be retained.

5.9.3 International Cyanide Management Code

Representative Comment(s)

The project needs to seek accreditation for cyanide handling with the International Cyanide Management Code which now includes silver extraction as well as gold.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

The use of sodium cyanide in minerals processing is common practice. Its use for the Bowdens Silver Project as a zinc suppressant in the lead flotation circuit would be very small compared with the quantities used in gold mining operations. For example, Bowdens Silver would use an estimated 190t of sodium cyanide per year whereas the proposed McPhillamys Gold Mine Project near Blayney proposes to use 5700t per year i.e. approximately 30 times that proposed to be used at the Project. From a concentration perspective, Bowdens Silver proposes to use the sodium cyanide at a concentration of approximately 66mg/L (or ppm) whereas typical cyanide concentrations used in gold mining typically range from 300 to 500 mg/l (or ppm). The processing for gold at the proposed McPhillamys Gold Mine Project would apply the sodium cyanide at a concentration of approximately 300mg/L. The Human Health Risk Assessment for the Project

prepared by enRiskS (2021) determined that there were no public health risk issues associated with the use of sodium cyanide in the manner and concentrations proposed by Bowdens Silver. Similarly, the Hazard Analysis of Dangerous Goods for the Bowdens Silver Project (Sherpa, 2020) found that with the implementation of standard controls and safeguards, the use, storage and transportation of sodium cyanide would result in very low off-site and safety risks.

In the event the Project is approved, Bowdens Silver would prepare a range of different management and monitoring plans which would include a Cyanide Management Plan (CMP) and a Principal Hazard Management Plan (PHMP).

The CMP would include the following.

- Measures to manage the delivery, storage and use of sodium cyanide at the required concentrations at all times.
- Measures to contain sodium cyanide containing waste entirely with the Mine Site.
- Measures to maintain sodium cyanide levels to within limits prescribed by the Development Consent and the Environment Protection Licence for the Project.
- Contingency measures for sodium cyanide reduction in the unlikely event this is required.
- Details of a sodium cyanide monitoring program, including its products.

The PHMP would include the following.

- The identification of hazards (appraise risks) within the Mine Site in relation to cyanide.
- An assessment the risks of injury or ill-health to workers from the hazards.
- The identification of the controls required to manage all risks.

In addition, Bowdens Silver would prepare a Pollution Incident Response Management Plan (PIRMP) which is a mandatory requirement for the Project under the *Protection of the Environment Operations Act 1997* and an Emergency Response Management Plan (ERMP) to manage pollution and emergency responses at the Bowdens Silver Project and specifically in relation to cyanide.

It is also noted that the proposed concentration of free cyanide (<3mg/L) and weak acid dissociable (WAD) cyanide in the tailings for the Bowdens Silver Project are comparatively lower than those concentrations in tailings produced by the gold mining industry in Australia and internationally. For example, the Hera Gold Project in Nymagee must limit the concentration of WAD cyanide in tailings discharged to the TSF to 10mg/L and for the Tomingley Gold Project the limit is 30mg/L. A limit of 30mg/L is also proposed for the McPhillamy's Gold Project in Blayney that is currently under assessment. That is, approved Projects operate at between three to ten times more WAD cyanide than what is proposed for the Project.

The use of sodium cyanide is regulated in NSW through:

- the *Protection of the Environment Operations Act 1997*
  - administered by the Environment Protection Authority

- the *Work, Health and Safety Act 2011*
  - administered by the SafeWork NSW

Bowdens would responsibly manage the sodium cyanide used on site in order to protect the wider community, on-site personnel, contractors and local flora/fauna.

The International Cyanide Management Code (ICMC) is a voluntary initiative primarily for the gold mining industry as well as producers and transporters of sodium cyanide. There is no requirement for Bowdens Silver (or any mining company) to participate or seek any form of accreditation from the ICMC in order to operate safely within their mine sites. Only two Australian mining companies are currently members of the ICMC.

From Bowdens Silver's perspective, its use of sodium cyanide would be a very minor component of the entire project and not necessarily a component that would warrant being a signatory of the ICMC, particularly given the proposed method of storage, use and disposal on site and its coverage in the various management plans outlined above.

5.10 ECONOMIC

5.10.1 Overview

The following subsections provide a response to matters raised in relation to the Economic Assessment prepared by Gillespie Economics (2020). Matters raised within the submissions principally related to Project economics and Mine viability, concerns relating to property devaluation, economic impacts to surrounding land uses, and compensation for impact. Discussion and clarification of these issues has been provided, however, no updates or changes have been required to the Economic Assessment which demonstrates that there would be substantial economic and employment benefits to the NSW and local community resulting from the Project.

5.10.2 General

Representative Comment(s)

I fear that that the mine noise from the traffic movements , the blasting and constant machinery will effect (sic) *our business heavily,* i.e. sheep, cattle and *Louee Enduro and Motocross Complex, which is a* (sic) *off road dirt bike complex with accommodation for 76…*

Susan Combes of Lue, NSW (Submissions SE-8640624)

Response

The agriculture component of the subject business would not be affected based on outcomes of the range of specialist studies undertaken with respect to traffic, noise, vibration and dust with no predicted exceedances of relevant criteria at the Lue Enduro and Motocross Complex. Potential for agricultural impacts are also further discussed in Section 5.4 of this document.

The accommodation and off-road dirt bike business components would similarly not be affected given the fact that the Complex's patrons' focus is on the noisy activities of off-road dirt bikes and the range of specialist studies have not predicted any amenity or health impacts that would

adversely impact any patrons. Any impact associated with the 'stigma' associated with proximity to an operating mine and an impact to visitation of a motocross complex is speculation and not based on any known cases. In fact, the opposite may be the case with locally resident mining workforce and their families increasing patronage at the complex.

Representative Comment(s)

Local impacts of upward pressure on prices of goods and services have not been considered.

Agness Knapik of Carcalgong, NSW (Submissions SE-8652626)

Response

Section 5.5 of the Economic Assessment (Gillespie, 2020) considers the potential effects of the Project on other industries within the Mid-Western Regional LGA. Whilst a general conclusion is not drawn in relation to overall impacts on the local price of goods and services, it was concluded that wage impacts would not likely be significant. Therefore, the cost of services, principally driven by labour cost, would also not likely be significantly affected. Furthermore, where particular services are required for the Project, this would provide opportunities for existing service providers to expand, improving economies of scale, or for new providers to enter the local market, increasing competition, thereby keeping a downward pressure on prices.

In relation to goods, the potential impacts on housing prices was assessed as likely to be positive (i.e. upward) but negligible. Given that other goods required by the Project are readily transportable (fuel, equipment and consumables) there is unlikely to be any significant upward pressure on local prices. Whilst it is considered unlikely to be significant, it is noted that, where goods are required to be imported, this provides increased opportunity for other local businesses to take advantage of these supply chains, potentially reducing the costs for supply of those goods.

5.10.3 Project Economics and Mine Viability

Representative Comment(s)

The Economics of this project are questionable. The Bowdens Feasibility Study, June 2018 contained a Net Present Value (NPV) sensitivity analysis showing that the Project becomes NPV negative with less than 10% movement in silver lead and zinc prices.

The assumed silver price used in the EIS is US$20.91/oz. An online review of silver prices over the last 5 years does not show silver reaching this price at any time in that period.

If operating costs were to increase by 15% above the EIS assumed US$20.91/oz the Project NPV would be negative and the net economic benefits resulting to NSW would be zero.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

The economics of this mine do not add up…Assumed silver price in the EIS is US$20.91/oz…over the last 5 years the silver price has never reached this level and if production costs increase, the mine will be even less viable.

David White of Edgecliff, NSW (Submission SE-8599402)

As for SVL and previous owners this project has never been financial (sic) *viable. Silver price has always historically and presently been very volatile, this puts the project at risk.*

Lyn Coombe of Lue, NSW (Submission SE-8621920)

If the silver price is ever high enough they may even commence mining but the silver price has not been high enough for over 20 years and not for a continuous period of 16.5 years.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

Many factors influence the pricing of commodities. Silver occupies an unusual position being both a precious metal as well as having wide ranging industrial uses. Well over 50% of silver consumption is tied to industrial demand. Silver's use in photovoltaic cells is particularly important being at the forefront of the push to generate increasing quantities of clean energy. Supply and demand obviously play a role in setting the price of silver, however other factors include scrap availability, technological developments, global macro-economic factors, inflation, strength of the US dollar, gold price, interest rates, government policy and political and social stability. Analysts specialising in this area continually review these factors and assess how they may affect the price of silver into the future. Bowdens Silver utilised its access to various forecasts produced by such analysts and from this reached its conclusion regarding an appropriate silver price to be used in its June 2018 Feasibility Study.

An objective review of the silver price history over the past 20 years shows a steady rise in price of the metal from about 2002 onwards peaking in April 2011 at around US$47 per ounce. During the past decade, silver prices have averaged over US$21 per ounce. From May 2020, the silver price began rising steeply, peaking at over US$29 per ounce in February 2021. Pricing at the time of document submission is approximately US$26 per ounce placing it substantially above the level used in the Bowdens Feasibility Study and validating the analyst's projections of pricing levels.

It is noted that recently several major financial institutions have produced revised forecasts for silver. Both Goldman Sachs and Citigroup recently forecast silver at US$30 per ounce with US$40 per ounce in the next 12 months and an upside case of between US$50 per ounce and US$100 per ounce. One of the reasons put forward in support of these forecasts was the expected surge in demand for photovoltaic cells.

It is also important to note that mine development financing typically allows for the hedging of commodity pricing and the hedging of foreign currency exchange rates providing year-on-year stability in cashflows.

The Bowdens average cash cost of production (C1 costs) is calculated to be approximately US$11 per ounce of silver over the Project life demonstrating strong profit margins and project sustainability at current and forecasted silver prices.

The NSW DPIE has previously identified that the financial viability of a project is a risk assumed by the proponent. Bowdens Silver would not be undertaking the substantial investment in the Project if it did not consider the Project to be financially viable.

5.10.4 Property Devaluation

Representative Comment(s)

I sincerely believe that property values in Lue will severely decline. We will end up paying off a mortgage for a house that will loose (sic) *value as no one will want to buy a home that is only 2km from a noisy, toxic, dust producing mine.*

(Name Withheld) of Lue, NSW (Submissions SE-8420549)

This mine will result in decreased property values in the Lue area and less people living in our community if it is approved. No one will want to buy a house near a poisonous and noisy lead mine.

Rob Smith of Bara, NSW (Submissions SE-8639388)

Response

It is acknowledged that impacts to land values is a common fear for landowners when considering a mining or other development that changes the local environment and is outside the control of the owner.

The claims of impacts already occurring to property values are not consistent with observations of recent sales in Lue and its immediate surrounds. At least 12 known property purchases occurred within Lue since Bowdens Silver's involvement in the Project in 2016. These were across a range of property types including large acreage agricultural, smaller acreage lifestyle blocks and residential properties. These sales are separate to any acquisitions made by Bowdens Silver and there is no evidence of property prices declining. The real estate market has been particularly strong in the region through 2020 and 2021. This is demonstrated by a sale of a residential property within Lue in September 2020 that sold for $310,000 more than its previous sale price in 2016.

The potential for impacts upon property values, assuming the Project proceeds as proposed, have been considered in the Economic Assessment (Gillespie, 2020) and the Social Impact Assessment (Umwelt, 2020) with the outcomes also described in Sections 4.19.4.5 and 4.20.6.9 of the EIS. It is acknowledged that properties for which there are predicted exceedances of noise and/or vibration criteria as a result of the Project may experience negative impacts to property values. This does not extend to properties for which impacts are predicted to comply. Overall, it is considered that there would be a positive, albeit negligible, effect upon housing prices as a result of the Project. It should be noted that no exceedances of any relevant criteria/standards are predicted for any properties within Lue nor would any components of the Mine Site be visible from within Lue.

For the limited number of properties that would be potentially affected (to varying degrees), appropriate mitigation measures and/or offers of acquisition are proposed subject to reaching agreement with the landowner. These measures have been offered in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy (VLAMP) and these landholders have been consulted regarding these matters. The application of the VLAMP is discussed further in Section 5.10.5 of this document.

5.10.5 Compensation

Representative Comment(s)

The mine has made clear that no compensation will be made to nearby property owners or businesses for the irreversible damage it will cause.

Jane Hagan of North Sydney, NSW (Submission SE-8393674)

How do the current property owners receive compensation for devaluation and loss of lifestyle? Will the applicants offer compensation?

Brett Farrow of Lue, NSW (Submission SE-8643233)

I have been told by Bowden's that I will not receive any compensation for the loss of my health, my children and grandchildren's health, nor the loss of my 8,000 tree olive grove, nor the loss of my business at Rylstone Olive Press.

(Name Withheld) of Rylstone, NSW (Submission SE-8642238)

Response

Bowdens Silver's approach to compensation and other arrangements with property owners surrounding the Mine Site is guided principally by the results of the predicted noise, vibration and air quality levels and the requirements of the VLAMP. In this regard, Bowdens Silver has negotiated and is continuing to negotiate with the landowners who are predicted to experience noise levels in excess of the threshold levels nominated in the VLAMP. In six cases, Bowdens Silver is proposing to offer mitigation measures which are over and above that required by the VLAMP.

In all other cases, changes to general amenity would periodically be experienced within Lue and its surrounds, however the levels of impact would be below the levels / criteria set by relevant government agencies and guidelines.

The claim that the "mine has made it clear…" is understood to reflect a response provided by Bowdens Silver at a CCC meeting in relation to a question from a Lue Action Group member who asked "would Bowdens Silver buy out the village if people wanted to leave?". Bowdens Silver has no intention of buying all properties in Lue, rather the Company has been clear in its policy to see Lue retain its character and population.

The Human Health Risk Assessment concludes that the health of Lue and district residents would not be adversely affected as a result of the range of mitigation measures to be adopted for the Project, hence, health concerns expressed for people of all ages are unfounded. Similarly, there would be no adverse air quality or water-related impacts that would affect the olive grove operated by Rylstone Olive Press given the grove is in excess of 6km from the closest proposed activity within the Mine Site.

5.11 GROUNDWATER

5.11.1 Overview

This subsection provides responses to submissions that refer to the assessment of groundwater resources or those generally commenting on the groundwater resources within the Mine Site and broader region. Matters raised in submissions that refer to groundwater encompassed a range of issues. Groundwater availability, connectivity with surface water systems and water quality risks were raised in some submissions, reflecting the rural nature of the region and the likelihood of local residents relying on groundwater to water stock or irrigate. Potential impacts to groundwater resources from Project-related infrastructure such as the TSF, WRE and leachate management dam were also a focus for some community submissions. Predicted groundwater inflows, drawdown from development of the open cut pits, both during operations and following cessation of the Project were also noted in submissions. In addition, some community submissions also queried the inputs to the groundwater assessment including the results of water level and groundwater quality monitoring stream flow, presence of groundwater dependent ecosystems, geological structures and aquifer characteristics used for the groundwater modelling and assessment.

Comments arising from a review of the groundwater model by the Department of Planning, Industry and Environment – Water (DPIE Water) initiated the preparation of an update to the Groundwater Assessment (Jacobs, 2021). The Government reviews agreed with the independent peer review commissioned by Bowdens Silver (HydroSimulations, 2019), that the groundwater model developed to assess groundwater impacts is fit for the purpose of predicting changes to the groundwater setting as a result of the Project.

The principal updates to the Groundwater Assessment were associated with editorial comment and report re-structuring, whereby technical modelling information was moved from the main report to a technical modelling appendix (Annexure 9, Jacobs (2021)). A refined groundwater model was also developed in the vicinity of the TSF to better understand groundwater movement in the Walkers Creek area. Whilst this model utilised the peer-reviewed groundwater model developed for the EIS, there are no changes to the potential impacts or predictions presented in the EIS. The results of this additional modelling are summarised in Section 3.3 and presented as Annexure 10 of Jacobs (2021).

The additional modelling has provided increased certainty with regards to groundwater predictions in the vicinity of the TSF. However, more generally the following conclusions area relevant to the matters raised in submissions.

- Conceptualisation and modelling of the local and regional hydrogeological systems is supported by robust and site specific data (e.g. geology, water levels, flow, groundwater quality and hydraulic parameters).
- The numerical model developed for assessing the potential groundwater impacts from Project development, including the prediction of inflow volumes, water level drawdown and final void behaviour is fit for purpose.
- The Project would not significantly reduce access to, or availability for groundwater users including dependent ecosystems.
- The Project would not alter the beneficial use category of groundwater or surface water resources.

- The proposed design elements of the TSF, WRE, leachate management dam and processing area dams would reduce groundwater impacts such that the Project would not alter the beneficial use categories of local or regional groundwater resources.
- Bowdens Silver has secured water access licences to meet the predicted losses of groundwater from the system, both during operations and post closure.

An updated Groundwater Assessment that applies the outcomes of additional TSF modelling to the assessment presented in the EIS is provided as **Appendix 3** and is referred to throughout this document as Jacobs (2021). However, it is noted that the conclusions of the assessment provided in the EIS have not changed, that is, the Project meets the NSW Aquifer Interference Policy's Level 1 Minimal Impact Considerations for highly productive, alluvial, porous rock and fractured rock aquifers, with the predicted impacts of the Project acceptable under this policy.

Representative Comment(s)

The EIS *ignores the residents of Lue by including their homes on maps in the EIS, excluding them from the groundwater assessment.*

Unregistered bores in the village are not considered……

B. Wannan of Lue, NSW (Submission SE-8654059)

Response

EIS Figure 4.1.11 displays the locations of 44 residences within Lue with some displayed nearby. Table 4.4 lists the ownership of all properties within Lue. The suggestion that Bowdens Silver and its consultants have ignored the residents of Lue is incorrect. Community engagement for the Project has been comprehensive and there is clearly a strong level of support locally for the Project, as evidenced by the number of supportive submissions.

The Project's Groundwater Assessment considered the potential impacts at those registered bores with information available in the public domain, such as DPIE Water databases as well as bores currently or historically monitored by Bowdens Silver. It is acknowledged that Jacobs (2021) provides discussion only on those registered and known bores within the area of predicted drawdown. However, the predicted groundwater level drawdown contours presented in Jacobs (2021) do not limit interpretation by an individual landowner with respect to a given bore. By referring to these drawdown contours, owners of unregistered bores are therefore able to determine if their bores are likely to be impacted.

Furthermore, it is noted that modelling predicts no bore within Lue, either registered or unregistered, would be significantly impacted (i.e. drawdown >1m) as Lue is beyond the predicted 1m drawdown extent.

5.11.2 Aquifer Interference Policy

Representative Comment(s)

The impact in one bore in each of the groundwater sources is predicted to be greater than the allowed minimum impact threshold of 2m. Make good provision would apply to these bores as may be required. While make good may be feasible during mine operation, we require further information on how this will be addressed particularly after mine closure.

DPIE – Water and NRAR Request:

The proponent should provide information on how make good is proposed to be achieved at the impacted bores during operations and post closure.

DPIE – Water and NRAR

Response

Section 6.1.1 of Jacobs (2021) notes that two registered bores (GW061475 and GW802888) are predicted to experience maximum drawdown in the order of 2m (or greater). However, the predicted 2m to 5m drawdown at GW061475 is considered conservative (i.e. worst case scenario) whilst drawdown at GW802888 is not expected to impact supply at this bore due to its depth.

Notwithstanding this, Bowdens Silver would continue to monitor groundwater levels over the Project life. These measured groundwater levels would then be compared with predicted groundwater levels to validate and, potentially, refine the groundwater model. Should measured groundwater levels display similar behaviour and trends to those predicted, Bowdens Silver would enter into negotiations with the affected bore owner and settle on an appropriate course of action to ensure that the bore owner would continue to maintain access to groundwater resources. Such a course of action may include the drilling and installation of a suitable replacement bore at Bowdens Silver's expense. Whilst make good provisions would be described in a Water Management Plan for the Project, it is expected they would not be called upon given the outcomes of the assessment.

5.11.3 Rights of Groundwater Users

Representative Comment(s)

Protected groundwater users, including significant dependent ecosystems and bore users, exist within 2 km of the site. The potable water quality sustaining two listed flora, five listed aquatic fauna, two licensed allocations and 15 Stock and Domestic bore users within the Lue Village is at risk.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The comprehensive level of groundwater modelling and assessment undertaken for the Project is a direct result of community feedback and concern relating to the risk to groundwater impacts. It should be noted that the groundwater assessment was subject to an independent peer review by Dr Noel Merrick (HydroSimulations, 2019), an experienced and respected hydrogeologist. Furthermore, the NSW Government commissioned an additional independent peer review. None of these peer reviews or the review conducted by DPIE Water identified flaws in the approach to modelling that would call into question the predicted outcomes.

Predicted groundwater level drawdown contours are presented in Jacobs (2021), with discussion provided on registered bores that are within the area of predicted drawdown. Potential impacts on terrestrial flora and fauna are discussed in EnviroKey (2021), which also includes details of the proposed biodiversity offset measures for the Project.

As noted in Section 5.11.1, Lue village is outside of the predicted extent of significant drawdown and, as such, no bores either registered or unregistered within Lue village are anticipated to be impacted. In addition, as noted in Section 5.11.2, the groundwater predictions are conservative

(i.e. worst case scenario). That is, the predicted drawdown is based on a hydrogeological conceptualisation and modelling that utilises hydraulic parameters more likely to over predict the drawdown impacts. This approach was deliberately adopted in recognition of the high community value placed in groundwater resources in the vicinity of the Mine Site.

Furthermore, as presented in the uncertainty analysis (see Section 5.3.5.5 and Annexure 9 of Jacobs (2021)), even under the worst-case scenarios, significant groundwater drawdown (i.e. >1m) would not reach Lue village.

Representative Comment(s)

More baseline data is required to identify and protect significant groundwater receptors.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver contends that there is no basis for this statement. As noted in the independent peer review of Jacobs (2021) that was undertaken by HydroSimulations *"there is very expansive coverage of background data and baseline data analysis"*. HydroSimulations (2019) concluded that the groundwater model prepared by Jacobs was fit for purpose with that purpose being the joint estimation of groundwater take and the prediction of impacts (i.e. groundwater drawdown) to the regional groundwater system.

In addition, the independent peer review of the modelling conducted by Jacobs for the Project commissioned by DPIE and the review conducted by DPIE Water all identified that the model is fit for the purposes identified above.

5.11.4 Groundwater Dependent Ecosystems

Representative Comment(s)

The definition of groundwater dependent ecosystem (GDE) should be updated throughout the EIS.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Significant species have the potential to be impacted by changes in groundwater quantity and quality. Substantive evidence that these ecosystems will not be permanently affected is not provided in the EIS.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Some species are known phreatophytes and their presence under certain conditions may indicate groundwater dependence. For other species, it is not possible to determine groundwater dependence without harming the trees. However, inferences may be made based on species type, topography and geology.

Jacobs (2021) considers the local topographic and geological setting in the modelling assessment and this information plus comprehensive ecological field surveys were relied upon by EnviroKey (2021) that concluded the predicted groundwater drawdown was unlikely to have an

adverse effect on terrestrial biodiversity. Bowdens Silver has no reason to question the conclusions presented in EnviroKey and notes that relevant NSW Government agencies did not question the findings of EnviroKey.

Representative Comment(s)

This subsurface flow that supports all of the springs and seeps is groundwater and these ecosystems need to be included as GDE's.

In regards to comments on the terrestrial GDES (sic) *an assertion is made that River Red Gums are not necessarily obligate phreatophytes as they "root below the watertable'…This is completely wrong.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Bowdens Silver acknowledges that some springs within the Mine Site are associated with groundwater and these would likely be affected by depressurisation from open cut pit dewatering. However, numerous "springs" within the Mine Site are the surface expression of local catchment interflow. Whilst this interflow occurs within the soil profile, it is not connected to the regional groundwater system. Subsequently, such springs and seepages would be unaffected by drawdown and therefore would not be impacted by the Project.

The statement in Jacobs (2021) regarding River Red Gums is provided in full below.

> *Eucalypts are not necessarily obligate phreatophytes, but typically root below the water table and benefit from frequent replenishment of soil moisture.* (Jacobs, 2021 – Page 5-68)

This statement is an acknowledgement that the River Red Gums may, at times, access groundwater and is made in the context of a discussion of potential impacts to the local groundwater setting, including GDEs. It is also noted that given the nature of the existing environment including alluvial extents, flow patterns and pool depths, it is likely that this species reliance on groundwater is only evident during times of drought or no-flow.

5.11.5 Risks to Significant Species in Springs and Watercourses

Representative Comment(s)

Potential groundwater dependent ecosystems (GDEs) are identified around the site. Protected Murray Cod, Silver Perch, Southern Purple Spotted Gudgeon, Trout Cod, Murray Crayfish and Eel Tailed Catfish may exist within the area, as well as species within springs (modified or not). The locations and risks to these protected species should be clearly shown and evaluated in the EIS.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The Aquatic Ecology Assessment (Cardno, 2020) provides clear information on the locations and risks to protected aquatic species and populations in watercourses in the vicinity of the Mine Site, as follows.

- Sections 3.1.3 and 3.1.4 present reviews of existing information on listed threatened aquatic species and populations.
- Section 3.1.6 presents a review of existing information on potential aquatic GDEs.
- Section 3.2 presents the methods (including survey locations) and results of field surveys for aquatic species, including fish and stygofauna (and those associated with springs).
- Section 4 presents the assessment of impacts to aquatic habitat and biota including threatened fish and stygofauna.
- Annexure I presents Assessments of Significance / Consideration under Significant Impact Criteria for the listed threatened species of fish and in accordance with applicable State and Commonwealth legislation.

The results of the desktop review and field surveys indicated that Murray cod, southern purple spotted gudgeon and the Murray-Darling Basin population of eel tailed catfish may occur within Lawsons Creek. However, Cardno (2020) considered the other listed species as unlikely to occur in watercourses adjacent to the Mine Site. Cardno also noted that no threatened species of fish were caught during electrofishing surveys.

Some localised impacts to stygofauna may occur due to drawdown of groundwater levels in alluvial aquifers near Hawkins and Lawsons Creeks. During operations, the maximum impact of the Project on surface water flows would be a decrease of up to 2.2 % in Lawsons Creek and in Hawkins Creek by up to 4.4% (WRM, 2020). Cardno (2020) did not consider these changes as representing a significant impact to aquatic biota present in these creeks.

5.11.6 Risks to Licensed Bore Users

Representative Comment(s)

We rely heavily upon our bore water supply for livestock and domestic use and we are very concerned this will be damaged or drained by the mine operation.

Elizabeth Brown of Lue, NSW (Submission SE-8627238)

I am concerned that the amount of groundwater that is planned to be used will cause my bore (8km from the Mine Site) *to go dry.*

William Brown of Breakfast Creek, NSW (Submission SE-8630760)

The Mine will use the groundwater from the mine pit and...It will have a direct effect on the bore we use at our property (at Mount Frome, approximately 20km west of the Mine Site).

Michael Beohm of Mount Frome, NSW (Submission SE-8640773)

We have a bore which we use to grow our garden, if the proposed mine draws such a huge amount of water from the water table our bore will not work.

Bowdens have not investigated the impact the mine will have on bore users in Lue such as the drawdown and the deterioration due to mining with only 2 bore users being assessed for the EIS.

Lara Altimira of Lue, NSW (Submission SE-8642008)

What little bore water we already work with to irrigate our olive *trees will be inaccessible because the mine will lower the level of the water table in my bore.*

(Name Withheld) of Rylstone, NSW (Submission SE-8642238)

Little or nothing has been done to investigate other bore users and the impact mining will have on their groundwater supply.

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

We are extremely concerned that the proposed Mine will have a negative effect on the local ground water available for local village of Lue and neighbouring farming properties - our property is 3.6km from the proposed open-cut mine.

ACN 059 643 533 Pty Limited of Lue, NSW (Submission SE-8654532)

Response

The predicted maximum extent of drawdown propagation is between 1.5 and 2km from the open cut pit with no predicted drawdown within Lue village. As noted in Section 5.11.3, there is no predicted drawdown within Lue village under the worst case scenarios modelled for the uncertainty analysis. Bowdens Silver maintains that, based on the predictions of the peer-reviewed groundwater model, there would be no lowering of the water table beyond the predicted extent of drawdown due to mining. Any bores outside of the predicted extent of drawdown would not be impacted.

The inference that only two bore users were assessed in Jacobs (2021) is either incorrect or a misinterpretation of the information presented in Jacobs (2021). It is however correct that two registered bores are located within the extent of predicted drawdown. However, it is only possible to assess and describe impacts at bores that are either known to Bowdens Silver via direct knowledge or those identified from review of publicly available datasets.

Notwithstanding this, any bore owner who experiences an impact to groundwater availability as a direct result of mining operations would be able to rely upon make good commitments that would be implemented through a Water Management Plan for the Project.

Representative Comment(s)

Our concern that this mine will be using 80% of the underground water and the farming land will lose all underground water supply.

Patrick and Jo Miskle of Camboon, NSW (Submission SE-8557749)

Response

It is unclear what the basis of the claim, that the Project would use 80% of underground water, is referring to. Bowdens Silver acknowledges that groundwater dewatering due to the development of the open cut pit would occur and this is quantified and assessed in Jacobs (2021). Groundwater

inflows to the open cut pit would be sourced primarily from the Lachlan Fold Belt Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources and the Sydney Basin Groundwater Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources. However, the maximum predicted annual groundwater inflows to the open cut pit equate to approximately 0.11% and 0.15%, respectively, of the long term average annual extraction limits set by DPIE Water for these groundwater sources.

As previously identified, there would be no lowering of the water table outside of the predicted extent of drawdown due to the Project. Access to the underground water supply outside of the predicted drawdown extent would not be impacted by the Project.

Representative Comment(s)

I have a groundwater licence to pump 11 Megalitres per annum of water for my stock and to water the garden. Bowden's mine is 8.9Km from my farm…if the mine proposes to pump 5 Megalitres per day for 365 days per year – how will the groundwater table not drop drastically.

Janet Walk of Camboon, NSW (Submission SE-8662129)

Response

Potential drawdown of the water table due to groundwater entering the open cut pit has been predicted through peer-reviewed numerical modelling. This modelling was informed by detailed information obtained from extensive site investigations. The Bowdens Silver open cut pit would be approximately 160m deep with a significant volume of the predicted groundwater inflows resulting from the release of groundwater stored in the aquifer. Subsequently, as open cut pit development progresses, the bulk of the dewatering would be derived from aquifer storage. Following the end of open cut pit development (i.e. mining) the predicted drawdown extent has an average radius of in the order of 2km to 2.5km and does not propagate significantly further as, at this distance, the predicted drawdown cone has reached a state of near-equilibrium. This means that groundwater inflow to the open cut pit would be near equal to the horizontal flow of groundwater across the circumference of the drawdown cone and the rainfall recharge occurring within the cone. As a result of this near-equilibrium, all along the approximately 12.5km circumference of the drawdown cone, the horizontal groundwater flow rate towards the open cut pit per metre of circumference becomes so small that the drawdown cone ceases to expand. Therefore, no impacts to groundwater availability are anticipated at the property (i.e. at an 8.9km distance from the open cut pit).

Representative Comment(s)

The right to access groundwater is governed under Water Sharing Plans. Proposed activities require a formal risk assessment to clarify and enable approval decisions. Development of a clear risk assessment framework would enable the risks to be considered.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver has reviewed relevant legislation, regulations, plans and guidelines. No formal requirements have been identified for risk assessment. However, the assessment of potential groundwater impacts arising from the Project was undertaken in accordance with the NSW Aquifer Interference Policy (AIP). A key aspect of the AIP is to protect the access rights of other groundwater users with Annexure 1 of Jacobs (2021) presenting an assessment of the Project against the AIP.

5.11.7 Groundwater Flow Direction

Representative Comment(s)

The baseline groundwater flow direction is not well understood. This raises a concern regarding the prediction of impacts from groundwater contamination during and after mining.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver and its environmental advisors contend that there is no basis for this statement with the baseline groundwater flow directions being well understood. As presented in Figure 28 of Jacobs (2021), composite groundwater contours, derived from available monitoring data, enable the identification of groundwater flow directions. Aside from the written description provided in Section 4.5.13.2 of Jacobs (2021), the groundwater flow direction may be inferred from the groundwater contours as the direction of groundwater flow potential is perpendicular to these contours (in the down gradient direction).

Subsequently, and for clarity, this flow direction can be described as showing a good correlation with topography which indicates that groundwater flow is generally from areas of higher elevation to areas of lower elevation. It is noted however that an omission has been identified in Section 4.5.11.2 of the groundwater assessment that accompanied the EIS which describes the groundwater flow direction in the vicinity of the TSF and open cut pit areas, namely:

- *Groundwater flow directions are variable. In the TSF and open cut pit area however, a general southeasterly flow direction is indicated.*

This should read:

- *Groundwater flow directions are variable. In the TSF and open cut pit area however, general* ***southwesterly and*** *southeasterly flow directions are indicated respectively.*

This omission has been corrected and is provided in Section 4.5.13.2 of Jacobs (2021).

5.11.8 Relationship between Alluvium and Fractured Rock Aquifer

Representative Comment(s)

Aquifers within the alluvium associated with the creeks can be highly productive, and accessed by significant ecosystems and surface water/groundwater users. There is little focus on the relationship between the alluvial aquifers near Lue village, and the groundwater interference proposed in the fractured rock aquifer.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The alluvial aquifers in the vicinity of the Mine Site are discussed in Jacobs (2021) and there are numerous monitoring bores specifically targeting alluvial aquifers. Layer 1 of the groundwater model (8 layers in total) incorporates the alluvial aquifer system. The groundwater model achieves a good correlation between observed (actual) and simulated groundwater levels within the alluvial aquifer. This correlation is a key performance indicator of the model's ability to suitably represent the function of the modelled system.

The drawdown contours presented in Jacobs (2021) are composite contours of predicted groundwater drawdown, irrespective of the model layer represented. As such the predicted drawdown shown in Figures 71 and 72 of Jacobs (2021) present the predicted drawdown within the alluvial aquifers.

No additional drawdown in alluvial aquifers is anticipated above that presented in Jacobs (2021). Conversely, the groundwater model assumes a continuous hydraulic connection between the alluvium and underlying bedrock, whereas in reality, there is likely to be a degree of hydraulic disconnection, with the predicted drawdowns in alluvial aquifers being over-estimated.

5.11.9 Relevance of Paired Bores used for Site Characterisation

Representative Comment(s)

Paired monitoring wells are used to investigate the connectivity between deep and shallow aquifers. In this case, paired wells could be used to understand the relationship between the regional fractured rock aquifer and the shallow alluvial aquifer and leakage from the planned dams. There are no paired monitoring wells within 1.5 km of Lawson's Creek near Lue village so the degree of impact on riverine ecosystems and shallow bore users is poorly defined. Furthermore, conclusions presented in the EIS from the available data require further consideration.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Whilst it is correct that no paired monitoring bores (wells) are within approximately 1.5km of Lawsons Creek near Lue village, it is noted that the paired monitoring location comprising BGW29 and BGW38, are located approximately 1.5km from Lawsons Creek (between the Mine Site and Lue village). The groundwater model used to assess potential impacts was calibrated to groundwater levels obtained from these and other paired monitoring locations as well as regional water levels, including those obtained from monitoring within Lue. Based on the extensive dataset used, Bowdens Silver and its advisors consider the groundwater model to be well calibrated. This position is supported by all independent peer reviewers who identified the model as being fit for the purpose of predicting groundwater level drawdown. Any ambiguity associated with the hydraulic properties of the hydrostratigraphic units situated between the Mine Site and Lue village, namely the Rylstone Volcanics and Coomber Formation, was tested via uncertainty analysis on model predictions. During this analysis, hydraulic properties were varied (i.e. an order of magnitude increase to hydraulic conductivity and a halving of aquifer storage values) along with rainfall recharge parameters. Even under such extreme scenarios, no further significant propagation of drawdown was predicted.

5.11.10 Groundwater Model

Representative Comment(s)

*The model has been prepared generally according to best practice…*and *is fit for the purposes of (a) predicting groundwater level drawdown in space and time, and (b) estimating direct groundwater and incidental surface take that relate to the required mine pit dewatering.*

However, omissions, errors, inconsistencies, and ambiguities have been identified in the report that should be addressed to ensure they are not symptomatic of serious model errors.

DPIE – Water and NRAR Request:

Address and respond to the detailed comments regarding the groundwater modelling reporting presented in Attachment B – see Annexure 11 of Jacobs (2021).

Present the information in a standalone groundwater model report structure and completed according to Chapter 8 in the Australian Groundwater Modelling Guidelines (2012). If any of the issues identified requires model revision, the model should be corrected and re-run. The model report should be updated accordingly.

DPIE – Water and NRAR

Response

A detailed response to DPIE Water comments regarding groundwater modelling reporting is proved as Annexure 11 of Jacobs (2021). It is noted that refined groundwater modelling of the TSF, including advective solute transport modelling, has been undertaken during the preparation of the Submissions Report. The results of this additional modelling are presented in Jacobs (2021). As requested by DPIE Water, the description of modelling in the Groundwater Assessment has been separated into a standalone modelling report that is presented as Annexure 9 of Jacobs (2021).

Representative Comment(s)

The Groundwater Model uncertainty analysis (EIS p4.121) does not consider low groundwater supply and low surface water supply.

The project design should not rely on average flows. In agriculture we must have strategies for 0.05 decile rainfall occurring for one month 3 moths [sic] *and greater than 6 months.*

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

Jacobs (2021) explicitly considers low groundwater supply as part of the uncertainty analysis. This analysis included the assessment of scenarios via additional groundwater model runs with adjusted hydraulic properties, such as low hydraulic conductivity, low aquifer storage, high evapotranspiration and low rainfall recharge. The results of these additional uncertainty model runs are presented in Jacobs (2021).

Whilst not explicitly stated in the groundwater assessment, a low surface water supply scenario is represented in groundwater modelling via the low rainfall recharge scenario. The Project does not place reliance solely on surface water to meet its water requirements. Mine Site runoff would be captured in the site water management system (see Section 4 of WRM, 2020), with priority placed on reuse of this water as opposed to external supply of water. However, this strategy is adopted to provide for the efficient use of water resources and to achieve optimal performance from the water management system.

Representative Comment(s)

There is no assurance that the groundwater model is Class 2. Model Level and suitability for contaminant investigations are not peer reviewed. Inconsistencies in the hydrogeological conceptualisation may require a Class 3 model if significant species are identified and impacted. Inconsistencies include:

- *Misrepresented groundwater quality at Lue village*

- *A lack of hydrostratigraphic interpretation between the site and Lue village, including outcrop of the Coomber Formation*
- *A lack of consideration of the impact of faults, especially around the TSF and leachate management dam*
- *The provenance of hydraulic conductivity testing does not extend across the faults, with the current uncertainty range. Considering the uncertainty, the proposed range of between 50-300 years to fill the pit is relatively narrow.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Comments relating to 'misrepresented' groundwater quality in Lue are addressed in Section 5.11.19. In summary however, the existing groundwater quality in Lue had no influence on any aspect of the groundwater impact assessment.

The groundwater model developed for assessing groundwater impacts has been peer-reviewed by Dr Noel Merrick (HydroSimulations, 2019) as well as an independent peer review commissioned by DPIE and an additional review by DPIE Water. All peer reviewers and reviewers identified the groundwater model as fit for purpose. Implicit in the findings of the peer reviews is the groundwater model meets the appropriate confidence level classification for its intended purposes, these being the prediction of groundwater level drawdown and estimation of the direct and incidental groundwater and surface water take associated with open cut pit dewatering.

In addition to the above, a detailed assessment of the model confidence level classification is provided in Table 1, Annexure 9 of Jacobs (2021).

5.11.11 Predicted Mine Inflows

Representative Comment(s)

Under the Aquifer Interference Policy 2012 s.2.1, where uncertainty in predicted mine inflows may have a significant impact on the environment or water users, additional information is required.

- *The uncertainty is acknowledged in Section 7.2, 7.5.1, (Jacobs (Australia), 2020)*
- *Sensitive receptors in Hawkins and Lawsons Creeks and associated aquifers are acknowledged in Section 8.2*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Uncertainty analyses are presented in Jacobs (2021). These analyses show that no additional significant propagation of groundwater drawdown is anticipated under the scenarios assessed. The most substantial change in predicted drawdown resulted from the high hydraulic conductivity scenario. This scenario assessed a universal, order of magnitude increase in hydraulic conductivity values for all model layers across the model domain. This increase resulted in a bulk hydraulic conductivity value for the Coomber Formation as high as 0.9m/day in the regolith zone (Layer 3) and 0.6m/day in the underlying rock (Layer 4). The Coomber Formation comprises

approximately half of the bedrock between Lue village, Lawsons Creek and the Mine Site. While hydraulic conductivities of this magnitude may be locally achievable through interconnected fracturing, they are overly conservative (very high) and unrealistic when applied on a regional scale.

5.11.12 Groundwater Drawdown Impacts

Representative Comment(s)

The groundwater drawdown (25m on site alone) will have an unacceptable effect on the Lawson Creek and other local waterholes and springs.

Jolieske Lips of Clandulla, NSW (Submission SE-8482089)

It is highly likely that the springs, seeps, wetlands, stream and terrestrial vegetation GDE communities will all be impacted by the predicted conservative drawdown levels.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Jacobs (2021) describes the approach to groundwater modelling and therefore the predicted drawdowns as being conservative. For the purposes of clarification, a conservative approach to impact assessment is one that, whilst based on parameters that are within the range considered plausible and reasonable, are likely to result in less desirable (or worst case) outcomes. In this respect, the predicted drawdowns presented in Jacobs (2021) are considered more likely to be an over-prediction than an under-prediction.

Furthermore, neither significant drawdown nor significant impacts are anticipated for Lawsons Creek. Water holes and springs outside of the predicted drawdown extents would not be affected.

It is recognised that springs associated with groundwater within the Mine Site would likely be affected by depressurisation due to dewatering. However, numerous "springs" within the Mine Site are actually the surface expression of local catchment interflow that, whilst occurring within the soil profile, are not connected to the regional groundwater system. Subsequently, such springs and seepages would be unaffected by drawdown.

Representative Comment(s)

This mine will use a lot of water. It will take groundwater from the Lawson Creek catchment, 5 megalitres every day which is not available in our catchment.

Elizabeth White of Paddington, NSW (Submission SE-8484710)

…approximately 800 mega litres of this water to be taken from the Lawson Creek Valley will destroy the water table.

Mudgee District Environment Group of Mudgee, NSW (Submission SE-8622333)

Response

The predicted peak dewatering requirement for the main open cut pit is approximately 3.5ML/day, whilst the predicted peak annual dewatering volume (Year 4) is approximately 1 066ML which equates to 2.9ML/day. The predicted average annual dewatering requirement, over the Project life is approximately 774ML (approximately 2.1ML/day). As noted in Section 5.11.7, the bulk of this volume would be derived from groundwater stored within the fractured and porous rock aquifers. As the proposed open cut pit is approximately 160m deep, this aquifer storage represents a significant volume of groundwater available for release as the result of open cut pit development.

Furthermore, as noted in Section 5.11.7, at a radius of nearly 2km from the centre of the open cut pit, the drawdown cone has reached a state of near-equilibrium, meaning that the flow of groundwater from all points along the circumference of the drawdown cone, plus any rainfall recharge that may occur within this cone, is equal to the groundwater inflows to the open cut pit.

Therefore, any water table decline (groundwater drawdown) would only occur within the area of predicted drawdown (i.e. within a radius of approximately 2km from the open cut pit). Groundwater drawdown is not predicted to affect the wider catchment (Lawsons Creek included) and the groundwater supply potential, outside of the area of predicted drawdown, would not be impacted.

5.11.13 Impact on Box Gum Woodland

Representative Comment(s)

The White Box-Yellow Box-Blakely's Red Gum Grassy Woodland is listed as critically endangered. The EIS does not clearly explain how groundwater drawdown from the proposed Project will impact these protected woodlands outside the mine site.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Section 7.4.8 of EnviroKey (2021) and EIS Section 4.10.6.3 discuss the potential implications of groundwater drawdown on terrestrial biodiversity. In summary, EnviroKey (2021) concluded that groundwater drawdown associated with the Project was unlikely to have an adverse effect on vegetation as:

- the vegetation remaining in EnviroKey's Study Area is unlikely to be obligate phreatophytes (i.e. groundwater dependent).
- The vegetation within EnviroKey's Study Area is unlikely to draw water from the regional groundwater table, but rather more likely to rely on rainfall and subsequent infiltration or groundwater within drainage lines.

5.11.14 Final Groundwater Levels

Representative Comment(s)

The final water level is predicted to stabilise 130 years after mining. Site groundwater contour maps, including maps around the TSF and pit lake, should be included for assessment.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Pit lake spill point of 597 mAHD and the operating level of 572.5 mAHD are both higher than the level of Lawsons Creek near Lue village (~550 mAHD), indicating the potential for reestablishment of the natural groundwater flow carrying evapo-concentrated pit lake water and site contaminants down gradient.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Post mining water table contours are provided in Jacobs (2021) which includes refined modelling of the TSF and seepage potential.

The final void water table contours indicate that, from the final void, groundwater flow direction is generally to the southeast toward Hawkins Creek, with no direct flow towards Lawsons Creek or Lue. The contours indicate a shallow gradient from the pit lake towards Hawkins Creek of less than 1% (1m elevation for every 100m distance). Based on this gradient over an approximate distance of 800m, and applying conservative indicative hydraulic parameters (Kh = 0.1m/day and effective porosity of 5%), a potential groundwater travel time in excess of 100 years is indicated.

Given the distance to Hawkins Creek and indicative travel times, and including allowance for dilution and attenuation of any seepage constituents along the flow path, degradation of water quality in Hawkins Creek or surrounding groundwater due to seepage from the final void is considered unlikely.

5.11.15 Link Between WRE/TSF Management and Groundwater Assessment

Representative Comment(s)

The groundwater assessment (Jacobs 2020) considers groundwater availability around the site. No peer review has been conducted on groundwater contamination risks. The hazardous nature of substances in the WRE and TSF merit a local and detailed model of hydrogeological processes to adequately manage the proposed activity. There is significant risk of TSF leachate bypassing the seepage collection ponds and entering the groundwater system.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Refined modelling, including solute transport modelling, has been undertaken in the vicinity of the TSF to assess seepage rates and potential impacts (Jacobs, 2021). The modelling adopted a conservative approach, considering advective transport and dispersion only. As such, the approach is likely to over predict potential seepage concentrations arriving at Lawsons Creek without the mitigating influence of degradation of adsorption to aquifer materials along the flow path.

Two alternative TSF design options were considered in the modelling, both of which differ from that presented in the EIS and comprised:

- Design Option 1 – a full bituminous geomembrane liner beneath the entire TSF; and
- Design Option 2 – a partial bituminous geomembrane liner and underdrains that extended beneath the extent of the decant pond.

Aside from the extent of the bituminous geomembrane liner and underdrainage, all other design options remained as presented in the EIS.

For both design options, total flux and percentage of water reaching Lawson Creek and that originated at the TSF were calculated. The first arrival of groundwater at Lawsons Creek originating at the TSF is predicted to occur after 60 years. Percentages of groundwater originating at the TSF reporting to Lawsons Creek peak at approximately 2.5% at 150 years for Design Option 1 and 14% after 180 years for Design Option 2.

An assessment of potential contaminants of concern reporting to Lawsons Creek has been undertaken based on the refined TSF model outcomes. The assessment considered mixing with natural groundwater along the flow path and dilution on arrival at Lawsons Creek.

While modelling indicates there is the potential for some concentrations greater than guideline values to arrive at Lawsons Creek, it is also apparent that background concentrations of some constituents in groundwater and surface water naturally exceed the guideline values.

For TSF Design Option 1, copper, zinc, cyanide and phosphorous exceed guideline values when arriving at Lawsons Creek, and for Design Option 2, cadmium, chromium, lead and manganese are added. When dilution with surface flows in Lawsons Creek is considered, for low and median flows for Design Option 1, only copper and zinc remain above guideline values, with median flow concentrations only marginally exceeding the guideline values and commensurate with background concentrations. For Design Option 2, at low flow, cadmium, copper, cyanide and zinc exceed the respective guideline values, with only copper and zinc persisting above guideline values at median flow due to the elevated background concentrations.

In order to further refine the understanding of risks to water quality in Lawsons Creek, Bowdens Silver has committed additional assessment including reactive transport modelling to further quantify the geochemical processes and natural attenuation of potential seepage from the TSF to inform detailed design. Regardless, it is considered that the assessment undertaken to date is sufficiently detailed and conservative to support approval of the conceptual design of the TSF for the Project.

5.11.16 WRE and Leachate Dam

Representative Comment(s)

57% of waste rock is potentially acid forming (PAF). No acid treatment plan has been presented. Leachate from the waste rock emplacement (WRE) is planned to be sent to a leachate management dam that has a design of 1 m of freeboard proximal to Price and Hawkins Creeks. Despite the presence of local faults, monitoring for leakage, triggers and a contingency plan to remediate leakage in the leachate management dam are not provided. The WRE and leachate dam do not minimise impacts to the greatest extent practicable using best practice.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The management of PAF waste rock would be via encapsulation within the WRE, a lined and capped engineered landform specifically designed to manage potentially acid forming material. The conceptual design of the WRE and leachate management measures are provided in

Advisian (2020a). As noted in Advisian (2020a), the leachate management dam would be a fully lined "turkeys nest" style dam with a capacity of 65ML. For conservatism, this capacity was calculated to safely store the full 217mm rainfall depth, from the largest WRE cell (Cell 7, see Table 5 of Advisian 2020a), for the 72 hour, 1% AEP design rainfall event with 1m freeboard. However, not all rainfall would become runoff, meaning that the full storage volume is unlikely to be required. Should a rainfall event of rarer frequency or longer duration occur during operations (when the contributing WRE catchment may be greatest), integration of the dam with the site water management system via pump and pipe, plus the 1m freeboards would limit the dam's potential to overtop.

The specific management measures in place for the leachate management dam, including contingency measures, would be described in the Water Management Plan for the Project. This plan would be prepared in the event the Project is approved and submitted to relevant authorities (e.g. DPIE, DPIE Water and NRAR) for approval prior to operations commencing.

5.11.17 Groundwater Leakage / Contamination

Representative Comment(s)

The geology and hydrogeology around the TSF lacks detail. Further consideration of hydrogeological processes around the TSF would provide further confidence in the predicted behaviour and fate of leachate seeping from the TSF.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

The native groundwater flow direction from the TSF is misreported; existing groundwater contouring is not well explained; evidence of leachate migrating from the TSF is presented, however, the fate of leachate if it reaches the water table has not been demonstrated. Considering these factors, further investigation of leachate is warranted.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

The groundwater analysis should consider the relationship of groundwater, including leakage from the leachate management dam, the TSF and pit lake after 130 years, with each creek separately.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

An assessment of the impact of acid mine drainage seeping from the TSF and pit lake (once full) should be included. The influence of faults should be considered.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Treatment of contaminants in the TSF is not presented in the EIS. The TSF is planned to be constructed on a fault. 1.6 ML/day of TSF leakage is planned without considering the fault risk. The planned monitoring places few controls on compliance with the design and there is no contingency plan to remediate leakage. No peer review of contamination risks has been presented.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

The use of particle tracking or MODFLOW USG-Transport modelling would enable groundwater contamination risks to be considered during operations and after mining (e.g. 50, 100 and 200 years).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver commissioned Jacobs to refine the groundwater model to include advective transport modelling in the vicinity of the TSF in response to submissions and to assess additional design elements to further reduce potential impacts from seepage from the TSF. This refinement included a more detailed definition of the extents of alluvial deposits, based on further field mapping and observations, as well as the refinement of regolith thicknesses, based on geotechnical drilling and test pits in the vicinity of the TSF. However, the basal lithology underlying the majority of the TSF and Lawsons Creek alluvium (Rylstone Volcanics) remains largely unchanged, other than to accommodate any changes to extent and thickness of alluvium and regolith.

The model iterations, their development, implementation and results of groundwater flow and advective transport modelling to determine surface water and groundwater quality implications are provided in Section 6.5 and Annexure 10 of the updated Groundwater Assessment (Jacobs, 2021), whilst Annexure 1 of Jacobs (2021) provides an assessment against minimal impact considerations of the AIP. In summary, the results of this refined TSF modelling required no revision to the assessment under the AIP.

Bowdens Silver recognises that historic faulting exists in the vicinity of the TSF (and elsewhere on the Mine Site) as the geological structures presented in the EIS are derived from geological and geophysical mapping and interpretation. However, it is noted that the Meadow Fault, which transects the TSF area, is not present in the overlying Sydney Basin sediments. This absence from overlying strata confirms that the Meadow Fault has been inactive for at least 160 million years. This is supported by hydrogeological investigations in the Mine Site which indicate that these regional scale fault systems (such as Meadow Fault, Gully Fault, Eastern Fault, and Prices Gully Fault) act more as barriers to groundwater flow than conduits. Any potential for a localised, increased permeability would generally be captured in the bulk order of magnitude increase in hydraulic conductivity utilised for the TSF modelling uncertainty assessment.

The proposed final WRE landform includes a vegetated store-and-release capping and cover system that would eliminate the need for seepage and leachate collection. The effectiveness of the proposed closure and rehabilitation measures would be trialled, monitored and evaluated during operations, as part of progressive rehabilitation of the WRE. As noted in Section 2.16.5 of the EIS, the leachate management dam would be lined during its construction and retained until leachate is no longer being generated. As part of the rehabilitation of the Mine Site, the leachate management dam would be removed and the former landform re-established in this area.

As noted in Section 5.11.14, the final void water table contours indicate a shallow gradient from the pit lake towards Hawkins Creek with no direct flow path towards Lawsons Creek. The shallow gradient, coupled with low permeability of the intervening Rylstone Volcanics and distances to watercourses would result in low groundwater flow velocities and potential travel times towards Hawkins Creek that are in excess of 100 years.

5.11.18 Cyanide Containment

Representative Comment(s)

Different assumptions regarding volume of cyanide used and whether leakage will occur raise concerns about the projects stated ability to contain cyanide.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

As noted in EIS Section 4.16.1.3, cyanide concentrations in the discharge water from the processing plant, (i.e. tailings discharge) would average approximately 2.5 mg/L (Free)[10], 6.5 mg/L (WAD)[11] and 6.7 mg/L (Total)[12] cyanide. As noted in NICNAS (2010), it is anticipated that any cyanide in tailings discharge would rapidly decompose in the decant pond, substantially reducing cyanide concentrations by up to 90%. This decomposition would be due to photolysis (i.e. degradation due to ultraviolet radiation) and volatilisation as hydrogen cyanide (HCN). The low cyanide concentrations at the point of tailings discharge, coupled with rapid decomposition processes identify that if cyanide was present in TSF seepage, its concentration would be very low.

5.11.19 Groundwater Quality

Representative Comment(s)

'Typical' quality of water in EIS Table 4.44 (R. W. Corkery & Co. Pty. Limited, 2020, pp. 4-152) is drawn from six groundwater bores without justification. Median suspended solids in groundwater of 21 mg/L implies improper purging.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

EIS Table 4.44 presents typical groundwater quality anticipated for the open cut pit, with EIS Section 4.7.4.4 clearly stating that these statistics are derived from groundwater bores situated within the footprint of the open cut pit.

Bowdens Silver recognises that the median total suspended solids (TSS) presented in EIS Table 4.44 is 21mg/L. Whilst the period of groundwater data collection used to support this statistic commenced prior to the Applicant's acquisition of the Project, there is no valid reason to disqualify this data nor the method of its collection. It is noted that a 2006 study conducted by the United States Geological Survey (Knobel, 2006) to assess the implications of reduced bore purge volumes concluded that changes to bore purge volumes had no discernible effect on the data acquired.

[10] Free cyanide is cyanide that is present in water as hydrogen cyanide or cyanide ion and is very reactive forming simple salts with alkali earth cations and ionic complexes of varying strengths with numerous metal cations.

[11] Weak Acid Dissociable (WAD) cyanide refers to cyanide species that are liberated at a moderate pH of between 4.5 to 6.0 WAD cyanide is moderately reactive.

[12] Total cyanide includes all free and WAD cyanide complexes, as well as strong metal and noble metal cyanide complexes. These strong cyanide complexes are largely non-reactive.
Comment: The preferred cyanide terminology used in this document is WAD cyanide given the EPA relies upon this term in all Environment Protection Licences issued in NSW.

Representative Comment(s)

There are also statistical inconsistencies in the reporting of heavy metals. Averages ignore values less than the limit of laboratory reporting and include outliers.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

The existing groundwater quality should be accurately reported around the Lue village.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The methodology used to assess water quality statistics has been reviewed and updated statistics are provided in Jacobs (2021). For completeness, the revised averages for heavy metals in Lue village bores that are claimed to be misrepresented in the Lue Action Group submission, are presented below. These revised averages were derived using a substitute value where results were below the laboratory limit of reporting. This substituted value is half of the laboratory limit of reporting.

It is acknowledged that the previously reported average values were therefore greater than those presented below. This was due to the exclusion of results below the laboratory limit of reporting. However, the table on existing water quality has no influence on any aspect of the groundwater impact assessment.

- BGW21 – average nickel concentration (0.043 mg/L): exceeds Australian Drinking Water Guideline (ADWG) value (0.02mg/L).
- BGW24 - average nickel concentration (0.149 mg/L) exceeds ADWG value (0.02mg/L).
- BGW32 – no exceedance of ADWG.
- BGW33 – no exceedance of ADWG.
- BGW35 - average nickel concentration (0.497 mg/L) exceeds ADWG value (0.02mg/L).
- BGW37 – no exceedance of ADWG.

5.11.20 Water Access Licences

Representative Comment(s)

Confirm that the Controlled Allocation Order process has been completed, relevant WALs obtained and peak water take accounted for.

Clarify the water management zone details for the Water Access Licenses (WALs) RO1218-111 and RO13-19-097 and confirm the project has sufficient entitlement in the correct zone which is the Sydney Basin MDB (Other) Water Management Zone of the Sydney Basin MDB Groundwater Source.

DPIE Water and NRAR

SVL has entitlements of 1066Ml of groundwater entitlements at Lue (EIS p2.64). Could you provide us with more information to make an informed decision about effects on groundwater supply in our area?

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

The previous responses in Sections 5.11.3 and 5.11.7 regarding groundwater drawdown and risk to groundwater users are also relevant to these comments. Based on the results of peer-reviewed groundwater modelling, Bowdens Silver maintains that no impacts to groundwater supply would occur in the Havilah area that is approximately 9km from the open cut pit.

1 066ML per year is the predicted peak annual inflow to the open cut pit from all groundwater sources for Year 4 of mining. However, the peak individual take from each of the three groundwater sources does not occur concurrently.

In accordance with the AIP, Bowdens Silver must hold groundwater entitlement options totalling 1 101 ML to cover the maximum predicted inflows. To meet these obligations, Bowdens Silver holds the following groundwater entitlement options.

- 907ML from the Lachlan Fold Belt (Other) Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources to cover peak inflow from this groundwater source in Year 4 of mining.
- 194ML from the Sydney Basin Groundwater (Other) Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources to cover peak inflow from this groundwater source in Year 9 of mining.

These entitlements are licensed volumes issued by NSW regulatory authorities. While these values are high relative to on-farm use of water and may appear to be significant when considered against water available from these sources as assessed by the NSW Government they equate to approximately:

- 0.11% of the 821 250.47ML per year identified as the long-term average annual extraction limit for the Lachlan Fold Belt Groundwater Source
- 0.15% of the 604 42.96ML per year identified as the long-term average annual extraction limit for the Sydney Basin Groundwater Source.

Therefore, impacts to local groundwater supply have been considered from two perspectives for the Project.

1. Groundwater drawdown in the vicinity of the Mine Site
2. Total water take expressed as the peak licence requirement

In all cases, as confirmed by the peer-reviewed groundwater model that is considered fit for purpose by DPIE Water, the impacts to local groundwater users are considered acceptable under the AIP and have been accounted for, where required, in accordance with the AIP (see Annexure 1 of Jacobs (2021)). Regardless, under the AIP, Bowdens Silver would be required to provide make good arrangements for any groundwater users that experience a decline in groundwater availability as a direct result of the Project.

5.11.21 Water Supply Borefield

Representative Comment(s)

The proponent should clarify whether a borefield is part of this application and provide details of the proposed borefield review and approval.

DPIE Water and NRAR

Response

Bowdens Silver are assessing options for water supply resiliency, including ongoing investigations around the Mine Site to assess the potential for deep groundwater resources to supplement the proposed supply options. These investigations are coincidental to regional mineral resource investigations and are ongoing. The primary water supply arrangements remain as presented in the EIS namely, mine dewatering, rainfall and runoff capture, supplemented by water imported from the Ulan Coalfield.

Should additional reliable groundwater supply options be indicated in the vicinity of the Mine Site in future, the appropriate investigations and assessment for approvals would be undertaken at that time.

5.11.22 Groundwater Contamination Controls

Representative Comment(s)

Groundwater contamination is predicted, however, there are few controls on contamination spreading 40 m from the site boundary as prescribed under the Aquifer Interference Policy.

More confidence that contamination will not breach the 40 m distance from the site boundary is sought.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The AIP requires that the beneficial use of an aquifer not be diminished beyond 40m from the activity. In this instance, the 40m limit is inferred from the Mining Lease boundary of the Project. Whilst the TSF seepage management and mitigation measures presented in the EIS, are preliminary only, the assessment of their effectiveness identifies no reduction in beneficial use as the result of TSF development.

Further refinement of TSF seepage controls would occur, as required. Any refinement would be based on site investigations to support detailed design of the TSF. Detailed TSF design would further progress seepage management, mitigation, monitoring and recovery measures to reduce any risk of potential seepage.

Refined modelling of the TSF considered both the preliminary seepage mitigation measures (bituminous membrane liner, clay liner, grout curtain and seepage interception trenching) and additional TSF design elements included at the request of Bowdens Silver.

The model iterations, their development, implementation and results of groundwater flow and advective transport modelling to determine surface water and groundwater quality implications are provided in Section 6.5 and Annexure 10 of the Groundwater Assessment (Jacobs, 2021) whilst Annexure 1 of Jacobs (2021) provides an assessment against minimal impact considerations of the AIP.

Table 25 of Jacobs (2021) identifies that there is the potential for some concentrations greater than guideline values to arrive at Lawsons Creek (see Section 3.3 of this document and Annexure 10 of Jacobs, 2021). However, a conservative approach to modelling seepage with the refined TSF model was undertaken, considering the advective transport and dispersion of potential seepage only. As such, this approach is likely to over predict groundwater concentrations arriving at Lawsons Creek as it does not consider the mitigating influence of degradation of adsorption to aquifer materials. Bowdens Silver has committed to reactive transport modelling to further quantify the geochemical processes and natural attenuation of potential seepage from the TSF to inform detailed design.

It is also apparent that background concentrations of some constituents in groundwater and surface water exceed the guideline values.

5.11.23 Monitoring

Representative Comment(s)

The proponent has an extensive groundwater monitoring network situated around the proposed open pit mine, and an adequate regional monitoring network needed to define baseline conditions within and around the mine area. However, preliminary monitoring coverage around the TSF is limited to 5 bores of varying depths, one of which is within the TSF footprint.

The EPA is satisfied with the proposed monitoring objectives and seek to have it extended to additional monitoring bores to be drilled prior to commencement of works, if approved. The EPA acknowledges the commitment to a GMP with updated monitoring infrastructure and details but seeks that the proponent have it reviewed and endorsed prior to commencement of construction.

NSW Environment Protection Authority

Response

Bowdens Silver acknowledges this comment and would provide further information on proposed groundwater monitoring as part of an approved Water Management Plan.

Representative Comment(s)

Investigation wells enable an understanding of the geology between activities and neighbouring beneficial users of groundwater. No investigation bores have been drilled between the site and the Lue village. These would have been useful to investigate site hydrogeology and identify any barriers that may protect riverine ecosystems and shallow bore users from drawdown associated with mining. At Lue village, around 10 households can depend on groundwater for potable use during times of water scarcity. Potential impacts on riverine ecosystems and shallow bore users requires definition in the EIS.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver maintains an extensive groundwater monitoring network comprising purposely drilled and installed monitoring bores (wells) on Bowdens Silver's landholdings and private bores where the landholder provides access for groundwater monitoring. Bowdens Silver acknowledges the benefits from increased data collection and more intensive monitoring coverage. However,

Bowdens Silver is confident that the existing groundwater monitoring network and hydrogeological investigations undertaken are more than adequate to meet the objectives of the groundwater assessment. As noted by the NSW EPA, Bowdens Silver's existing groundwater monitoring network is extensive and provided adequate baseline data for the groundwater assessment. This latter point was also noted in DPIE Water's review which acknowledged sufficient baseline information was used to render the groundwater modelling fit for purpose.

Representative Comment(s)

A Water Management Strategy and details of a Trigger Action Response Plan are required in the SEARs. Impacts to significant water resources and threatened species must be minimised to the greatest extent practicable. There is no inference of where new monitoring wells would be drilled, nor which locations would be used to monitor what during and post mining (sic). *Identifying the dependence of groundwater users, including ecosystems, on the native groundwater system would enable an effective monitoring plan, including trigger levels against analytes or water levels (availability), to be determined.*

The monitoring network should be improved and detailed. Triggers for action should be agreed with the community now and approved.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

In the event the Project is approved, Water Management Plan would be prepared in consultation with DPIE, DPIE Water and the NSW EPA. Such a plan would require approval prior to mining commencing. The plan would identify the appropriate monitoring locations and monitoring parameters. Site specific trigger criteria would be established based on the monitoring data record and in consultation with NSW regulatory agencies.

Developing such a plan prior to mining commencing, as opposed to the environmental approvals stage, allows for further collection of monitoring data. As Bowdens Silver's groundwater monitoring program continues, this monitoring data may then be used to derive more representative trigger values that would be presented in the Water Management Plan.

As noted by the NSW EPA, Bowdens Silver's existing groundwater monitoring network is extensive and provided adequate baseline data for the groundwater assessment. This latter point was also noted in DPIE Water's review that acknowledged sufficient baseline information was used to render the groundwater modelling fit for purpose. Prior to, and during operations, information from this monitoring network would be regularly reviewed to provide further network refinement where necessary.

5.11.24 Risk Assessment

Representative Comment(s)

There is no quantitative risk assessment – likelihood, consequence, risk, mitigation.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

This statement is incorrect, Appendix 7 of the EIS presents the environmental risk assessment undertaken for the Project.

5.11.25 Best Practice Mitigation Measures

Representative Comment(s)

Best practice and full range of methods not discussed – examples from Cloudbreak and other mine's treatment of contaminants should be followed.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver confirms that the management measures considered and presented in the EIS and various assessments are based on current industry best practice. It must be noted that designs for the WRE and TSF are preliminary only and suitable for the current stage of mine planning. These designs would be further advanced during detailed design.

Bowdens Silver notes that the Cloudbreak Mine is not a suitable comparison for this Project. The Cloudbreak Mine is an iron ore operation located in the Pilbara region of Western Australia which requires substantially different environmental management measures due to its geology, terrain, climate and groundwater regime.

5.11.26 Key Performance Indicators

Representative Comment(s)

More definitive and robust key performance indicators would instil confidence in the planned management.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Key performance indicators relating to groundwater would be included in a Water Management Plan that would be prepared in consultation with DPIE, DPIE Water and the NSW EPA.

5.11.27 DPIE Water and NRAR Specific Questions/Considerations

Whilst a range of very minor errors, inconsistencies and formatting matters were raised by the DPIE Water reviewer and are addressed separately in Annexure 11 of Jacobs, 2021, the responses below are provided to those matters that are considered material to the Groundwater Assessment.

Representative Comment(s)

Supply more information to better address the risks of water quality impacts on the receptors downstream of the tailing storage facility (TSF) (including the water utility borefield) as a result of migration of contaminants associated with the groundwater mound underneath the TSF including:

a) *Confirmation of standards used for the design of the lining of the TSF as it appears the design allows for 0.5 metres of lining rather than a 1.0 metre thickness;*

b) *Ensuring that the predictions are substantiated with pre and post mining piezometric (groundwater level) maps with groundwater flow directions rather than referring to drawdown maps.*

c) Revising the assessment against the Aquifer Interference Policy (AIP) framework if an update is necessary.

d) Assessing and expressing clearly the groundwater quality impacts on the Sydney Basin MDB Groundwater Source and provide details how the water quality impact falls within Level 1 minimal impact assessment criteria of AIP.

Response

a) The preliminary design for the TSF presents discussion on the liner design (see Section 17 of ATC Williams (2020)). This discussion identifies that the assessment of the 0.45m compacted clay liner proposed in preliminary design was undertaken using laboratory (consolidation) testing of tailings samples and permeability testing of clay samples obtained from the TSF impoundment area. As noted in Section 17.4 of ATC Williams (2020), based on the assessment, even with tailings at their maximum thickness (20m), the expected seepage rate from the TSF ($6.0 \times 10^{-9} m^3/sec/m^2$) is lower than the maximum allowable seepage rates identified by the EPA for a liner with a thickness of 1.0 m ($2.0 \times 10^{-8} m^3/sec/m^2$). This notwithstanding, additional TSF design elements have been assessed at the request of Bowdens Silver to further reduce potential groundwater impacts in recognition of submissions received from the community. The model iterations, their development, implementation and results of groundwater flow and advective transport modelling to determine surface water and groundwater quality implications are provided in Section 6.5 and Annexure 10 of the updated Groundwater Report (Jacobs, 2021) whilst Annexure 1 of Jacobs (2021) provides an assessment against minimal impact considerations of the AIP.

b) Groundwater level maps for both the pre-mining and predicted post-mining condition are provided as Figures 28 and 49 of the updated Groundwater Assessment (Jacobs, 2021).

c) Bowdens Silver commissioned Jacobs to undertake refined groundwater modelling in the vicinity of the TSF in response to submissions and to assess additional design elements to further reduce potential impacts from seepage. The model iterations, their development, implementation and results of groundwater flow and advective transport modelling to determine surface water and groundwater quality implications are provided in Section 6.5 and Annexure 10 of the updated Groundwater Assessment (Jacobs, 2021) whilst Annexure 1 of Jacobs (2021) provides an assessment against minimal impact considerations of the AIP. In summary, the results of this modelling required no revision to the assessment under the AIP.

d) As noted above, refined groundwater modelling of the TSF did not alter the previously presented minimal impact considerations.

5.12 HEALTH

5.12.1 Overview

The following subsections provide a response to matters raised in relation to physical and mental health (excluding matters relating to lead which are addressed in Section 5.15). A range of information provided in the response to matters relating to air quality (see Section 5.5 of this document) also provide relevant background to some of the matters raised in this section. Where applicable, cross references to these other response sections are provided.

A comprehensive HHRA has been undertaken that considered potential impacts on community health in relation to the predicted / assessed changes in air quality, water (both surface water and groundwater) and noise. An updated version of the HHRA is included as **Appendix 7** which clarifies and expands on matters presented in the assessment presented in the EIS. A sensitivity calculation has also been included relating to adoption of lower background lead concentrations as suggested in the review undertaken for the Lue Action Group (further discussed in Section 5.15 of this document).

No physical health risk issues have been identified that would be associated with the Project. Mental health matters, principally stress and anxiety, have also been raised by the community and addressed within the EIS and SIA. Notwithstanding, an extensive range of both proactive and reactive / adaptive management measures are proposed for the Project to minimise the potential for unexpected impacts to both physical and mental health.

The following responses to health issues raised within the submissions provides further clarification and information, where necessary. The key issues and responses in relation to health are as follows.

- Radioactive components of minerals would not be liberated by the proposed operations to interact within the environment.
- Where applicable, the assessments have assessed cumulative impacts with relevant criteria and guidelines. The use of conservatively high baseline metal concentrations (as suggested within some submissions) effectively results in a more conservative assessment with less 'buffer' remaining for any incremental increase to remain within the acceptable cumulative risk.
- The predicted concentrations for both respirable crystalline silica and cyanide are significantly below the respective health guidelines with the HHRA concluding that there are no health risk issues in relation to community exposures.
- Both positive and negative mental health outcomes have been identified in submissions. Management measures are proposed to ensure that the community is accurately informed of Project progress and availability of support for health services that would be provided through Bowdens Silver's Community Investment Program.
- It has been reaffirmed that an extensive range of monitoring is proposed and would commence at the beginning of operations to demonstrate compliance with the relevant criteria and guidelines.

Whilst these responses and the minor updates to the HHRA assist in clarifying the various matters raised within the submissions, the outcomes of the HHRA remain consistent with those originally presented, i.e. the Project presents no health risk issues to the local community.

5.12.2 General

Representative Comment(s)

Job creation must not come at the expense of human health.

Susannah White of Mudgee, NSW (Submission SE-8631516)

Response

Bowdens Silver agrees that activities must only be undertaken in a manner which carries acceptable risk to human health. Accordingly, to assess this risk, an extensive HHRA was prepared by specialist health risk consultants enRiskS and peer-reviewed by Priestly Toxicology Consulting. This comprehensive assessment has determined that the Project presents no health risk issues.

Representative Comment(s)

When these rocks are crushed, they will release radioactive elements.

(Name Withheld) of Mudgee, NSW (Submission SE-8634609)

Response

The concentration of elements in the Bowdens deposit has been widely measured from drill core and drill cutting samples. When crushed, radioactive portions of the rocks would not be liberated from minerals in which they occur to interact with the environment. (e.g. zircon, sphene, apatite, oxide of iron manganese (or) titanium in volcanic glass). The radioactive elements in the rocks to be mined are very low concentrations of Uranium (U) and Thorium (Th).

Of the 47 206 analyses for U and Th undertaken to date, uranium has been detected in 30.8% and Thorium in 41% of samples. When detected, the average concentration was 7ppm Uranium and 13ppm Thorium.

In order to place these concentrations in perspective, an average granite bench top contains 4ppm Uranium and 12ppm Thorium. For ore to be classed as radioactive in NSW a prescribed concentration of 2000ppm Uranium or 5000ppm Thorium must be present, or a combination where the sum of the ratios of the measured concentration of each substance to the prescribed concentration for that substance is greater than one[13].

Representative Comment(s)

Being an elderly resident in Lue for the last 6yrs I feel that if the mine goes ahead I will have to move as I feel I will be concerned about the quality of the air and water on my health!

Yvonne Butler of Lue, NSW (Submission SE-8638159)

Response

Bowdens Silver recognises the community's concerns regarding potential health impacts and as a result of extensive community consultation commissioned extensive specialist studies, including a HHRA prepared by specialist health risk consultants enRiskS and peer-reviewed by Priestly Toxicology Consulting. Both assessments have not identified any health risk issues for the local community.

The HHRA assessed the potential for health impacts relating to air quality (including metals), water and noise at the most affected residence in close proximity to the Mine Site and determined the Project would present no health risk issues It is noted that the adopted health guidelines are protective of health for all members of the community, including infants, the elderly and sensitive individuals.

[13] https://www.legislation.nsw.gov.au/view/whole/html/inforce/current/sl-2013-0052#sec.5

Representative Comment(s)

Very fine mineral dust particles from blasting and drilling can accumulate in the lungs, causing a disease called pneumoconiosis.

(Name Withheld) of Mudgee, NSW (Submission SE-8634609)

The risk of mining dust exacerbating chronic cardiovascular or respiratory disease is not the only health concern emanating from this project. Those exposed to mining dust are at risk of developing the serious condition of pneumoconiosis.

The Bowdens Silver Project has the potential to exacerbate the both (sic) *respiratory and cardiovascular disease in a Local Health District which is already demonstrating signs of health disadvantage.*

Imants Rubenis of Petersham, NSW (Submission SE-8645461)

Response

Assessment of fine particulates (PM_{10} and $PM_{2.5}$), which are the key particle sizes of concern for respiratory and cardiovascular effects, has been undertaken and compared against relevant standards for air quality and assessed in terms of potential health impact, that include protection of respiratory and cardiovascular effects. The assessments have concluded that PM_{10} and $PM_{2.5}$ would remain below the relevant health impact criteria. Furthermore, the maximum incremental risk (for all health effects including respiratory and cardiovascular effects) arising from the Project's contribution to $PM_{2.5}$ levels was less than the acceptable risk level outlined in the *NSW Approved Methods for the Modelling and Assessment of Air Pollutants* (NSW EPA, 2016).

5.12.3 Assessment Methodology

Representative Comment(s)

The EIS uses standard methods for health risk modelling. However, the values used to model the risk index from existing exposures and intakes appear to be significantly larger than values measured by Macquarie University, as presented in this report. The modelling in the EIS is used to represent the proportionate increase in incremental risk from the project (e.g. Figure 5.4 p. 7 – 80). As result of the data used for the natural baseline, the impacts of the operations appear to be less than what they would be if more representative data were used.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The modelling undertaken within the AQA has been completed in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2017). In accordance with these guidelines, modelling of the incremental impacts was undertaken and incremental and cumulative levels of dust and metals were assessed against the appropriate criteria (with some criteria being for incremental and other for cumulative). EnRiskS have similarly presented both the incremental and cumulative risk index for metals. The incremental risk is not affected in any way by the baseline.

However, in the event that the baseline metal concentrations have been overestimated, this provides a more conservative assessment with less 'buffer' remaining for any incremental increase to remain within the acceptable cumulative risk. Further discussion regarding baseline lead levels is provided in Section 5.15.5 of this document.

5.12.4 Silicosis

Representative Comment(s)

…there can be no "acceptable " level of dust release when it contains silica in fine particles.

(Name Withheld) of Totnes Valley, NSW (Submission SE-127486)

Crystalline Silica (which is found in rock) dust which can travel up to 10Km away, creating potential water contamination to Lue village and surrounding water catchments…crystalline Silica causes Silicosis, lung cancer, Pulmonary Tuberculosis, airway disease, autoimmune disease and renal disease.

(Name Withheld) of Mount Frome, NSW (Submission SE-8571413)

Dispersion of respirable crystalline silica (as $PM_{2.5}$ annual average) derived from Project operations will require regular monitoring to ensure that appropriate levels are met in the community based on 3 µg/m^3 now applied in Victoria (EPA Victoria 2007) based on California EPA Office, and beyond the current workplace exposure level of 0.05 mg/m^3 (50 µg/m^3). Evidence from coal mining in the Hunter Valley shows that heavy vehicles on mine sites creates $PM_{2.5}$ particulates by action of tyres driving over sedimentary rock and releases silica particles.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Silica in the form of quartz is one of the most commonly occurring minerals on the Earth's surface, with over 95% of the earth's crust made of minerals containing silica. There are two forms of silica – crystalline silica and amorphous silica. The type of silica of concern is respirable crystalline silica.

Specific health effects of respirable crystalline silica are related to repeated and prolonged workplace exposure (typically over many years). There is no guidance in NSW for community exposure to silica. However, Victorian EPA applies an annual average guideline of 3µg/m³ for non-occupational exposures to respirable crystalline silica. This is consistent with the public health guideline established by the California EPA Office for Environmental Health Hazard Assessment (OEHHA 2005), and slightly higher than the Texas Commission on Environmental Quality (TCEQ) long-term guideline of 2µg/m³ (TCEQ 2009).

The maximum annual average concentrations of crystalline silica derived from the Project at surrounding privately-owned residences (0.21µg/m³-over all years), is an order of magnitude lower than the most stringent of the available health-based guidelines. On this basis, there are no health risk issues in relation to community exposures to crystalline silica derived from the Project and therefore ongoing monitoring has not been recommended by the AQA or HHRA.

Notwithstanding, Bowdens Silver recognises that management of respirable crystalline silica would be required for its workforce and would involve a program of on-site monitoring consistent with industry standards.

It is also confirmed that the AQA and HHRA considered and accounted for $PM_{2.5}$ emissions sourced from haulage activities (i.e. vehicles driving over rock).

5.12.5 Cyanide

Representative Comment(s)

Cyanide is acutely toxic to humans … is this what you want upstream from Mudgee, Dubbo and beyond?

Terry Kavanagh of Bara, NSW (Submissions SE-8640671)

Cyanide effects, prevents the cells of the body from using oxygen. … Cyanide is more harmful to the heart and brain than any other organs.

Patricia Kempton of Mount Frome, NSW (Submissions SE-10304465)

Response

Section 5.4 of the HHRA and Section 4.8.5.5 of the EIS provide an assessment of cyanide and outline what the fate would be of the cyanide used for the Project. In particular, the following quote is repeated to explain the toxicity profile for cyanide.

> "*The principal feature of the toxicity profile for cyanide is its high acute toxicity by all routes of exposure (inhalation, dermal contact or ingestion), however, cyanide does not bioaccumulate and is not carcinogenic. The toxicity of hydrogen cyanide gas is dominated by the acute health effects which commonly result in effects prior to determining any chronic health effects (WHO, 2004). Hence, the prevention of acute effects associated with inhalation of hydrogen cyanide is expected to be protective of chronic health effects (enRiskS, 2020)*"

The most stringent health-based guideline established by Office of Environmental Health Hazard Assessment (OEHHA) is 340µg/m³, however, the EPA Approved Methods include a more stringent criteria of 200µg/m. The range of maximum 1-hour average concentrations of gaseous hydrogen cyanide predicted by Ramboll (2021) are as follows.

- Project-related receivers 1.8µg/m³ to 5.9µg/m³
- Privately-owned rural residences 0.3µg/m³ to 4.1µg/m³
- Privately-owned Lue residences 1.6µg/m³ to 2.2µg/m³

The HHRA concludes that there are no health risk issues in relation to community exposures to hydrogen cyanide derived from Project operations. This would similarly apply for areas within Mudgee, Dubbo and beyond.

It should also be noted that volatilised hydrogen cyanide is broken down by UV light (in a process called photolysis) and, as stated above, cyanide does not bioaccumulate.

On the basis of the above, there are no health risk issues in relation to community exposures to hydrogen cyanide derived from Project operations.

5.12.6 Mental Health

Representative Comment(s)

My daughter said to me the other day, that she will probably not come home with her family to visit, as she will be too worried for her children. I was mortified…very real mental health issues.

Susan Combes of Lue, NSW (Submissions SE-8640624)

The mental health of the residents is certainly something that must be considered in this application.

(Name Withheld) of Havilah, NSW (Submission SE-8642118)

The township will live in constant fear for their health and future development & health to our children. Much needs to be said of long term mental health effects.

(Name Withheld) of Lue, NSW (Submission SE-8640239)

I may become depressed and suffer from mental stress and fatigue.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

Bowdens Silver recognises that mental health is an important concern and is often linked to physical health. Both can affect each other. In addition to assessment of physical health impacts, consideration has been given to mental health. It is acknowledged that, for some members of the community, the uncertainty regarding the approval, or otherwise, of the Project has resulted in an increase in stress and anxiety levels. It is also acknowledged that, should the Project be approved, some members of the community concerned about negative impacts may continue to experience stress and anxiety. It is likely that misinformation circulated by opponents to the Project and/or lack of information and uncertainty about the extent of impacts that are actually occurring may be a significant contributor to stress and anxiety.

Therefore, a range of management measures have been proposed to keep the community accurately informed about the activities and results of monitoring. As the Project progresses, and with demonstrated compliance with relevant air and water quality criteria, the level of stress and anxiety regarding these matters would be expected to reduce. Residual mental health effects would be further mitigated through proposed support for health services as part of Bowdens Silver's Community Investment Program.

For other members of the community, the approval of the Project would result in positive mental health effects. Various research shows that economic downturns, resulting in unemployment and income decline, can exacerbate mental health issues. Umwelt (2020) recorded during the random community survey performed for the Social Impact Assessment that unemployment was a significant perceived challenge facing the community, particularly given the loss of several local businesses in the LGA (e.g. the cement / lime works and the recent Bylong Coal Project refusal by the IPC). Impacts from COVID-19 have likely exacerbated these concerns.

With the proposed range of measures to maximise the local benefit of employment and use of local businesses, the potential positive mental health benefits of the Project would be maximised.

Representative Comment(s)

In this case, Lue is under threat. It is natural that this would create anxiety…Blind freddy can see that if you bust up a community it will hurt.

Tom Combes of Lue, NSW (Submission SE-8640730)

Response

It is acknowledged that the uncertainty regarding the approval, or otherwise, of the Project has resulted in an increase in stress and anxiety levels amongst some community members. Bowdens Silver has undertaken extensive community consultation and provided detailed information and responded to community queries throughout the Project planning and assessment phases. It is clear from the community consultation and engagement as well as the submissions received that there is both strong support and some opposition to the Project and this would have caused contention between community members. The determination of the development application for the Project would have a significant mitigating effect on those uncertainties for many members of the community. Bowdens Silver would continue to engage with the community throughout the assessment and determination process to reduce any uncertainties to the extent possible. It is also documented that community anxiety has been exacerbated by misinformation circulated by opponents to the Project.

5.12.7 Proactive and Reactive Health Measures

Representative Comment(s)

Further, deposition of toxic chemicals would be silent and hidden until measured. That is, irreversible exposure would be underway before measurement and detection. This adds another layer of risk to health. In addition, the SIA does not consider what remedies would be available to local residents in a situation of elevated measurements. The lack of a solution would again add to the risks to health.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

As detailed in both the HHRA and AQA, an extensive range of monitoring programs are proposed as part of the Project and would be included within management plans required by any Development Consent and, where relevant, the Environment Protection Licence issued for the Project. These plans would be prepared in consultation with and to the satisfaction of relevant regulatory agencies and the monitoring results regularly reported on the Bowdens Silver website.

This monitoring would commence at the beginning of operations and as such potential exposures would not be "hidden" or occur "before measurement and detection". For example, as part of the air quality monitoring program, testing for lead and other metals would be undertaken on a regular basis to measure any increase from baseline concentrations.

In the event that impacts such as noise or dust were to exceed predicted levels, this would be identified through the regular monitoring and additional mitigation measures would be implemented. Furthermore, any exceedances of the approved criteria would be classified as an incident and would require reporting to DPIE, other relevant government agencies and any affected landholders and a response plan developed and implemented.

Where residents have concerns or any issues with any responses, the Development Consent would also provide for a complaints, dispute resolution and independent review process. As such, there are multiple measures and processes in place to protect local residents. It remains Bowdens Silver's objective to, with its proactive approach, avoid the need for dispute resolution or independent review.

5.13 HISTORIC HERITAGE

5.13.1 Overview

Submissions that raised matters of historic heritage impacts associated with the Project referred to heritage buildings outside of the Mine Site disturbance areas and the general heritage of the landscape and locality. These concerns related to how the presence of the Project nearby may affect the heritage values of these buildings and of the locality.

Aside from the historical heritage items identified and assessed by Landskape Environment and Heritage (2020), the Project would not directly impact any items, buildings or places of historical heritage significance. Locations of historic heritage interest outside of mining disturbance would not be directly impacted by the Project. In addition, the Project would not significantly alter the experience of the local landscape particularly from a heritage perspective. Therefore the impact referred to in submissions is something that is specific to the individual and the value they hold for an item, building or place.

On balance, the Project would not change the historical heritage values of these places nor significantly alter the experience of the local landscape. Therefore, it is concluded that any historical heritage impacts are minor and acceptable.

5.13.2 General

Representative Comment(s)

The Historic Heritage report in the EIS is inadequate and does not include many items of historical significance.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Places of Historical significance also hardly get a mention in the report. The Historical Monivae the original home of William Walker who settled here in 1821 and Havilah built by Nicolas Paget Bailey in 1823 are not mentioned. My home at Lue Station, built in 1915 seems to get a mention.

There is no consideration given into the report of the many families that have lived in Lue for generations. I will not mention these family names in this submission, but there are many families that have resided in Lue for several generations. There is nothing in the EIS about these families or their heritage value. It seems some old hut that nobody knows about can get a mention in the EIS but a family that has lived in the valley for 140 years and will be adjacent to the proposed mine is forgotten. Poor show. These families have worked hard to develop and preserve their local community and its heritage. They have paid their taxes and rates and contributed heavily. This mine will impact on the local heritage and change Lue. These issues must be considered.

Tom Combes of Lue, NSW (Submission SE-8640730)

Response

Assessment for the EIS, including the Historic Heritage Assessment undertaken by Landskape (2020) focussed on those matters at risk from change and impact due to the development of the Project. Therefore, historical cultural heritage was identified in the area of direct impact by extensive field surveys and literature and database searches. Monivae and Havilah are respectively over 3km and 7km from the Mine Site. The historical significance of these locations would not be affected by the activities in any way.

Lue Station and the heritage values of other homes and the families that have resided in them would not be changed by the Project. The Project would not erase the historic record and remove these locations. Land use at the Mine Site is proposed to change but it is not proposed to significantly alter the local landscape or diminish existing agricultural practices. Bowdens Silver and a large proportion of the Lue and regional communities believe that the Project would enhance the local area and create the heritage that will be looked back upon by generations of the future. Bowdens Silver is committed to preserving the historical significance of the area.

Representative Comment(s)

I am also deeply concerned that this important ecological and historic region will be threatened by the open-cut mine. Just last week I visited the region of Havilah and Dunns Swamp, and was blown away by its beauty, its rich agricultural lands and historical significance.

Sally Killoran of Willoughby, NSW (Submission SE-8592956)

Response

The rural locality of Havilah is located more than 7km to the west of the Mine Site at its closest location. Dunns Swamp is located more than 38km to the southeast of the Mine Site at its closest location. The ecological and heritage values within both areas would not be impacted by the proposed activities.

5.14 INFRASTRUCTURE

5.14.1 Overview

Several submissions noted that Bowdens Silver had not concluded arrangements for power supply to the Mine Site at the time the EIS was finalised and that this would be applied for as a separate application to the Project application (SSD 5765). It remains the intention of Bowdens Silver to apply for approval for this powerline and power supply through an application under Part 5 of the *Environment Planning and Assessment Act 1979*. This approach has been agreed in principle with Endeavour Energy and investigations have commenced for this process. Bowdens Silver is investigating power supply via a 66kV powerline that would enter the Mine Site via Breakfast Creek, noting that the final alignment of this powerline remains subject to agreement with landholders.

It is noted that the proposed realignment of the 500kV transmission line that currently transverses the Mine Site has been included in the development application at the request of TransGrid (see Section 3.2).

5.14.2 66kV Power Transmission Line

Representative Comment(s)

Justification be provided regarding why the full power line has not been included in the environmental assessment for SSD 5765.

DPIE Biodiversity Conservation Division

…relevant power company deciding whether there was likely to be a significant effect on the environment of a route or routes favoured by the mining company… Thus further opportunities for comment may be limited.

Ian Cranwell of Annandale, NSW (Submission SE-8604737)

We are being pressured to have the transmission line constructed on our property without compensation.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

As discussed in Section 2.1.3 of the EIS, activities associated with construction and use of the power supply to the Mine Site and the realignment of the 500kV transmission line that currently crosses the proposed main open cut pit would require assessment and determination by the relevant network service provider.

TransGrid manages the infrastructure for the 500kV transmission line that currently traverses the Mine Site. Feedback from TransGrid, both in response to the exhibition of the EIS and in further consultation, has indicated that TransGrid will not accept responsibility to assess and determine any application to realign the existing 500kV transmission line when it is so closely associated with the application for the Mine Site. To that end, an Amendment Report has been prepared that seeks to amend the development application for the Project to include the realignment of the 500kV transmission line. It is noted that the EIS presented an assessment of impacts relating to this realignment and therefore there is no change to the environmental impacts associated or presented for the Project to date.

The 66kV powerline would supply electricity to the Mine Site via a connection to the existing electricity network and meet the Mine Site at the Main Mine Substation. At the time the EIS was exhibited, Bowdens Silver was considering a number of electricity supply options via the existing electricity network managed by either Endeavour Energy or TransGrid as well as a new connection to the Wollar Solar Farm (which is currently under construction). These options were presented in Appendix 9 of the EIS. Since that time, Bowdens Silver has worked with GHD to review and assess the technical, environmental and social constraints of each of the options initially available to supply electricity to the Mine Site.

An alignment for the powerline that connects to the Mine Site via the existing network at Breakfast Creek to the east of the Mine Site is now proposed. This alignment would 'tee-off' from the existing power supply to Bylong and cross to the west to enter the Mine Site. **Figure 5.7** presents the current electricity infrastructure to the east of the Mine Site and the area being considered for the new powerline. The precise alignment is not presented on **Figure 5.7** as it is still being discussed with landowners and the details are confidential at this time. A final alignment will be planned and presented in the development application for this infrastructure.

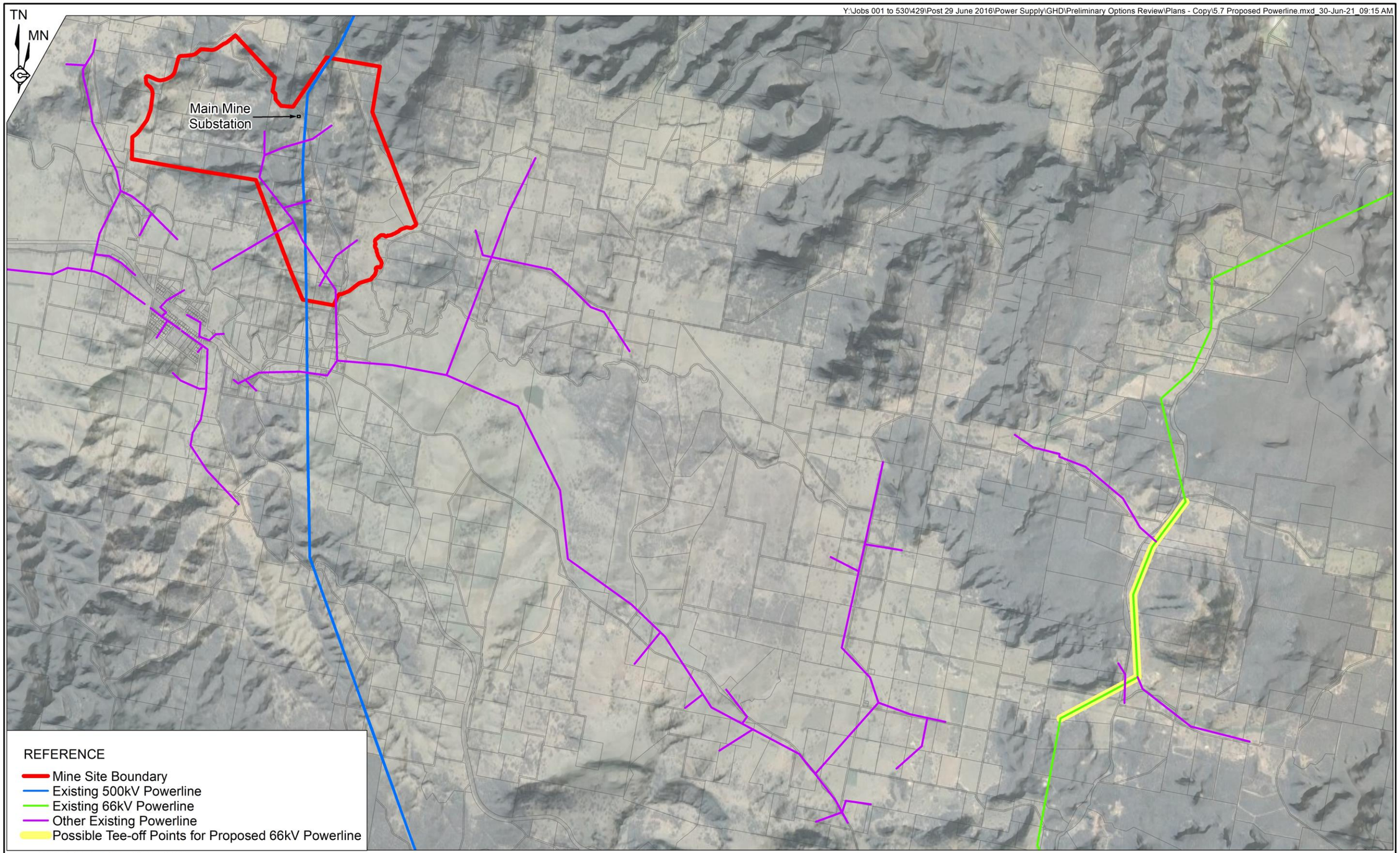


Figure 5.7
PROPOSED LOCATION FOR 66kV POWERLINE

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Initial discussions with Endeavour Energy, who would take responsibility for management and maintenance of the powerline once constructed, has indicated this option is feasible. Bowdens Silver and its representatives have also commenced discussions with Council and with relevant landholders to establish the most efficient and feasible alignment for this powerline. Bowdens Silver would utilise a valuer experienced in this type of infrastructure to determine fair and reasonable compensation to land holders that agree to the powerline construction or upgrades on their land. Avoiding disruption to properties and vegetation are key considerations for this alignment and sections of the road corridor may be used to facilitate the alignment where the use of private land is not preferred or agreed with the landowner. Bowdens Silver has a preference to use existing easements for this purpose where they are available. Once an alignment for this powerline is finalised, the details would be provided to DPIE and the local community.

Endeavour Energy will assess the application prepared by Bowdens Silver for the proposed alignment under Part 5 of the *Environmental Planning and Assessment Act 1979*. The application would consider all aspects of construction and use of the powerline including biodiversity and Aboriginal heritage matters, as well as dust and noise generation during construction. The powerline would be designed and constructed in accordance with the relevant guidance to limit impacts associated with electric and magnetic fields (EMF).

Representative Comment(s)

Were both the Bowdens and the Bylong projects to access this line, it is very likely that it's capacity would be exceeded and a second line would need to be installed, requiring the enlargement of the easement through my property. It is quite likely that the Bowdens project with its high load, and the increasing domestic load of the Bylong area alone, would need the line to be duplicated in the near future.

Roger Heap of Rylstone, NSW (Submission SE-8648688)

Response

Advice from GHD, who investigated the feasibility of the powerline options presented in the EIS and who recommended the line described above, has been that with voltage support, an upgrade to the existing lines would be necessary to enable power supply to the Project. This would involve an upgrade to existing poles and wires and not duplication of the line as has been suggested above.

More information on the upgrade requirements and technical details on how power would be supplied to the Mine Site will be provided to DPIE and the community once the details of this application are confirmed.

Representative Comment(s)

I have included an attachment from Endeavour Energy's" TRANSMISSION NETWORK PLANNING REVIEW 2017 - 2026", titled "16 Ilford Transmission Substation". It states load application NIL0212 for the Bowdens project, connecting to the Ilford substation busbar. This would imply the Ilford option, via the Bayswater 500kV easement. This option does not affect my property, and would raise no objection from me but, if this option has progressed beyond the scope of the JLE report, it would indicate out of date information has been used within the EIS. This raises the question, how many other sections of the EIS are defective.

Roger Heap of Rylstone, NSW (Submission SE-8648688)

Response

While the text presented in the planning overview document is acknowledged, it can be confirmed that Bowdens Silver is not planning to progress the option referred to in the document. It is noted that the concluding statement to this document notes the following.

> *There are no incomplete approved major projects to consider within the Ilford TS area.*

This is taken to refer to the fact that at the time the document was prepared both the Bylong Coal Project and Bowdens Silver Project were not approved and therefore power supply requirements not confirmed.

It can be confirmed that all information presented in the EIS was considered appropriate and current at the time the document was finalised.

Representative Comment(s)

We have a current conservation agreement with the NSW Government Biodiversity Conservation Trust, in which we have agreed to preserve defined native vegetation. The agreement is registered on the title of the property. Removal of trees and vegetation in the proposed area where the powerlines are proposed would contravene this agreement.

Ruth Level of Oatlands, NSW (Submission SE-8571895)

Response

It should be noted that Bowdens Silver has elected not to progress the electricity supply option that would impact this respondent's property. Regardless, it should be clear that securing power supply for the Mine Site is not a process that is forced on landowners without their involvement. A legally enforceable easement is required and matters such as existing conservation arrangements must be considered. As noted above, Bowdens Silver has engaged a qualified land valuer to engage with landowners on the land required and the value of compensation required by landowners.

5.15 LEAD

5.15.1 Overview

Whilst some submissions referred to concerns about air quality and human health risks generally, there were a number of submissions that referred specifically to the potential health impacts from lead exposure, principally through the generation and dispersion of dust that may contain higher than average levels of lead. The following subsections specifically respond to matters relating to lead exposure including discussion of the erroneous comparisons of the Project to large historical lead mining and smelting operations, lead exposure risks and the applied assessment methods and outcomes. Bowdens Silver has spent considerable time and resources educating and informing the local community regarding the risks associated with lead exposure associated with the Project. This included commissioning a detailed assessment of metal concentrations in particulate matter as part of the Air Quality Assessment (AQA) and then further commissioning a Human Health Risk Assessment (HHRA) that considered lead exposure pathways amongst other health risks. Responses to submissions relating to air quality and health (including other metals) are addressed in Sections 5.5 and 5.12 of this document. Where applicable, cross references to these other response sections are provided.

Potential health impacts of lead were addressed as part of the HHRA. An updated HHRA is included as **Appendix 7** and has been prepared to clarify and expand on matters presented in the original assessment. The updated HHRA also includes a sensitivity calculation for the adoption of lower background lead concentrations as suggested in the review undertaken for the Lue Action Group. Importantly, none of the outcomes of the HHRA have changed, with the HHRA concluding that impacts derived from the Project would make a negligible contribution to overall exposures to the assessed metals including lead. Importantly, the detailed technical assessment concluded that there would be no health risk issues relevant to the Project for any members of the community, including children and sensitive individuals. Regardless of this conclusion, a comprehensive monitoring program has been proposed so that this may be demonstrated in practice.

The following responses to lead-related issues raised within the submissions provides further clarification and information where necessary. The key issues and responses in relation to lead are as follows.

- It is inappropriate and misleading to compare the Project to current and historical operations at Broken Hill and Mt Isa. Furthermore, the Project does not include on-site smelting or other high temperature processes that would volatilise the metals present in the ore.
- The HHRA has adopted a blood lead criteria of 3.5µg/dL which is lower than the NHMRC guidance of 5µg/dL and is therefore even more conservative/stringent than is required in Australia and suggested within the submissions.
- The HHRA has utilised a range of conservative assumptions, including use of the highest predicted metal concentrations at a surrounding receiver and applying this for the entire community over the life of the Project and, for relevant exposures, well beyond the life of the Project.
- The adopted baseline levels have been reviewed and continue to be considered appropriate. These levels have been, in part, based on an extensive baseline monitoring program completed as part of the assessment. Furthermore, a program of monitoring would commence at the beginning of operations to demonstrate compliance with the relevant criteria and guidelines.

The HHRA includes a comprehensive assessment of potential human health risks from metals, including lead. The HHRA concludes that impacts derived from the Project make a negligible contribution to overall exposures to the assessed metals. Furthermore, there are no health risk issues relevant to the Project for any members of the community, including children and sensitive individuals. Notwithstanding, in addition to the extensive range of proposed management measures to minimise dust generation and dispersion in accordance with best practice for mining, reactive / adaptive management would also be applied to ensure that Bowdens Silver promptly respond and resolve any unexpected outcomes.

5.15.2 Comparison with other Mining Operations

In some submissions there are references to and comparisons with the large-scale operations at Mount Isa in Queensland and Broken Hill in New South Wales where there have been historical issues from mining and smelting activities. These operations are considerable sized lead and zinc mines as well as mines where silver is the dominant element mined. Mount Isa also produces copper. Bowdens Silver is a silver mine with minor zinc and lead. With regards to lead, the

Bowdens Silver lead grade in its Mineral Resource is 0.26% lead i.e. low grade compared to Mount Isa and Broken Hill where resource grades for lead are reported as 7.8% and 7.2% lead respectively. This represents 28 to 30 times higher lead grade when compared to Bowdens Silver. Historically, the metal grades at Mount Isa and Broken Hill have been substantially higher.

Notably, the more significant difference is that Mount Isa and Broken Hill have or have had substantial smelting activities on site with technologies that have dated back to the 1880s for Broken Hill and 1930s for Mount Isa. Historically, environmental controls were limited, if not non-existent, resulting in pollution and contamination of the surrounding environment.

Mount Isa is currently one of the world's largest silver, lead, copper and zinc mining complexes and continues to operate a lead smelter and a copper smelter. Smelting for Broken Hill's production is now located at Port Pirie in South Australia.

Historically, smelting activities have been the primary source of pollution through unfiltered gaseous and dust emissions. Although smelting technologies are now considerably more advanced, the historical smelting legacies at Mount Isa and Broken Hill remain. These issues are carefully managed.

Bowdens Silver would not have a smelter or any other high temperature processes that would volatilise metals as part of its development.

With these facts outlined, it is incorrect and misleading to be drawing comparisons between Bowdens Silver and such fundamentally contrasting current and historical operations.

Representative Comment(s)

No existing, large, multi-element mining operation, which processes lead can demonstrate an absence of off-site impacts.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

Day to day and essential activities, such as driving a motor vehicle, using electricity, farming, etc. result in the generation of particulate matter (and metals and other elements being attached to or forming the mineralogy of the particulates). For there to be an absence of any off-site impacts from any activity all activities would be required to generate zero emissions. Clearly, this is not rational or feasible for day to day essential activities. Similarly, it would not be rational or feasible to operate any primary or secondary industries including mining, construction, transport, agriculture, etc which are all essential for the provision of our society's infrastructure, services and all requirements, with zero emissions.

In light of the above, a realistic approach must be applied which includes setting threshold criteria, including for particulates and for metals attached to those particulates, including lead. The threshold criteria have been determined by the NSW EPA and the National Environment Protection Council (NEPC). The NSW EPA provides the following summary of how these standards are derived in their 2015 *Fact Sheet – National Environment Protection Measures (NEPMs).*

> ***"How are the standards derived?***
>
> *The standards are developed based on scientific understanding of the substances and interactions with the environment. Government agencies nationally, along with industry and academic experts, advise on the development of the standards, providing*

technical advice and achieving consensus on the appropriate levels. Due to the thorough nature of the process, the resulting standards are generally very conservative."

In addition to simple comparison against these criteria, the HHRA considered both the short and long-term health effects using a range of conservative assumptions, such as discussed in Section 5.15.11 of this document. The AQA and HHRA has determined that the potential impacts from the Project would remain below the relevant thresholds and identified no health risk issues.

Representative Comment(s)

The community at Lue is located at a similar distance from the boundary of mining operations as Mt Isa and Broken Hill when considering the whole affected areas. The example of the historical operations at Mt Isa and Broken Hill have demonstrated that where there has been a long history of dust deposition within the towns, the communities are exposed to both naturally elevated levels of lead and re-dispersed historical deposition.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

This statement is misleading and incorrect. The town of Broken Hill is in fact divided by open cut mining activity with residential areas immediately adjacent to the open cuts. Further mining and associated activities (e.g. processing) is then also located at various points surrounding the town. The town of Mt Isa similarly sits adjacent to the mining operation. This can be easily seen through review of publicly accessible aerial imagery (such as Google Earth).

It is inappropriate and inaccurate to compare the proposed operations within the Bowdens Mine Site to those at Broken Hill and Mt Isa which include mining immediately adjacent to the towns and historic operations including smelting operations. The proposed Project does not include smelting, would be located ~2km from the closest part of Lue, would include modern environmental management controls and ongoing monitoring and reporting which would be readily available to both government agencies and the public.

It is also noted that modern rehabilitation practices would be employed and a rehabilitation security provided as guarantee for the completion of rehabilitation. As such, the Project would also not become a legacy mine.

Representative Comment(s)

There are a number of examples of mine sites with mineral processing by sequential floatation processes to produce silver/lead and zinc concentrates that have resulted is dispersion of black-coloured metal sulfide halos that are clearly visible. Such examples are the current processing facilities at Broken Hill and former Woodcutters lead-zinc mine in the Northern Territory, that don't have smelter facilities.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

As discussed above, comparison to operations at Broken Hill are inappropriate and inaccurate. In relation to the Newmont Woodcutters lead-zinc mine in the Northern Territory, it is understood that the mine commenced operations in 1985, was decommissioned in 1999 and rehabilitated. The submission contains no literature reference and no 'halo' is visible in readily accessible aerial photography sources.

Notwithstanding, as described in the EIS, the processing operation would include primary crushing of the ore prior to it being conveyed, mixed with water and fed into the semi-autogenous grinding (SAG) mill before being pumped (as a slurry) to the flotation circuit (also a wet process). The resultant concentrate would be thickened to produce a concentrate with about 10% moisture, placed in sealed bulk bags which would then be loaded into shipping containers.

The proposed Bowdens Silver processing does not include any smelting or other high temperature processes that would volatilise the metals and the majority of the processing is a wet process. As such, the processing operation presents a low risk for off-site particulate or metal emissions.

5.15.3 Lead Exposure Limits

Representative Comment(s)

there is no level of exposure to lead that is known to be without harmful effects' and that young children are particularly at risk.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

I am particularly concerned that the health risk assessment in the EIS is based on out of date references regarding compliance levels for community exposure to lead dust and blood lead levels.

Elizabeth Combes of Lue, NSW (Submissions SE – 8626312)

My great grandchildren will not be able to visit me because the effects of lead is greater in young children and lead poisoning is irreversible.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Blood lead modelling has used a criteria value of 10 µg/dL as guideline for benchmarking the human health risk assessment. The blood lead value of 10 µg/dL is outdated. Whilst the National Health and Medical Research Council's (NHMRC) (2015) assessment reported that the evidence for adverse effects at levels less that (sic) *10 µg/dL is not clear, it revised (2015) the Australian investigation level for blood lead to 5 µg/dL. Therefore, the 5 µg/dL blood lead concentration should be the value to be used in Australian assessments. Moreover, 10 µg/dL does not reflect global opinion and is too high. Indeed, several studies show that lead exposure is more damaging per unit of exposure at the lowest levels in terms of lost IQ points.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The HHRA has not been based on a blood lead goal of 10µg/dL. As noted within the submissions, the NHMRC guidance indicates that blood lead of 5µg/dL should be used in assessments within Australia. Whilst the NHMRC guidance has been considered, in addition to this, the HHRA has also reviewed international work on lead and the UK's Department of Environment, Food & Rural Affairs (DEFRA) guidance. The DEFRA guidance includes more conservative guidance levels than is adopted by NHMRC with the adopted blood lead goals for this assessment being 3.5µg/dL. Given this value is lower than the NHMRC guidance the HHRA assessment is even more conservative/stringent than is required in Australia and suggested within the submission.

Representative Comment(s)

The EIS refers to an outdated indoor lead dust guideline (NSW EPA and NSW Planning, 2003, Table 4.49, p. 4-181 in the EIS) that relates to interior window sills and ledges at 5.4 mg/m2 (or 5,400 µg/m2), rather than the floor standard in that same document that is set at 1.0 mg/m2 (or 1000 µg/m2). It is not apparent what effect this has on the blood lead risk modelling, but modelling should be compared against using a more appropriate (contemporary) standard.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

The compliance level for acceptable community exposure in houses is taken from out of date guidelines (NSW 2003) - the EIS should use the more recent USEPA criteria (2019a) which considers blood lead of children to be below 5 micrograms per decilitre.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Table 4.2 in the HHRA has been updated to reference the recent USEPA (2020) guidance that was not available when the HHRA was completed. There is no change in HHRA outcomes as exceedances of the older (now superseded) guidelines were already identified and related to background conditions and not HHRA outcomes. Adoption of the lower guideline for those existing exposure sources does not change the intake / exposure assumptions utilised within the HHRA.

Representative Comment(s)

…recent review of blood lead at Broken Hill showed that lead in deposited dust (outdoors) needed to be lower than 90 µg/m^2/day to keep children's blood lead below 5 µg/dL. The point being is that lead dust loadings need more careful scrutiny than provided for in the EIS and should be linked to enforceable trigger values and frequent monitoring to best manage emissions.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

There is no guideline adopted or accepted by any Australian or NSW agencies for metal concentrations within deposited dust (as a unit rate of deposition). Notwithstanding, the deposition rate of lead and other metals was considered as part of the multi exposure pathway calculations (as outlined in Annexure G of the HHRA). The deposition rate for lead adopted in these calculations (and derived from the AQA) was 0.7667mg/m^2/year. This equates to a rate of 2.1µg/m^2/day which is well below the value of 90µg/m^2/day noted in the submission.

5.15.4 Bioaccessibility

Representative Comment(s)

The lead that is proposed to be mined at Lue is more toxic than the lead at Mount Isa so this is extremely worrying considering the effect the lead mining in Mount Isa has had on the community there.

Lara Altimira of Lue, NSW (Submission SE-8642008)

Limited data used in the health risk assessment for lead bioaccessibility in 14 soil samples from the mine lease and community shows values of 14.6% to 53.8% (average bioaccessibility 32.7% compared with an average of 25% at Mount Isa city residential area), and indicating that surface and near surface mined material at Lue will have 24% higher absorption (bioavailability) by people than observed at Mount Isa. Surface soil sampled only have a maximum lead concentration of 305.5 mg/kg total concentration whereas drill core data shows concentrations of lead up to 4150 mg/kg. Therefore further measurement of lead and also arsenic bioaccessibility (as no data is provided in the EIS) and particle size distributions on mined and processed tailings material is required before a mining lease is granted and as mining proceeds to enable reliable health risk assessment to be performed.

For the Bowdens EIS assessment, where oral exposures to lead in soil relate to emissions of dust to air from Project activities the average bioaccessible fraction of 33% has been adopted. This bioaccessibility value only relates the ingestion of soil or dust, not the ingestion of lead from any other media such as water or food products.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Due to a limited number of samples, further measurement of lead and also arsenic bioaccessibility (as no data is provided in the EIS) and particle size distributions on mined and processed tailings material is required as mining proceeds to enable a more reliable health risk assessment to be performed.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

The HHRA has used site-specific data for lead bioaccessibility not average data from other sites such as Mount Isa. The risk calculations for this assessment have assumed that the bioaccessibility of ingested soil / dust is 33%. The testing of 14 samples for bioaccessibility is a higher level of testing than is normally undertaken for such measurements. Other sites are evaluated typically through testing of only 3 or 4 samples. The use of results from 14 samples gives a good estimate of this parameter.

In relation to the differing concentrations of lead within soil and ore, the AQA has for each activity assigned a source group of either soil, waste rock or ore, with a different metal content applied for each source group based on extensive sample analysis (see Section 5.5.5 of this document for further detail). Consequently, the differing concentrations of lead and other metals in these materials has been used to calculate the total received metal content at surrounding receivers. Therefore, the HHRA risk calculations have accounted for the higher lead concentrations in the ore (and waste rock).

In relation to the bioaccessibility of lead from other media such as water or food products, Section 5.2.2.4 of the HHRA addresses this as follows (underline added).

> *"For most media ingested, such as water and food products the bioaccessibility is 100%. However, for soil, the bioaccessibility varies significantly between different sources of lead (including mineralologies) and soil types. ……*
>
> *For this assessment, where oral exposures to lead in soil relate to emissions of dust to air from Project activities (where all different soil types and materials would be disturbed and contribute to these dust emissions) and the deposition of dust to soil*

and other surfaces, the average bioaccessible fraction of 33% has been adopted. This bioaccessibility value only relates the ingestion of soil or dust, not the ingestion of lead from any other media such as water or food products."

In relation to bioaccessibility of arsenic, it has been assumed that 100% of arsenic present is bioaccessible, i.e. providing a conservative assessment. Any bioaccessibility testing would only reduce the assumed exposure to arsenic. Given that no health concerns relating to arsenic have been identified assuming 100% of arsenic present is bioaccessible, further arsenic bioaccessibility testing would not change the outcomes of the assessment.

Commentary in relation to consideration of particle size distributions and tailings is provided in Sections 5.5.5 and 5.5.9 of this document.

5.15.5 Baseline Lead Levels

Representative Comment(s)

Clearly there are no up to date reliable figures showing the levels of lead in soil, water, surfaces and ceilings at Lue Public and this company shows no interest in or capability of providing them…it is grossly negligent at best for SVL to rely solely on such limited and now wholly discredited data as that produced by the previous proponent in 2013.

Maureen Boller of Lue, NSW (Submissions SE – 8542230)

Bowdens silver has clearly demonstrated lack of interest and concern for the Lue community and district with their management of the serious issue of lead results at Lue public school.

Lyn Coombe of Lue, NSW (Submission SE-8621920)

Response

The data from the Lue Public School dust wipe and soil samples are not representative of the surrounding environment / baseline lead levels. As noted within the HHRA, this data has been affected by the presence of lead paint at the school. Therefore, further sampling at the school for the purpose of assessing the potential impacts from the proposed mining operation would not change the outcomes of the HHRA. Whilst it is appreciated that local residents are concerned, having been made aware of the issue via the EIS for the Project. However, it is not clear how the conclusion has been made that Bowdens Silver is not interested, incapable of responding or not concerned about the matter.

It is noted that results of the testing were provided at that time to the Lue Public School and to the NSW Department of Education. The management of existing lead paint at the Lue Public School remains within the jurisdiction of the NSW Department of Education. Whilst it is inappropriate for Bowdens Silver to provide commentary on the adequacy or otherwise of the Department's response, it is noted that the Department has been notifying parents and carers of their investigations into this matter. Notably, in a "Works Update" dated 4 August 2020 it was stated that an independent hygienist's investigations has confirmed that "*the school continues to be safe for students and staff*".

Representative Comment(s)

The EIS indicates some existing (baseline) soil and dust lead levels from Lue village buildings in 2012 exceed the guidelines for allowable lead concentrations, supporting an argument that the mine will not adversely affect the community because they're already exposed to high levels. There needs to be a more current baseline assessment of Lue population lead exposure including pre-mining blood lead survey.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

The baseline value of Pb in soil in Lue may be inaccurate:

- *Soil collected at residential properties in Lue village and rural areas by Macquarie University in 2012 (including vacuum dust and surface soil samples, are significantly lower than the lead concentrations used in the EIS.*
- *All but three of the soil test locations identified in the EIS are located inside the mining lease area.*

This has resulted in establishing a higher baseline than what is actually the case which would mean that the relative impact of the operations would appear less significant versus the existing exposures.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Surface soils from Rylstone Olives *show lower trace element concentrations than those used in the EIS, which were predominantly from the mine lease area). The effect of this is that by not using soil lead concentration data from the village may have resulted in establishing a higher baseline than what is actually the case. This would mean that the relative impact of the operations would appear less significant versus the existing exposures.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The EIS and supporting assessments do not make any argument that any existing elevated metal exposures justify predicted emissions from the Project. The references in this regard are incorrect. The assessment of potential health effects is against a cumulative criteria. Higher background levels result in a lower remaining 'buffer' to the applicable health standards and therefore is a more conservative approach to assessing the cumulative health risk.

Notwithstanding, the Project's contribution, independent of how much exposure comes from other sources (unrelated to the proposed mine), it is predicted to result in a negligible incremental exposure to lead for the community. Specifically, Figure 5.5 in the HHRA shows that the incremental risk due to lead from the Project is about 3% of the amount health authorities have determined should cause no adverse effects (i.e. 0.03 risk index).

In relation to the coverage of soil samples, it is noted that the submission incorrectly states that all but three of the soil test locations are located within the mining lease area. The soil sample map included within the submission relates only to agricultural and land capability soil sample sites. The soil sampling program for metal analysis includes a total of 388 soil samples collected within and surrounding the Mine Site, compared with a total of 40 samples collected to support the submission provided by Professor Mark Taylor of Macquarie University. It is important to note that the sampling and analysis was privately organised by the Lue Action Group and not in conjunction with or part of the Bowdens Silver Project or EIS.

Furthermore, the background soil lead concentrations reported by Professor Mark Taylor (4.4mg/kg to 300mg/kg) are within the range reported in the HHRA (1.5mg/kg to 1380mg/kg). This is not surprising given the greater number and geographic extent of sampling completed for the Project. In selecting a background soil lead concentration the HHRA excluded elevated lead levels recorded within the Mine Site (in recognition of the influence of the local ore body) and adopted a conservative level of 50mg/kg given that soil lead levels away from the open cut are <50mg/kg. This is not significantly different to the geometric mean of 13.3mg/kg reported by Professor Mark Taylor.

For completeness, the updated HHRA (see **Appendix 7**) includes a sensitivity calculation to illustrate the effect of adopting the mean soil lead level of 13.3mg/kg as well as the lower concentration of lead in rainwater tanks of 0.0009mg/L reported by Professor Mark Taylor. The sensitivity analysis found that these changes do not significantly change the total Risk Index (RI) from existing exposures as these are dominated by dietary intakes (food), with the total RI for lead changing from 0.28 for children and 0.35 for adults to 0.20 for children and 0.22 for adults. As such, the use of the alternate soil and rainwater tank data for the assessment of existing exposures does not change the outcomes of the risk assessment and the contribution of the Project to total risks remains negligible.

Representative Comment(s)

The geometric mean lead dust deposition rate at Rylstone Olives in 2017/2018 *was 0.3 µg/m2/day of lead… The EIS provides an annual average lead dust deposition rate of 0.001 g/m2/month or 1000 µg/m2/month.*

The background value promogulated in the EIS of 1000 µg/m2/month (33.3 µg/m2/day) is over 100 times greater than the average of the data collected by Macquarie University in Lue in 2017/18. Moreover the predicted rates of lead dust deposition during the operations, even at their peak, appears to be uncharacteristically low, especially given that dust has been identified by Bowdens Silver as the primary pollutant from the mine

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

It is not clear what dust gauge data was used for the EIS modelling, the time frames, and the locations identified in the EIS. This needs to be clarified in the EIS and statistical assessment of the mean and confidence interval around the mean provided along with the raw values and locations.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

Further review of the background deposited dust metal concentrations quoted within the EIS and AQA has identified that there is a clerical error in the quoted values for lead, arsenic and zinc with a missed decimal place resulting in the values presented being 10 times higher than the actual values. As such the recorded median background lead concentration is 0.0001g/m^2/month, not the quoted 0.001g/m^2/month. This equates to 100µg/m^2/month (3.33µg/m^2/day) and, when converted to a percentage concentration this equates to 0.01%, which is similar to the adopted background soil concentration of 0.005% (i.e. 50mg/kg). Whilst this is still greater than the

0.3µg/m^2/day of lead in Lue reported by Professor Mark Taylor[14], as discussed above, the assumption of higher background levels results in a lower remaining 'buffer' to the applicable health standards.

In relation to the dust gauge data used in the EIS modelling, Section 5.2 of the AQA presents the locations of the gauges, Section 5.6 summarises the background dust deposition rates including a graphical summary of the data over the 6 year period, and Section 5.8 confirms the adopted background level of 1g/m^2/month, based on the average for all sites. The background dust deposition level (for total dust) was then added to the incremental deposited dust from the Project as predicted through modelling for the assessment of cumulative deposited dust.

It is noted that the AQA does not assess deposition rates of lead or other metals. As outlined in Section 5.15.3 of this document, there is no guideline adopted or accepted by any Australian or NSW agencies for metal concentrations within deposited dust (as a unit rate of deposition). Rather, the AQA assesses the concentration of lead in suspended particulates. The resultant concentrations were then assessed against the impact assessment criteria as specified by the NSW EPA in their Approved Methods. Therefore, the clerical error in reporting background concentrations of metals within deposited dust does not affect the assessment of predicted concentrations within the suspended particulates ($PM_{2.5}$, PM_{10} and TSP).

Similarly, the background concentrations of metals in deposited dust do not affect the inputs to the exposure risk. Rather, suspended particulates, soil and water concentrations (all of which are influenced by existing dust deposition) were utilised as part of the calculation of existing metal exposures.

Representative Comment(s)

The key sources of lead dust are the soils on the mine site (maximum of 1380 mg/kg; Table 4.49 (page 4-181 in the EIS) and the lead ore concentrations recoverable from the pit operation 0.32% or 3,200 mg/kg (p. 2-13 of the EIS), which would be subject to remobilisation as dust during the operations. In addition, p. 3 – 127 of the EIS shows waste geochemistry samples from weathered ignimbrite to contain up to 4,160 ppm of lead from samples at 13-14 m depth, further suggesting that waste materials at the site which are remobilised as dust would be very elevated in lead. It is unclear how the EIS modelling has accounted for the mobilisation of soils and mine waste with these high concentrations.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

In relation to the differing concentrations of lead within soil, waste rock, and ore, the AQA has, for each activity, assigned a source group of either soil, waste rock or ore, with a different metal content applied for each source group based on extensive sample analysis. A detailed discussion regarding the metal concentrations utilised for each of these source groups is provided in Section 5.5.5 of this document.

Whilst the median metal concentrations for each source group are considered the most appropriate value to represent the received metal concentrations, the ability to achieve compliance with the applicable criteria is not sensitive to the source material's metal

[14] As the submission does not provide the total insoluble solid values recorded a comparative percentage concentration of lead cannot be undertaken.

concentration. Rather, the aspect that has the greatest effect on the received metal concentrations at surrounding receivers are the source controls. As such, the proposed management and mitigation practices, which focus upon reducing overall dust emissions rather than specific management of materials that have elevated metal concentrations, remain the most effective for minimisation of metal concentrations at surrounding receivers.

It is also noted that the HHRA calculations have been undertaken using the estimated air concentrations and dust deposition rates at the locations with the highest predicted contributions from the Project. As such, the calculated risk represents the highest health risk to the community and therefore provides a further level of conservatism.

Representative Comment(s)

Table 4.1 and Table 4.2 - Both tables do not indicate the number of samples analysed per category listed nor do they give percentile distributions of concentration apart from median values and excluding for lead.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

The number of samples has been included as a footnote to the tables in the updated HHRA (see **Appendix 7**).

An additional analysis of percentage distributions is not considered warranted noting that the HHRA is focused on assessing potential health risks from the proposed mine and not from the existing background conditions. In addition, a detailed understanding of the existing situation is not critical to the HHRA given the assessed negligible contribution from the Project.

Representative Comment(s)

The data for lead in Table 4.2 (P7-45) includes a sub-set of soil and dust samples from the Lue Public School collected in 2012 which are clearly associated with the presence of lead paint. These samples were also analysed for selected other metals (not provided in the EIS). These data reflect concentrations of metals in soil, as well as levels that are present in dust indoors (as a bulk dust sample or as surface sample), but do not relate to the survey of natural background in soil or of the orebody halo from Bowden's deposit.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

This is noted and it is confirmed within the HHRA that the data from the Lue Public School do not relate to the background levels in soil in Lue or near the deposit. Rather, soil lead concentrations have been based upon 388 soil samples collected from within and areas surrounding the Mine Site. Table 4.2 of the HHRA notes that soil lead levels outside the proposed open cut are <50mg/kg and that, as such, a conservative background soil lead level of 50mg/kg has been adopted.

Representative Comment(s)

The EIS presents values for dust wipes and accumulated dust, with a primary focus on ceiling dust and the Lue Public School, which are known to be high in Pb. Ceiling dust has limited potential as an exposure pathway and evaluating relevant environment data from likely environmental pathways, and at regular residential sites would be more useful for establishing an accurate baseline of extant lead risks in Lue.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The comment is noted. The dust wipe and accumulated dust data presented is only one aspect of the extensive background monitoring and characterisation work undertaken.

Representative Comment(s)

More reliable dust deposition data is needed for lead and other heavy metals to allow proper assessment of ingestion pathway for exposure of people, as distinct from total dust only fallout measurement.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

The HHRA utilises the detailed outputs from the AQA which includes the predicted metal concentrations within the received particulates. Reliance is not placed upon total dust fallout measurements. The HHRA has used the outputs from the air quality modelling and included detailed spreadsheets showing how the risk calculations were undertaken in Annexure G of the HHRA. These calculations consider multiple ingestion pathways.

Representative Comment(s)

It is not transparent what the input trace metal (including lead) values are as they do not appear consistent in the EIS. These values are critical because they influence the predicted impact of lead exposure on the community during operations.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The specific apparent inconsistencies have not been outlined so it is difficult to respond to this comment. A detailed summary of the input metal concentrations is provided within the AQA and further detailed discussion of the metal concentrations utilised within the air quality modelling is provided in Section 5.5.5 of this document. The HHRA has used the outputs from the air quality modelling and included detailed spreadsheets showing how the risk calculations were undertaken in Annexure G of the HHRA.

5.15.6 Wind Effects

Representative Comment(s)

It is clear that prevailing winds according to Lue Met01 (see the wind rose data in Figure 4.1, p. 2 – 31 in the EIS) will impact the village, and winds according to Lue Met02 aerosols will be dispersed across away from the village toward the north west, towards agricultural lands.

Nevertheless, examples of where wind flow is predominantly away (~80 % of the time) from primary receptors such as at Mount Isa, the local community are still causally exposed to lead dust from winds blowing only ~20 % of the time across the mine site towards the city (Taylor et al. 2010).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The AQA modelling uses a full year of hourly wind observations and models each hour of the year. Therefore, an accurate representation of local climate conditions is used and includes periods when winds are blowing towards Lue. These conditions influence modelling outcomes including the calculation of hourly, daily and annual average concentrations for all receiver locations. Furthermore, the HHRA has utilised the predicted concentrations at the locations with the highest predicted contributions from the Project and applied this to the entire community. Therefore the assessments have adopted a conservative approach which is not restricted by the prevailing winds. Further discussion regarding prevailing winds is provided in Section 5.5.3 of this document.

Representative Comment(s)

Moreover, the proposed mitigation strategies for dust management e.g. during high wind events, lack specific details in regard to triggers and thresholds for total dust and its trace metal concentrations the EIS). Thus, the impact of high wind events on the broader area is overlooked.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

Section 4.4.2.3 of the EIS outlines management and mitigation measures, including the use of a proactive air quality management system which would include real-time meteorological monitoring (including wind speed and direction) and air quality monitoring. Thresholds have not been specified and would be dependent on various factors, including the location of the real-time monitors in relation to both the mine activities and surrounding receivers. Notwithstanding, the principles of real-time monitoring are well understood and applied within the mining industry. This includes use of alerts from real-time monitoring stations that inform site personnel prior to an exceedance of the respective air quality criteria. This enables a proactive response relevant to the activities being undertaken. Proactive response examples are provided in Table 4.25 of the EIS.

As discussed in Section 5.5.5 of this document, the ability to achieve compliance with the applicable metal concentration criteria and reduce overall metal concentrations at surrounding receivers is most sensitive to management and mitigation practices which focus upon reducing overall dust emissions. Therefore, use of triggers to avoid exceedance of suspended particulate criteria would also be appropriate to ensure compliance with relevant metals criteria.

Further details of the proactive air quality management system would be developed and outlined in the Air Quality Management Plan for the Project which would be subject to review by relevant agencies and approval by the DPIE. This management plan would then continue to be reviewed on at least an annual basis as part of the Annual Review process.

5.15.7 Year 9 Modelling

Representative Comment(s)

A further gap is the cessation of modelling air and human health risks at year 9, the result of which is that it does not seem incorporate any dust generation effects from the tailing storage facility (TSF) after that time and during the post mine period when it is drying out and being reworked. The TSF will by its very nature collect fine particulates. These particulates will have higher metal concentrations due to their small size and higher surface area to volume ratios. In addition, the TSF will be absent any binding organic matter and as it dries out periodically and more permanently it will be subject to remobilisation as dust.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

The AQA modelling scenarios, by design, are selected based on the operational years with the highest potential for total dust emissions (years with the largest amount of material handling and largest areas of disturbance). Therefore, the modelling scenarios represent a worst-case snapshot of mining operations and total dust emissions from all sources.

While the concern expressed in the submission is acknowledged, it does not take into account the cumulative effect of reduced sources elsewhere on the Mine Site and the limited contribution of wind sourced dust including from the TSF. Furthermore, it is noted that the tailings are not proposed to be "reworked". Rather, the rehabilitation of the TSF would occur through progressive placement of capping material over the tailings as it dries out and can support placement of material. Therefore, the progressive capping of tailings as it dries would further limit the dust emissions from the tailings. Notwithstanding, Bowdens Silver would continue to monitor air quality over the life of the Project and until rehabilitation is completed (as discussed in Section 5.5.16 of this document).

It is also noted that the HHRA calculations assume much longer exposures than the values from the air quality modelling and well beyond the actual mine life. For inhalation, it has been assumed that people would be in the maximum affected locations 24 hours a day, 365 days per year for 35 years. For dust deposition to soil, it has been assumed that the dust deposits for 70 years and it is the concentration in soil that occurs at the end of 70 years that has been used to calculate exposures for this assessment. For deposition onto above ground produce, it has been assumed that dust might fall on the plant for 70 days as this is the time it takes for vegetable crops to grow and for periods between rain events. For below ground produce, it has been assumed they are exposed to the soil with concentrations after 70 years of deposition. For eggs it has been assumed the chickens consume the soil with concentrations after 70 years of deposition and they consume grass or vegetables which may have dust from over 70 days of deposition which is relevant for periods between rain events.

5.15.8 Predicted Lead Levels in Dust

Representative Comment(s)

The modelling of project impacts in the EIS predicts very low values of lead in air along with deposited lead in dust. Given that all mine sites generate significant fugitive emissions and that operations extracting lead will inevitably cause surface contamination (as evidenced by dust

emissions from fugitive sources at Broken Hill, Port Pirie and Mount Isa), it seems inconceivable that the predicted aerosol emissions of dust and its lead concentrations will be so low during the active phase of operations. Indeed, these low values estimated during operations versus existing values results in a conclusion that the impact of the operations will be trivial.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

As outlined in Section 5.7 of the AQA, the average background concentration of lead measured in TSP was 0.001µg/m^3. This concentration is in fact very low with the AQA stating "*When compared with the NSW EPA's impact assessment criterion of 0.5µg/m^3, the existing ambient levels of lead in the Lue area are negligible (i.e. 0.2% of the impact assessment criteria)*".

Table 7.8 of the AQA summarises the predicted lead concentrations for suspended particulates with the predicted mine contribution of 0.001µg/m^3, the same concentration as background TSP. Whilst this essentially would result in an increase in the existing quantity of lead received at the most affected residence, the combined levels would remain well below the EPA criteria of 0.5µg/m^3.

As discussed in Section 5.5.5 of this document, a sensitivity analysis was undertaken for the adopted metal concentrations within the source materials (i.e. soil, waste rock and ore). This sensitivity analysis shows that, regardless of whether the median, mean or 90th percentile of the metal contents is used, the predicted concentrations are below the impact assessment criteria for all metals. For example, using the 90th percentile lead content, the resultant concentration of received lead from the Project would be 0.02µg/m^3, which is 4% of the EPA criteria. This highlights that the received metal concentrations are most sensitive to management and mitigation practices which focus upon reducing overall dust emissions.

Discussion regarding comparisons with Broken Hill and Mt Isa is provided in Section 5.15.2 of this document.

Representative Comment(s)

The EIS has been found to be vague and unclear for the purpose of assessing community exposure to deposition of air-borne contaminants from mining operations particularly from lead and heavy metals.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Bowdens Silver contests this statement and notes that the health impact of predicted worst case deposited dust levels that may be experienced by the community, including lead and heavy metals, has been considered and assessed as part of the HHRA. In particular, the HHRA considers the potential health effects of metals within dust from multiple exposure pathways, including ingestion and dermal contact with dust depositing onto topsoil, in household dust or onto roofs where it may then be washed into rainwater tanks, as well as inhalation of suspended particulates. Annexure E of the HHRA outlines how the exposures through the various pathways have been characterised and accounted for. In this manner, the HHRA is considered to have been thorough in its assessment of community exposure.

5.15.9 Drinking Water Tanks

Representative Comment(s)

Lue village relies on drinking water captured via roof catchment and rainwater tanks.

It is difficult for local residents to believe that dust from the project site will not travel 2 kilometres to the Lue village.

Mid-Western Regional Council

I am very concerned that dust from the mine site will contaminate my drinking water which is collected from the house and shed roofs on my property "East Ridge" (3km from the Mine Site Boundary).

Philip Carkagis of Pyangle, NSW (Submission SE-8640592)

Response

The AQA presents contour plots of predicted suspended and deposited dust concentrations in Annexure 6. As can be seen from the contour plots, dust levels, especially deposited dust, rapidly decreases with distance from the Mine Site as it drops out of the air. Table 7.6 in the AQA also provides a summary of the dust deposition levels at each receiver location and the receivers with the 'L" prefix are those located in Lue village. The highest deposited dust value predicted within Lue for contributions from the Project is 0.04g/m^2/month at property L50. Compared to the average background concentration of 1g/m^2/month, the contribution of the Project to deposited dust within Lue village is very small. Therefore, it is concluded that dust from the Mine Site may reach Lue under unfavourable climate conditions, however, the level of dust would not risk the quality of drinking water or result in health risk issues.

Representative Comment(s)

The EIS provides an average concentration of 0.0059 mg/L (5.9 µg/L) of Pb in rainwater tanks in Lue (p. 7 – 51 in the EIS). This value is higher than Pb measurement from Macquarie University's investigations.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Given that the entire community in and around Lue rely on rainwater tanks for drinking water, any deposition to rainwater (drinking water) tanks, which according to the EIS, have an existing average lead concentration of 5.9 µg/L (> 50 % of the upper maximum value of 10 µg/L for drinking water), would potentially result in exceedance of the Australian Drinking Water Guidelines value for lead (NHMRC 2018).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Limited data on tank water shows that existing supplies may be contaminated with lead from historical sources, probably lead paint. An increased build up of lead in tank and drinking water is not desirable for the community. It is recommended that community water supply be replaced by reticulated water meeting Australian Drinking Water Criteria where this is possible.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

It is useful to consider the baseline rainwater tank data in context. Out of 42 tank samples (prior to cleaning) the lead concentration in 24 samples was below the level of detection (1µg/L). Applying the methodology used by Professor Mark Taylor for these samples, i.e. applying a lead concentration of half the limit of detection (0.5µg/L), the average lead concentration would be 2.65µg/L, compared to Professor Mark Taylor's value of 0.9µg/L (from 25 samples). Additionally, the maximum concentration recorded by Professor Mark Taylor was 12µg/L compared to a maximum of 37µg/L recorded for the Project studies. It is noted that Professor Mark Taylor's submission does not confirm the date of samples or provide the raw data.

It is noted that the concentration of lead in a rainwater tank would depend on the amount of dust in air recently, the accumulation of sediment in the tank, how long it has been since the tank has been cleaned out (noting that rainwater tanks were cleaned out as part of the sampling process completed for the Project – which could have affected Professor Mark Taylor's results if they occurred after this), whether the system has a first flush device, the age of the tank, including whether lead solder was used in its manufacture or on the roofing, whether lead paint has been used, etc. The concentration of lead would vary through time so it is quite likely that different concentrations would be reported for samples collected at different times.

Notwithstanding, enRiskS have reviewed and do not agree with this statement, with the HHRA having considered this matter in detail. The lead concentration in rainwater tanks solely due to the proposed mine is 0.00000086mg/L or 0.00086ug/L – so small as to be indistinguishable. As such, there is no concern that the Project would result in exceedance or have any significant contribution to lead within rainwater tanks.

5.15.10 Lead in Groundwater and Surface Water

Representative Comment(s)

The application does not disclose the level of lead that will contaminate the water with toxic level for a small yield of silver.

Name Withheld of Clareville, NSW (Submissions SE – 8657423)

Lead poisoning from dust and potential water contamination to Lue village and surrounding water catchment.

Patricia Kempton of Mount Frome, NSW (Submissions SE – 10304465)

Dust and particularly lead dust is not only carried on the wind but on mine vehicle wheels, in water, i.e. Lawson creek and subsequently the Cudgegone (sic) *River.*

Janet Walk of Camboon, NSW (Submissions SE – 8662129)

Lead dust will contaminate … Lawsons Creek with either the run off or directly from the tailings and on-site processing.

Edward White of Paddington, NSW (Submissions SE – 8628103)

The magical town of Lue will be ruined by the amount of LEAD and ZINC that will make its way into our water tables, and magnificent agricultural environment.

Peter Combes of Lue, NSW (Submission SE-127779)

Response

Section 4 of WRM (2020) describes the proposed water management strategy for the Project. This strategy comprises three distinct water management zones, the containment zone, erosion and sediment control (ESC) zone and clean water zone. The containment zone includes groundwater inflows to the open cut pits and runoff from the open cut pit areas, processing plant area, oxide ore stockpile, TSF and WRE (including leachate). As runoff within the containment zone is likely to have elevated dissolved metal levels, a key intent of this zone is to maximise capture and water re-use in order to reduce external water demand (i.e. effective use of resources). This strategy redirects internal runoff and greatly reduces the risk of its release to the downstream environment (i.e. Lawsons Creek and Hawkins Creek) and potential contamination. Furthermore, site water balance modelling identified that even under high runoff scenarios, all site water storages can be operated without any overflows (refer Section 5.7 of WRM (2020)). Therefore, there is no evidence that the water quality of Lawsons Creek and Hawkins Creek would be different to that presented in Table 3.2 of WRM (2020).

Furthermore, the HHRA (enRiskS, 2020) specifically addresses the potential health risks arising from the deposition of dust from the Mine Site into water sources (refer Section 5 of enRiskS (2020)) as well as those arising from direct surface water and/or groundwater impacts (refer Section 6 of enRiskS (2020)). This assessment of health risks utilised the detailed and peer-reviewed modelling and assessments undertaken by Ramboll (air quality), WRM (surface water) and Jacobs (groundwater) and concluded that no health risk issues were identified.

5.15.11 Lead in Soils and Produce

Representative Comment(s)

A critical issue for the community and agricultural producers is that trace metal and metalloid emissions, including the known toxic substances lead and arsenic, are elemental and accumulate over time in environmental, human and biotic systems. Moreover, the role of wind dispersal and accumulation of contaminated dust on surrounding agricultural produce including grapes and olive berries has not been covered in the EIS. A study of South Australian red wine covering a 50-year period (1963-2012) showed that even though the grapes were washed, the lead concentration in wine corresponded to year matched lead petrol emissions (tonnes of lead petrol emissions; air lead concentrations, $\mu g/m^3$ and lead isotopic compositions) in Adelaide ~40 km away (Kristensen et al. 2016).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

LEAD dust will contaminate soil and water, getting into the human food chain via water and home grown vegetables.

Suzana Chandler of Lue, NSW (Submissions SE – 8536336)

If the Silver mine goes ahead my son and daughter in-law wont (sic) *be able to eat their produce, because it wont* (sic) *be safe for them.*

Judith Brown of Camboon, NSW (Submission SE-8624625)

…we grow all our own vegetables and fruit. If the mine was to be approved we would not be able to grow and consume these as they would be contaminated and result in lead exposure.

Lara Altimira of Lue, NSW (Submission SE-8642008)

Response

The HHRA has included an extensive assessment of potential accumulation of dust from the proposed mine in soil and in produce. The dust deposition rates from the air quality modelling have been used to estimate what levels of metals might be added to the soil over time. The following conservative assumptions have been applied for community exposure to these predicted dust / metal levels (noting the proposed mine life of 23 years – including rehabilitation)[15].

- For inhalation, it has been assumed that people would be in the maximum affected locations 24 hours a day, 365 days per year for 35 years.
- For dust deposition to soil, it has been assumed that the dust deposits for 70 years and it is the concentration in soil that occurs at the end of 70 years that has been used to calculate exposures for this assessment.
- For deposition onto above ground produce, it has been assumed that dust might fall on the plant for 70 days as this is the time it takes for vegetable crops to grow and for periods between rain events.
- For below ground produce it has been assumed they are exposed to the soil with concentrations after 70 years of deposition.
- For eggs it has been assumed the chickens consume the soil with concentrations after 70 years of deposition and they consume grass or vegetables which may have dust from over 70 days of deposition which is relevant for periods between rain events.

Applying these conservative assumptions, the HHRA has assessed the predicted emissions and concluded that there would be no health risk issues. This includes the growth and consumption of crops, local and home-grown produce, eggs, milk, beef, etc.

Furthermore, the NSW Government requires operators of mines to have much better controls on dust emissions than was historically the case. Compliance with criteria is monitored through approved monitoring programs with data being made publicly available and is regularly reviewed and reported. As such, all interested community members would have access to the monitoring data and relevant reporting, thereby providing transparency.

It is also noted that Professor Mark Taylor has inappropriately compared the proposed mining operation to emissions of lead in leaded petrol. Notably, lead in petrol was in a form that was readily taken up by plants whereas lead ore is much less readily accumulated into organisms. Further, combustion sources produce a greater proportion of fine ($PM_{2.5}$) and ultrafine ($PM_{0.1}$) particulates compared to dust generated from crustal material from mechanical activity and as such their dispersion and health effects are not directly comparable.

[15] The timeframes for exposure / accumulation are based upon default values / timeframes within relevant risk assessment guidelines.

Representative Comment(s)

There is no consideration of the fact that lead in the soil does not dissipate but remains.

…if this mine proceeds, the risk of lead contamination may be sufficient to render Lue uninhabitable for many of its residents, for example parents of young children…the risk to health from lead is silent, serious and long term.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

As discussed above, for dust deposition to soil, it has been assumed that the dust deposits for 70 years and it is the concentration in soil that occurs at the end of 70 years that has been used to calculate exposures. The HHRA has assessed predicted emissions on this basis and concluded that there would be no health risk issues. It is therefore considered that these long-term exposure scenarios built into the risk assessment take appropriate account of the potential for elements like lead to accumulate due to operations at this proposed mine.

5.15.12 Monitoring and Management

Representative Comment(s)

The FAQs on the Bowdens Silver website say that blood lead monitoring is "expected to be undertaken, before and after operation of the mine" (Bowdens Silver 2020). This is not reflected in the EIS (that we are aware of). Blood lead monitoring should be required to be undertaken if the mine goes ahead and should incorporate the time periods before, during and after the mine's operational period.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

EIS Section 4.8.9 "Management and Mitigation Measures and Opportunities for Health Improvement" includes the following commitments.

> *"should development consent be granted for the Project and prior to commencement of mining operations, a baseline blood lead level testing program would be offered to Lue and district residents to enable surrounding residents to understand their existing lead exposures. Blood lead level testing would also be offered at ongoing intervals during operations. Additionally, an information package providing an outline of the existing potential exposure pathways to lead and other metals and ways in which exposures can be reduced would be provided to all residents in the locality together with the lead monitoring results"*

Representative Comment(s)

Trigger values should be implemented in the Lue area to better manage dust and its lead content, especially since Bowden's identify dust as being the primary pollutant from the mine. The EIS should include total projections of dust deposition (in µg/m2/day) for trace elements of concern, primarily lead inside and outside of homes. Lead dust loadings need more careful scrutiny than provided for in the EIS and should be linked to enforceable trigger values and frequent monitoring to best manage emissions.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 2

Response

As discussed in Section 5.5.5 of this document, the ability to achieve compliance with the applicable metal concentration criteria and reduce overall metal concentrations at surrounding receivers is most sensitive to management and mitigation practices which focus upon reducing overall dust emissions. Bowdens Silver has made commitments to a range of air quality management measures to proactively control and reactively manage dust generation. The use of real-time monitoring triggers to avoid exceedance of suspended particulate criteria would also be appropriate to ensure compliance with relevant metals criteria.

Complementing the proposed blood lead monitoring discussed above, Section 4.4.2.3 of the EIS outlines management and mitigation measures for air quality management, including the use of a proactive air quality management system which would include real-time meteorological monitoring (including wind speed and direction) and air quality monitoring. As discussed in Section 5.15.5, thresholds have not been specified and would be dependent on various factors, including the location of the real-time monitors in relation to both the mine activities and surrounding receivers. Notwithstanding, the principles of real-time monitoring are well understood and applied within the mining industry. This includes use of alerts from real-time monitoring stations that inform site personnel prior to an exceedance of the respective air quality criteria. This enables a proactive response relevant to the activities being undertaken. Proactive response examples are provided in Table 4.25 of the EIS.

Further details of the proactive air quality management system would be developed and outlined in the Air Quality Management Plan for the Project which would be subject to review by relevant agencies and approval by the DPIE. This management plan would then continue to be reviewed on at least an annual basis as part of the Annual Review process.

5.16 MINE DESIGN AND OPERATIONS

5.16.1 Overview

Matters relating to mine design and the proposed mining operations for the Project were raised in submissions received from the NSW Government and the Lue Action Group. Review of the items identified in the submissions has prompted Bowdens Silver to clarify how the mine would be designed and operated to achieve the proposed outcomes in terms of mining productivity and environmental performance. On balance, it is considered that Bowdens Silver and its contractors AMC Consultants have proposed an achievable level of productivity using equipment and processes that would achieve the predicted levels of environmental performance.

5.16.2 Internal Roads

Representative Comment(s)

It is unclear if all haul roads have been identified and whether they will be permanent or temporary. For example, the mine site layout figures do not indicate how haul roads would connect to the satellite pits. As the location of access tracks is unknown, it is unclear whether 'clean water' zones are undisturbed or potentially impacted by access roads.

EPA Request: *It is recommended that the proponent:*

a). commits to adopting the practices and principles of Managing Urban Stormwater – Soils and Construction – Volume 2C: Unsealed Roads.

NSW Environment Protection Authority

Response

The haul roads displayed on the figures in the EIS would be the key roads in use throughout the Project life. However, many operational haul roads on a mine site are periodically relocated to accommodate variables in the materials being transported and factors relating to the road gradients. This would be the case for the Bowdens Silver Project. That said, the locations of the short-term roads would be documented in the relevant *Annual Review* prior to their construction and would be constructed in accordance with *Managing Urban Stormwater – Soils and Construction – Volume 2C: Unsealed Roads*. Emphasis would be placed upon directing as much up-slope runoff around the active haul roads and the collection of sediment-laden water from the road surfaces. It should also be noted that this strategy is taken into account for all aspects of the assessment, and in particular the need to clear any vegetation and the risks of impact to items of Aboriginal heritage value.

5.16.3 Open Cut Pit Optimisation

Representative Comment(s)

It is noted that the optimised open pit shell used as the basis for design excludes from the production profile approximately 98 Mt of ore. Optimisation of the pit design may be revisited in the future with a change in metal prices.

It is noted that the optimised open pit shell used as the basis for design excludes from the production profile approximately 98 Mt of ore. The excluded material is estimated to have the following grade and contained metal.

Table 2: Excluded material and contained metal grade.

Excluded Tonnage Mt	Grade			Contained Metal		
	g/t Ag	% Zn	% Pb	Ag Moz	Zn t	Pb t
98.0	30.6	0.36	0.24	96.5	354,460	236,860

Optimisation of the pit design may be revisited in the future with a change in metal prices.

DRNSW Mining, Exploration and Geoscience

Response

The data included in the table above was provided in a presentation to the DRNSW Mining, Exploration and Geoscience (MEG) on 13 March 2020 during discussions regarding the optimised design of the open cut pits. The reference to 98Mt of "ore" actually should be represented as "mineralisation". There is a clear distinction between "ore" and "mineralisation" within the Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The use of the term "ore" relates to mineralisation that is present with sufficient grade in an area that can be economically recovered by open cut or underground mining methods.

As noted in the MEG comment, there is the possibility that optimisation of the open cut pit may provide an opportunity to extend the operation of the proposed mine in the future, should it be determined that the identified mineralisation can be mined economically. This would be subject to a future development or modification application and is not part of the current development application for the Project.

Of importance for this application is that Bowdens Silver was able to demonstrate to MEG that no mineralisation would be sterilised by the proposed open cut pits.

5.16.4 Mine Haul Trucks and Excavator

Representative Comment(s)

The 15 metre wide WEA perimeter haul road is planned as a two-way haul route. This will not work with Cat 777 haul trucks.

This means that the Waste Rock Emplacement Area haul road needs to be widened and the WEA footprint increased or the planned haulage routes need to be re-designed as one way which will increase cycle times.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The operating width of a Cat 777 G is approximately 6.7m. Applying the recommended dual lane width guideline (3.5 times the operating width) would require a minimum 23.5m WRE haul road. However, given the limited number of trucks that will be travelling to and from the WRE, it is practical to operate a 15m wide WRE haul road with two lane passing bays located at approximately 500m intervals.

Advisian, the technical consultant for the WRE has advised that the batter slope of the flood/acoustic bund adjacent to the haul road can be reduced and reinforced/stabilised using gabions to allow for passing bays along the haul road alignment. This will be the approach adopted by Bowdens Silver during detailed design of the WRE.

Representative Comment(s)

The mine haul truck numbers used for noise modelling look to be unachievably low.

The EIS uses a maximum of four Cat 777 rear dump haul trucks in its mine plan. It also states it will only be running three trucks when operating the water cart. This is neither practical nor feasible.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

AMC Consultants Pty Ltd (AMC), a highly experienced and internationally recognised mining consultancy, were commissioned by Bowdens Silver to undertake the mining studies for the Project's Feasibility Study. During these studies, AMC conducted detailed analysis of the mining cycle times to the run-of-mine (ROM) pad and respective waste rock destinations TSF and WRE to establish mining fleet requirements. From this analysis, AMC identified an initial requirement

for three Cat 777 trucks, rising to four in the eighth year of operation and returning to three in the 14th year. The restriction of only operating three trucks when operating the water cart would only apply at night (10:00pm to 7:00am). Given the short distances to be watered during this period, the proportion of time required for water cart operations would be comparatively small.

Representative Comment(s)

The Hitachi Ex 1900 excavator is capable of moving 6 million tonnes per annum if it is not waiting on trucks.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

As noted in the response above, AMC undertook the mining studies for the Project's Feasibility Study. AMC estimated the productivity of the Hitachi EX 1900 in combination with Cat 777 G trucks for handling both oxide and fresh rock material. AMC determined annual productivity to be 4.37 million bank cubic metres (Mbcm) of oxide material (9.77 million tonnes (Mt)) and 4.05Mbcm (9.58Mt) of fresh rock. That is, the equipment would have the capacity to move 19.35Mt per annum.

Based on the Project's mining schedule, operations would require the maximum annual movement of 6Mt, meaning a Hitachi EX 1900 excavator (or similar) would have approximately 60% surplus capacity.

5.17 MISCELLANEOUS

5.17.1 Overview

A range of matters identified in submissions were not easily categorised and have been grouped under miscellaneous items for the purpose of this document.

5.17.2 Crown Land

Representative Comment(s)

All Crown land and Crown roads within a Mining Lease must be subject to a Compensation Agreement issued under Section 265 of the Mining Act 1992, to be agreed and executed prior to any mining activity taking place. The Compensation Agreement may include conditions requiring the Mining Lease Holder to purchase Crown land impacted on by mining activity.

NSW Crown Lands

Response

Bowdens Silver acknowledges that NSW Crown Lands will be entitled to compensation for any compensable loss suffered as a result of Bowdens Silver exercising rights over Crown land pursuant to a mining lease. Bowdens Silver will negotiate a compensation agreement with NSW Crown Lands for all relevant Crown land and Crown roads covered by a mining lease for the Project and prior to any mining-related activities taking place on that land. The *Mining Act 1992* provides a process for compensation agreements to be negotiated and agreed to.

Representative Comment(s)

Any Crown land and/or Crown road impacted by the Water Supply Pipeline, including infrastructure to support the mine proposal, (where not subject to a Mining Lease) will require authorisation under the Roads Act 1993 and or the Crown Land Management Act 2016 prior to any activity taking place within such lands. This would most likely take the form of a licence and public use and access of Crown land would need to be maintained. The licence must be procured prior to any works taking place.

NSW Crown Lands

Response

Bowdens Silver acknowledges that a licence (or other form of approval) from NSW Crown Lands would be required for those sections of Crown land or Crown roads that would be impacted by the construction and operation of the water supply pipeline if the pipeline is not otherwise covered by a mining lease for ancillary mining activities. Bowdens Silver will continue to consult with NSW Crown Lands regarding the Project and the route of the water supply pipeline. If required, Bowdens Silver would ensure that the required licences or approvals are obtained prior to the commencement of any project-related activities being undertaken on the Crown land or Crown roads.

5.17.3 Mining Lease

Representative Comment(s)

As Silver, Lead and Zinc are prescribed minerals under the Act, the Proponent must obtain the appropriate mining title(s), such as a mining lease, from MEG allowing for mineral extraction over the project area.

DRNSW Mining, Exploration and Geoscience

Response

Bowdens Silver currently holds Exploration Licences 5290 and 6354 covering the Mine Site. It is Bowdens Silver's intention to lodge an application for a mining lease for Group 1 minerals over the Mine Site. Section 4.42(1) of the *Environmental Planning and Assessment Act 1979* provides that the mining lease cannot be refused once the Project is the subject of a development consent granted under Division 4.7 of the Act. In accordance with the *Mining Act 1992*, Bowdens Silver will not carry out mining related activities until the mining lease is granted.

Representative Comment(s)

A proponent seeking to undertake a designated ancillary mining activity outside a mining area, but in the immediate vicinity of and that directly facilitates the mining lease in respect of mineral(s), must apply for one of the following:

- *A separate mining lease for the designated ancillary mining activity which authorises the carrying out of the activity. (This provides the holder with the right to access the mining area to undertake the ancillary mining activity, however, does not provide the holder with the right to mine).*

- *A condition on an existing mining lease that regulates the carrying out of the designated ancillary mining activity in an off-title area. (See section 6(2) of the Act). The ancillary mining activity condition will include the survey plan of the designated ancillary mining activity area on which the designated ancillary mining activity is (or is proposed to be) located.*

DRNSW Mining, Exploration and Geoscience

Response

The proposed water supply pipeline is not a "designated ancillary mining activity" as defined within Table 2 of the Fact Sheet issued by Regional NSW (Mining, Exploration and Geoscience) – Source: https://www.resourcesandgeoscience.nsw.gov.au/miners-and-explorers/applications-and-approvals/mining-and-exploration-in-nsw/ancillary-mining-activity-ama

The proposed water supply pipeline is, however, an ancillary mining activity for which a mining lease can be sought if Bowdens Silver considers it is necessary for operational or strategic reasons. Given the water supply pipeline would be in the immediate vicinity of the mining lease covering the Mine Site, a separate mining lease for ancillary mining activities could be applied for if Bowdens Silver elects to do so.

5.17.4 Potential Mine Extension

Representative Comment(s)

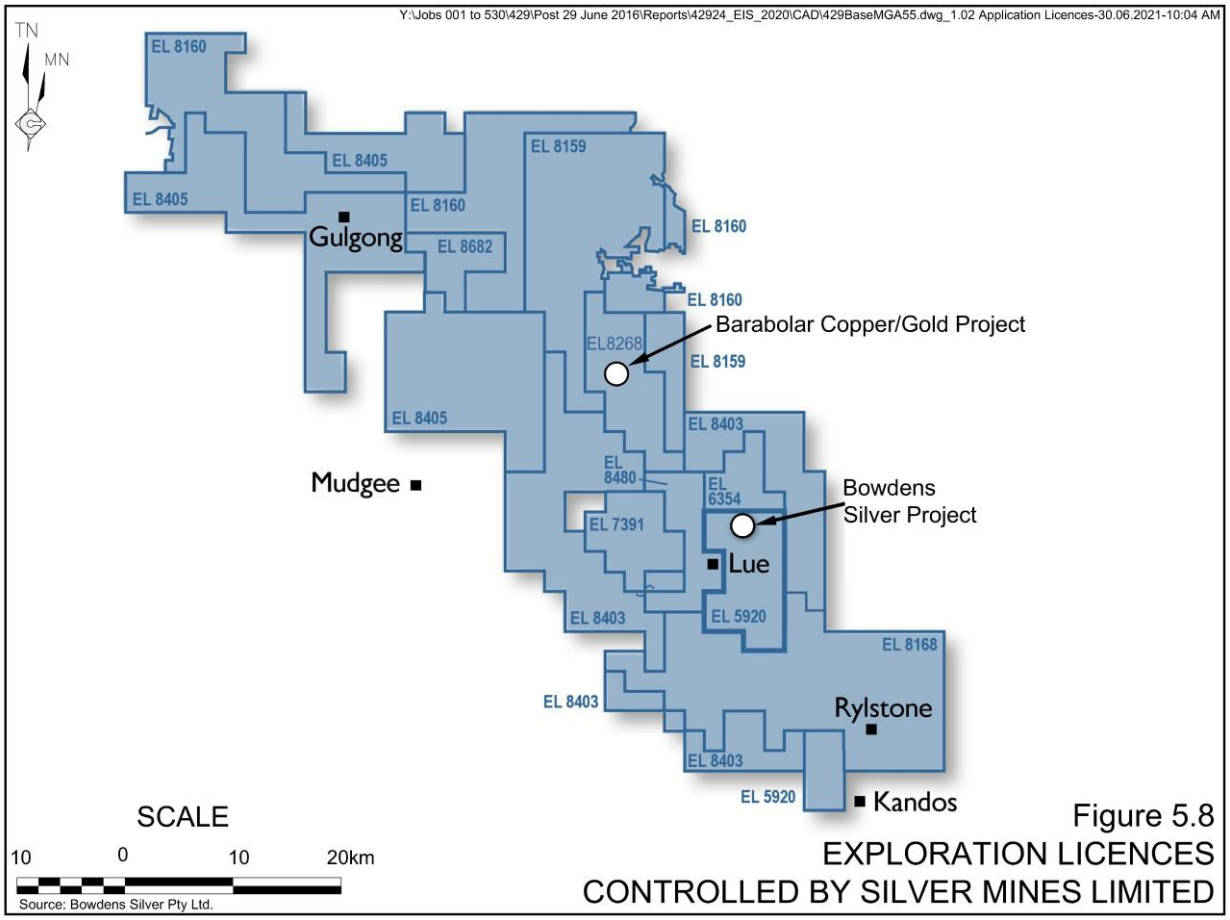
Currently Bowdens Silver has many target (sic) *under there exploration lease in the local area Kia Ora, Kia Ora West, Bara, Bara North & Botbolar… What assurances will Bowdens Silver Project give the community that they will not amend there* (sic) *original planning consent for the Bowdens site if approved.*

(Name Withheld) of Collaroy, NSW (Submission SE-8628937)

Response

Bowdens Silver holds a total of 11 exploration licences in the Kandos to Gulgong area (see **Figure 5.8**) covering approximately 2 007km^2, all related to metalliferous minerals i.e. Group 1 – Under Schedule 1 of the *Mining Act 1992*. As holder of these exploration licences, Bowdens Silver is required by the NSW Government to expend funds to undertake a range of exploration activities that can define recoverable mineral resources, should they be present. The targets referred to in the above comment have all been identified as a result of the reconnaissance exploration undertaken by Bowdens Silver, however no mineral discovery has been achieved to date. Over the coming years, the Company plans to follow up with more exploration activities to establish whether there is a sufficient quantity and concentration of mineralisation that could warrant recovery.

It is noted that all exploration companies identify numerous targets through a range of initial exploration techniques for subsequent, more intensive exploration, most or all of which are removed from further consideration as the concentration of minerals, their size or location would not be conducive to the development of a mine to recover the minerals.



Should any of the exploration targets within the 11 Exploration Licences result in a mineral discovery and the definition of any recoverable mineral resources, Bowdens Silver would need to seek all necessary approvals (as is presently occurring for the Bowdens Silver Project) in order to commence operations. The extent to which the development of a new mineral resource would result in an amendment of the development consent for the Bowdens Silver Project would clearly depend upon its location, the type and quantity of mineralisation and a wide range of local factors. In the event any of the components of the Bowdens Silver Project could be used for the development of a new mineral resource, Bowdens Silver would need to obtain all necessary amendments to the range of approvals held for the Project. This approach reflects a responsible approach to the development of new mineral resources.

It remains a key objective of the Bowdens Silver Project, to fully explore the land covered by its 11 exploration licences over the ensuing years. It is too early in the exploration phase to determine if the sites the subject of these exploration licences have resources that could be mined.

5.17.5 Monitoring and Management

Representative Comment(s)

There is overuse of 'monitoring and management' in the EIS. It is proposed to monitor and then manage many of the impacts identified. Once a negative impact has been identified through monitoring – it is too late, damage has already occurred.

Rosemary Hadaway of Budgee Budgee, NSW (Submission SE-8655995)

Response

Monitoring and management are critical elements of a successful mining and processing operation required by an operating company to demonstrate the Project is operating as planned and specifically in accordance with all approval and legislative requirements. It should be noted that management would not only occur in response to monitoring as is inferred in this comment. Proactive management commitments have been made by Bowdens Silver as presented in the EIS with monitoring being a component of this management approach. Numerous aspects of the local environment would be monitored to quantify and understand the extent to which the Project is changing the surrounding environment. Bowdens Silver will be required to monitor the following throughout the Project life. The frequency of monitoring would be nominated in the respective management plans.

- Air Quality: $PM_{2.5}$, PM_{10}, deposited dust, personal respirable crystalline silica exposure (workforce), metal content in PM_{10} and deposited dust.
- Noise: Construction, operational and traffic noise.
- Blasting: Ground vibration, air blast overpressure, blast fumes.
- Surface Water: Water quality in on-site dams, watercourses; domestic water tanks, quality and quantity of water discharged from the Mine Site.
- Groundwater: Water quality, groundwater levels.
- Water Usage: Water pumped to the Mine Site, dewatering volumes, water recovered from TSF.
- Vegetation: Seed collection, hollow-bearing trees removed.
- Fauna: Pre-clearance surveys, feral animals.
- Biodiversity Offset: Species diversity and density, weed growth and feral animals
- Agricultural Productivity: On land owned by Bowdens Silver and appropriate surrounding land.
- Aquatic Ecology: Aquatic biota in Hawkins and Lawson Creeks and reference creeks, stygofauna.
- Rehabilitation: Landform stability, vegetation growth rates and diversity, weed growth.
- Traffic: Project-related traffic (heavy vehicles), traffic levels and vehicle mix on local roads.
- Visual Impacts: Progressive photography from nominated vantage points.

The claim that "it's too late, damage has already occurred" is not accurate for the above full range of parameters to be monitored. In the first instance, the monitoring would be undertaken to demonstrate that the impacts are consistent with the predicted impacts and to identify any trends in outcomes. In the event the monitored impacts are not consistent with the predicted impacts or are trending towards an adverse outcome, it will be necessary for Bowdens Silver to identify the reason(s) why and how it/they can be remedied and revert to the required outcome. It is noted that for all predicted impacts presented in the EIS the level of impact(s) have invariably been

based upon conservative assumptions and therefore overpredict or present worst-case outcomes. Consequently, in the event there is a recorded change in impact recorded by the monitoring, the level of impact could still be acceptable and within nominated criteria or limits, i.e. no adverse impacts have occurred.

Bowdens Silver proposes to maintain the two existing meteorological stations throughout the Project life to compile all parameters relevant to the interpretation of many of the above parameters. It may be necessary to relocate meteorological station Met 01 during the Project life to ensure data collected is not adversely impacted by the construction of the southern section of the WRE.

Bowdens Silver would publish the results of its monitoring program on its website on a monthly basis with a summary presented in each Annual Review for the Project.

In the event the monitoring identifies an impact that exceeds the nominated criteria or limits, Bowdens Silver will promptly implement responsive management to address the exceedance(s) through the adoption of the most appropriate measures. All exceedances must be notified to the relevant Government authorities such as DPIE and/or the EPA and resolved in consultation with them.

5.17.6 Contingency Planning

Representative Comment(s)

Contingency plans to remediate impacts when the assessment is incorrect should be prepared and ready for approval.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver will be required to prepare a comprehensive set of management plans to outline the manner in which the relevant environmental parameters would be managed. An important component of a number of the management plans will be the documentation of the contingency plans to be adopted in the event the impacts are not consistent with the predicted impacts – hence, the comment requiring the contingency plans is supported by Bowdens Silver.

Management plans that incorporate contingency plans would be submitted to DPIE and the relevant Government agencies nominated in the conditions of consent for the Project prior to the commencement of the applicable Project component.

5.17.7 Complaints Process

Representative Comment(s)

Council requests that a comprehensive complaints process is prepared and considered by the Department prior to a determination being made.

Mid-Western Regional Council

Response

Bowdens Silver would adopt a pro-active complaints process that would incorporate the following component steps.

All complaints would be registered in a database and responded to within two business days from the receipt of the complaint. The response provided may need to be an interim response explaining the investigations planned to identify a problem and/or solution.

The following information would be recorded (where it can be reasonably obtained) in the database.

- The date/time the complaint was made.
- The name of the person receiving the complaint (and method of receipt, e.g. phone, text, email, post, personal approach).
- Complainant's name.
- Complainant's telephone number and/or email/postal address.
- Nature of the complaint.
- Action taken in relation to the complaint including any follow-up contact.
- If no action is required, the reason why.
- Satisfaction of the complainant.

This process will be incorporated in all relevant management plans which the DPIE and other relevant Government Agencies would review prior to the commencement of the relevant Project component. It is noted that the process outlined above is consistent with the requests nominated by the EPA for all holders of environment protection licences.

The nature of the response to complaints would depend on the nature and source of complaint but will include one or more of the following actions.

1. The complaint would be reviewed by the Mine Manager or their delegate to determine the nature, date and time of the exceedance or non-compliance.
2. If required, liaison with the complainant to ascertain all relevant details to fully identify the nature and source of the complaint and provide supplementary details for the complaints log.
3. The initiation of monitoring or other investigations to verify or otherwise the exceedance or non-compliance with approval or licence condition(s).
4. Initiation of appropriate changes in operating practices or procedures.
5. Conducting a follow-up interview with the complainant to determine their level of satisfaction with the response and the resultant outcome.

A copy of the complaint report will be offered to the complainant. A complaints record would be updated on Bowden Silver's website on a quarterly basis and a summary of the complaints received in each 12-month period would be included in each Annual Review. The Compliance Manager will be responsible for the recording of the complaint, response action requirements and updating of the database and website.

The inclusion of this complaints process in this document will enable the DPIE to consider the process before the Development Application is determined, as required by Council.

5.17.8 Risk Assessment

Representative Comment(s)

A risk framework, including maximal and residual risk assessments should be included within the EIS.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The EIS included an Assessment of Environmental Risk (Appendix 7) which provided guidance throughout the preparation of the EIS. The introduction to each subsection of the EIS commenced with a review of the key risk sources and the assessed risk of impacts after the adoption of standard mitigation measures.

5.18 NOISE AND VIBRATION

5.18.1 Overview

Noise was raised frequently in submissions with a range of matters identified to be of concern to the local community. The comments included general concern regarding the potential change in noise sources and therefore experience of the rural locality, the impacts of construction activities and traffic and specific comments concerning for example noise impacts at the Lue Public School. Comments from the EPA identified a number of technical matters for which clarification was sought.

It is acknowledged that noise from the Project could range from being totally indiscernible to being clearly audible at times depending on proximity to the Mine Site, meteorological conditions and the presence of other noise sources at the time. The EPA, in developing the current Noise Policy for Industry (NPfI) assessment methodologies, acknowledges that compliance with the Project Noise Trigger Levels would not lead to all members of the community finding the noise acceptable or that mining noise would be inaudible.

Potential impacts associated with noise generation and vibration resulting from the Project were comprehensively assessed by SLR Consulting and presented in a Noise and Vibration Assessment (SLR, 2020). It is acknowledged that SLR (2020) has predicted a number of exceedances of adopted noise criteria during adverse climate conditions and assuming worst case operational circumstances. These outcomes would be managed in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy (VLAMP) with ongoing management designed to minimise the risk of impact.

In accordance with the SEARs and associated requirements, the NVA and the responses to the submissions received have comprehensively evaluated noise and vibration levels associated with the Project. The key outcomes arising from the responses to the various issues provided are as follows.

- It is acknowledged that there is potential for noise impacts from conducting construction activities outside of standard construction hours between 1:00pm and 6:00pm on Saturdays. However, all construction activities would be managed in accordance with an approved Construction Noise Management Plan to ensure that any potential construction noise impacts are minimised in terms of magnitude, duration and character.
- An additional Modified Scenario 3 (Year 8) has been developed to predict noise levels under standard and noise-enhancing meteorological conditions with a bulldozer operating 'in-pit' operating unrestricted in 3rd gear. Predicted noise levels from the Modified Scenario 3 (Year 8) indicates that predicted noise levels remain generally unaltered from Scenario 3 (Year 8) as presented in the NVA.
- Additional assessment of road traffic noise was conducted to assess the relocated Maloneys Road against hourly noise criteria for 'existing residences affected by noise from new local road corridors' in accordance with the Road Noise Policy (RNP). Road traffic noise from the relocated Maloneys Road is predicted to comply at all receivers when assessed as a new local road corridor.
- An additional assessment of road traffic noise inclusive of additional road traffic associated with the Power Transmission Line re-alignment works has been conducted. The assessment resulted in no material change in noise levels presented in the NVA.
- Blasting within the Mine Site is predicted not to result in any impacts to Country Rail Network (CRN) infrastructure. As such, the John Holland Rail Blasting guideline would not be applicable.

The NVA has incorporated a comprehensive range of design and operational mitigation measures to reduce noise levels at surrounding receivers as far as practicable. These would be supported by reactive management in response to triggers that would permit Bowdens Silver to proactively reduce noise generation where there is a risk of non-compliance. The proposed use of real-time monitoring would assist Bowdens Silver to manage its operations upon receipt of feedback from the system.

The NVA and responses to submissions present the assessment of noise and blasting from the Project at privately-owned residences, other noise sensitive land uses, infrastructure and privately-owned land. Review of the comments made in submissions relating to noise generation and blasting have resulted in no material change in the assessment of potential noise and blasting impacts or conclusions as presented in the NVA.

5.18.2 General

Representative Comment(s)

The EIS has attempted to avoid the unsustainability of this project by… ignoring the residents of Lue by including their homes on maps in the EIS, excluding them from the Noise Assessment.

B. Wannan of Lue, NSW (Submission SE-8654059)

Response

EIS Figure 4.1.11 displays the locations of 44 residences within Lue with some displayed nearby. Table 4.4 lists the ownership of all properties within Lue. The predicted noise levels at each residence has in fact occurred – all of which are included in various tables throughout Part 1 of the Specialist Consultant Studies Compendium.

5.18.3 Existing Noise Climate

Representative Comment(s)

The whole reason we escape Sydney to our Wyuna haven is for the tranquillity, peacefulness, clean air and the private open space.

Phillip Cameron of Lue, NSW (Submission SE-8624052)

Response

The introduction to the NPfI summarises its policy settings when endeavouring to balance social and economic interests, as follows.

> *This policy sets out the NSW Environment Protection Authority's (EPA's) requirements for the assessment and management of noise from industry in NSW. It aims to ensure that noise is kept to acceptable levels in balance with the social and economic value of industry in NSW.*
>
> *The reaction to noise varies widely from individual to individual. Because of this it is not possible to adopt noise levels that will guarantee that no one will experience an impact. Annoyance caused by noise is partly due to acoustic factors and partly due to other factors including the personal and social outlook of individuals (Guski, 1999). The noise levels in this policy should not be interpreted to mean that industrial noise will be inaudible, or that all members of the community will find the noise acceptable.*

As such, it is acknowledged by the EPA when forming the NPfI assessment procedures that there may be impacts even where compliance with the NPfI Project Noise Trigger Levels (PNTLs) is achieved. This is particularly important as the Project has the potential to change the noise environment of the surrounding area and some residents may experience mining noise for the first time. Conversely in those instances where PNTLs are not achieved, it does not automatically follow that all people exposed to the noise would find the noise "unacceptable".

Tables 35, 37, and 39 in SLR (2020) present the percentage of time that standard and noise-enhancing meteorological conditions occur at residences surrounding the Mine Site during the day, evening and night-time periods. During the daytime, evening and night-time period,

noise enhancing conditions for R87 'Wyuna' occurs from 21%, 39% and 55% of the time, respectively. Noise from the Mine Site, depending on the presence of any existing noise sources and meteorological conditions at the time, could range from being indiscernible to being audible at times when observed external to a residential building. Section 5.4 in SLR (2020) affirms Bowdens Silver's commitment to implement feasible and reasonable noise mitigation measures to minimise as far as practicable noise emissions from the Project.

This approach to management, coupled with the conservative and worst-case approach to assessment (as required by the EPA), indicate that although change would be experienced, the outcomes of assessment are not intended to represent the permanent or even the predominant outcome for residents. The local community's fears and expectations when contemplating this change are acknowledged and have not been dismissed but it is considered that the outcomes of assessment represent a compromise that avoids and reduces impacts as much as is reasonable and feasible while permitting the substantial benefits of the Project to the local and regional community to be realised.

5.18.4 Criteria for Noise Assessment

Representative Comment(s)

Wilkinson Murray considers these noise criteria to be appropriate for the area and the project. Additional noise monitoring will not reduce the noise criteria as they are the lowest possible as recommended by the NPfI.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

This support for the adopted criteria and use of background noise monitoring is noted.

5.18.5 Construction Noise Assessment

Representative Comment(s)

The proposed period of work between 1pm and 6pm on Saturdays is outside the recommended standard hours of work described in the ICNG.

As such, there is a potential that the extent of construction noise impacts has not been appropriately assessed for the works proposed outside of the recommended hours of work.

EPA Request: Construction noise assessment

a). There are inconsistencies in the tables that need correcting in the NIA:

- *Table 45 – R35 and R36A should be highlighted as exceeding the criteria.*
- *Table 47 – R37 is listed in both the 'Negligible' and 'Marginal to Moderate' columns. This needs clarifying or correcting.*
- *R46 should be listed in Table 47.*

NSW Environment Protection Authority

Response

The inconsistences in NVA Table 45 and NVA Table 47 regarding the 500kV power transmission line (PTL) have been remedied, as presented in **Table 5.8** and **Table 5.9**.

Table 5.8
Day-time Intrusive $L_{Aeq(15minute)}$ Operational and PTL Re-alignment Noise Levels (dB(A) re 20µPa)

Residence ID/Place of Interest[1]	Year 3 Scenario 2 Operational		Year 3 PTL Re-alignment Works		Total Year 3 Operational plus Re-alignment Works		% Frequency of Occurrence		Intrusive PNTL[2]
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard[6]	Enhancing Wind[7]	
Rural Residences									
R35	32	39	24	40	32	43	3	20	40
R36A	28	38	28	42	31	43	3	21	40
Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).									
Note 2: Predicted LAeq(15minute) intrusive noise level complies with the PNTL.									
Note 3: Predicted negligible noise exceedance 1-2dB(A) above the PNTL.									
Note 4: Predicted marginal to moderate noise exceedance 3-5dB(A) above the PNTL.									
Note 5: Predicted significant noise exceedance >5dB(A) above the PNTL – Note: none present									
Note 6: Standard meteorological condition - wind speed up to 0.5m/s.									
Note 7: Noise-enhancing wind - wind speed up to 3m/s; plus/minus 45 degrees with respect to the receiver.									
	Amendment to Table 45 in SLR (2020)								

Table 5.9
Privately-owned Residences and Project-related Receivers with PNTL Exceedances

Total Year 3 Operational plus PTL Re-alignment Works	Characterisation of PTL Re-alignment Noise Impacts		
	Negligible[2]	Marginal to Moderate[3]	Significant[4]
Privately-owned Residences[1]			
Rural Residences	R21; R25; R27; R37; R40; R45A; R46, R82; R86; R87	R35; R36A; ~~R37,~~	R4; R7
Lue Residences	L3; L4; L50	-	-
Lue Places of Interest	-	-	-
Project-related Receivers[1]			
Rural	R1L; R1N	R1B; R1H; R1K; R39; R47	R1A; R1J; R1P; R1Q, R10
Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).			
Note 2: Predicted negligible noise exceedance 1-2dB(A) above the daytime intrusive PNTL of 40dB(A).			
Note 3: Predicted marginal to moderate noise exceedance 3-5dB(A) above the daytime intrusive PNTL of 40dB(A).			
Note 4: Predicted significant noise exceedance >5dB(A) above the daytime intrusive PNTL of 40dB(A).			
	Amendment to Table 47 in SLR (2020)		

Representative Comment(s)

b). The proponent should provide sufficient justification for scheduling work during the proposed out of hours periods between 1pm to 6pm on Saturdays. If works outside standard hours are necessary, the construction noise impacts should be assessed against the background + 5 dBA criteria and appropriate mitigation measures implemented to minimise impacts during outside standard hours in accordance with the ICNG.

NSW Environment Protection Authority

Response

The construction activities undertaken on Saturdays between 1:00pm and 6:00pm would be undertaken in areas within the Mine Site, generally distant from residences and along the off-site road network, principally along the alignment of the relocated Maloneys Road. It is considered that limited noise-related impacts would occur during this 5 hour period within the 6 months given:

i) the rural nature of the construction areas;

ii) the periodic daytime use of farm machinery of a Saturday in the vicinity; and

iii) the fact that the locations of the construction activities would regularly change during the six month period, and the duration of exposure at the nominated levels would be limited.

Furthermore, it remains the preference of Bowdens Silver to maximise the hours for the construction of the relocated Maloneys Road as MWRC and a number of the Lue and district residents are supportive that the relocated Maloneys Road is constructed as quickly as possible to minimise daily traffic movements throughout Lue as soon as possible. Section 2.3 of the NSW Interim Construction Noise Guideline (ICNG) lists categories of work that might be undertaken outside of the recommended construction hours and includes:

- public infrastructure works that shorten the length of the project and are supported by the affected community.
- works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Given that MWRC and a number of Lue and district residents support that the relocated Maloneys Road is constructed as quickly as possible, it is considered that the minor extension of construction activities on Saturdays between 1:00pm and 6:00pm is reasonably supported by the community and the construction outside the recommended standard hours is justified.

Notwithstanding the foregoing justification, activities undertaken during the first 6 months of the site establishment and construction stage during proposed daytime out-of-hours (Saturdays 1:00pm to 6:00pm) have been re-assessed against the daytime background +5dB(A) criteria (which equates to a daytime out-of-hours Construction Noise Management Level (CNML) of 40dB(A) as presented in **Table 5.10**, **Table 5.11** and **Table 5.12**.

Table 5.10
Daytime Intrusive $L_{Aeq(15minute)}$ Construction Noise Levels (dB(A) re 20µPa)

Residence ID/ Place of Interest[1]	Off-site Road Network		On-site Earthworks and Infrastructure		Total Off-site plus On-site Construction Noise		Intrusive CNML[2]	Intrusive HNAL[2]
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind		
Rural Residences								
R4	7	24	25	38	25	38	40	75
R6	4	15	14	24	15	25	40	75
R7	8	26	24	32	24	33	40	75
R9	1	11	13	20	13	21	40	75
R10	8	27	26	39	26	39	40	75
R12	28	36	21	33	29	38	40	75
R13	1	12	13	20	13	20	40	75
R15	3	14	13	22	14	23	40	75
R16	2	11	12	19	13	20	40	75
R17	15	29	19	25	20	31	40	75
R19	-3	16	16	26	16	26	40	75
R21	2	22	19	31	19	32	40	75
R22	1	19	18	31	18	31	40	75
R24	6	19	19	30	19	31	40	75
R25	26	39	18	34	27	41	40	75
R27	8	23	23	34	23	34	40	75
R28B	4	18	17	28	18	28	40	75
R28C	5	15	18	25	18	26	40	75
R28D	5	16	17	26	17	26	40	75
R31	1	19	19	29	19	30	40	75
R33	4	19	19	29	19	29	40	75
R34	0	18	16	30	16	30	40	75
R35	30	40	18	36	30	42	40	75
R36A	31	43	17	35	31	44	40	75
R36B	32	44	16	20	32	44	40	75
R37	24	38	18	36	25	40	40	75
R39	13	26	19	33	20	34	40	75
R40	13	25	19	33	20	33	40	75
R42	23	37	17	34	24	39	40	75
R43	0	15	16	23	16	23	40	75
R44	16	25	13	32	18	33	40	75
R45A	17	29	15	31	19	33	40	75
R45B	15	24	14	31	17	32	40	75
R46	16	26	20	33	21	34	40	75
R47	13	25	20	33	21	34	40	75
R48	12	22	18	29	19	30	40	75

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Construction Noise Management Level (CNML), Highly Noise Affected Level (HNAL of 75dB(A)).
Note 3: Predicted LAeq(15minute) noise level complies with the intrusive CNML.
Note 4: Predicted negligible to marginal noise exceedance 1 to 5dB(A) above intrusive CNML.
Note 5: Predicted moderate noise exceedance >5dB(A) above intrusive CNML.
Note 6: Predicted significant noise exceedance above intrusive HNAL of 75dB(A).

Amendment to Table 32 in SLR (2020)

Table 5.10 (Cont'd)
Daytime Intrusive $L_{Aeq(15minute)}$ Construction Noise Levels (dB(A) re 20µPa)

Residence ID/ Place of Interest[1]	Off-site Road Network		On-site Earthworks and Infrastructure		Total Off-site plus On-site Construction Noise		Intrusive CNML[2]	Intrusive HNAL[2]
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind		
Rural Residences (Cont'd)								
R50	5	20	11	21	12	23	40	75
R58	25	36	15	25	26	36	40	75
R60	27	37	16	28	27	38	40	75
R63	7	22	10	20	12	24	40	75
R68	17	31	17	31	20	34	40	75
R70	15	32	17	21	19	32	40	75
R73	38	44	17	35	38	45	40	75
R74	28	39	17	33	29	40	40	75
R75	33	39	23	36	33	41	40	75
R76	22	41	17	32	23	41	40	75
R80	1	14	13	22	13	23	40	75
R81	45	51	20	33	45	51	40	75
R82	36	47	19	34	36	47	40	75
R83	22	36	18	33	23	38	40	75
R84A	25	36	18	33	25	38	40	75
R84B	25	36	18	32	26	37	40	75
R85	25	39	17	33	25	40	40	75
R86	30	40	18	35	30	41	40	75
R87	30	43	17	35	30	43	40	75
R88	54	57	19	31	54	57	40	75
R89	52	56	19	32	52	56	40	75
R90	50	54	20	32	50	54	40	75
R91	7	30	15	29	15	32	40	75
R92B	30	41	18	29	31	41	40	75
R92E	19	28	15	31	21	33	40	75
R92F	19	28	16	31	21	33	40	75
R92G	19	27	15	31	20	32	40	75
R93A	19	31	15	32	21	34	40	75
R93B	18	30	15	31	20	34	40	75
R93C	18	30	15	31	20	34	40	75
R94A	19	31	15	32	20	35	40	75
R94B	18	28	15	32	20	33	40	75
R95	13	21	17	24	18	26	40	75

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Construction Noise Management Level (CNML), Highly Noise Affected Level (HNAL of 75dB(A)).
Note 3: Predicted LAeq(15minute) noise level complies with the intrusive CNML.
Note 4: Predicted negligible to marginal noise exceedance 1 to 5dB(A) above intrusive CNML.
Note 5: Predicted moderate noise exceedance >5dB(A) above intrusive CNML.
Note 6: Predicted significant noise exceedance above intrusive HNAL of 75dB(A).

Amendment to Table 32 in SLR (2020)

Table 5.10 (Cont'd)
Daytime Intrusive $L_{Aeq(15minute)}$ Construction Noise Levels (dB(A) re 20µPa)

Residence ID/ Place of Interest[1]	Off-site Road Network		On-site Earthworks and Infrastructure		Total Off-site plus On-site Construction Noise		Intrusive CNML[2]	Intrusive HNAL[2]
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind		
Lue Residences								
L1	23	37	17	35	24	39	40	75
L2	22	34	17	34	23	37	40	75
L3	26	39	17	35	26	41	40	75
L4	25	40	17	34	26	41	40	75
L5	24	38	17	34	25	40	40	75
L7	23	37	18	35	24	39	40	75
L8	24	37	18	35	24	39	40	75
L9	21	35	17	34	22	38	40	75
L10	21	34	16	33	22	37	40	75
L12	21	34	16	33	22	37	40	75
L13	22	35	16	34	23	37	40	75
L15	22	35	16	34	23	37	40	75
L16	22	34	16	33	23	37	40	75
L17	22	34	16	33	23	37	40	75
L18	23	35	16	34	24	38	40	75
L19	23	36	17	34	24	38	40	75
L20	23	36	17	34	24	38	40	75
L21	23	36	17	34	24	38	40	75
L22	23	36	17	34	24	38	40	75
L23	23	36	17	34	24	38	40	75
L24	23	36	17	34	24	38	40	75
L25	23	36	17	33	24	38	40	75
L26	23	35	17	33	24	38	40	75
L27	23	36	18	34	24	38	40	75
L28A	23	37	18	34	24	39	40	75
L28B	23	37	17	34	24	39	40	75
L29	22	34	16	33	23	37	40	75
L30	22	32	17	33	23	35	40	75
L31	22	35	17	33	23	37	40	75
L32	23	35	17	33	24	37	40	75
L33	23	36	17	33	24	38	40	75
L34	23	37	17	34	24	38	40	75
L35	23	36	17	34	24	38	40	75
L37	24	36	17	34	24	38	40	75
L38	24	37	17	33	24	39	40	75

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Construction Noise Management Level (CNML), Highly Noise Affected Level (HNAL of 75dB(A)).
Note 3: Predicted LAeq(15minute) noise level complies with the intrusive CNML.
Note 4: Predicted negligible to marginal noise exceedance 1 to 5dB(A) above intrusive CNML.
Note 5: Predicted moderate noise exceedance >5dB(A) above intrusive CNML.
Note 6: Predicted significant noise exceedance above intrusive HNAL of 75dB(A).

Amendment to Table 32 in SLR (2020)

Table 5.10 (Cont'd)
Daytime Intrusive $L_{Aeq(15minute)}$ Construction Noise Levels (dB(A) re 20µPa)

Residence ID/ Place of Interest[1]	Off-site Road Network		On-site Earthworks and Infrastructure		Total Off-site plus On-site Construction Noise		Intrusive CNML[2]	Intrusive HNAL[2]
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind		
Lue Residences (Cont'd)								
L39	23	37	17	33	24	39	40	75
L40	23	37	17	33	24	39	40	75
L41	23	37	17	33	24	38	40	75
L42	24	37	17	33	24	38	40	75
L43	23	34	17	33	24	36	40	75
L44	24	37	17	33	25	39	40	75
L45	27	38	17	33	27	39	40	75
L46	24	37	17	34	25	38	40	75
L47	26	38	17	33	26	39	40	75
L49	21	34	16	33	22	36	40	75
L50	25	39	18	35	26	41	40	75

Table 5.11
Daytime Calm Intrusive $L_{Aeq(15minute)}$ Construction Noise Levels (dB(A) re 20µPa)

Residence ID[1,7]	Off-site Road Network		On-site Earthworks and Infrastructure		Total Off-site plus On-site Construction Noise		Intrusive CNML[2]	Intrusive HNAL[2]
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind		
Project-related Receivers								
R1A	9	25	24	37	24	37	40	75
R1B	8	26	22	31	22	32	40	75
R1G	7	18	22	30	22	30	40	75
R1H	8	24	27	36	27	36	40	75
R1I	7	23	23	34	23	35	40	75
R1J	9	25	29	37	29	37	40	75
R1K	6	20	37	43	37	43	40	75
R1L	46	52	20	27	46	52	40	75
R1M	44	50	20	25	44	50	40	75
R1N	38	48	19	34	38	48	40	75
R1O	70	70	20	33	70	70	40	75
R1P	8	25	26	40	26	40	40	75
R1Q	11	25	29	37	29	37	40	75
L1R	21	34	16	33	22	37	40	75
R10	8	27	26	39	26	39	40	75

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Construction Noise Management Level (CNML), Highly Noise Affected Level (HNAL of 75dB(A)).
Note 3: Predicted LAeq(15minute) noise level complies with the intrusive CNML.
Note 4: Predicted negligible to marginal noise exceedance 1 to 5dB(A) above intrusive CNML.
Note 5: Predicted moderate noise exceedance >5dB(A) above intrusive CNML.
Note 6: Predicted significant noise exceedance above intrusive HNAL of 75dB(A).
Note 7: Residences R1C, R1D, R1E and R1F have been excluded as these residences would be demolished.

Amendment to Table 33 in SLR (2020)

Table 5.12
Privately-owned Residences and Project-related Receivers with Out-of-Hours CNML Exceedances

Construction Activity	Negligible to Marginal 1 to 5dB(A) CNML[1]	Moderate > 5dB(A) CNML[1]	Significant > above HNAL[1]
Privately-owned Residences			
Total Off-site Road Network plus On-site Earthworks and Infrastructure Construction Noise	R25; R35; R36A; R36B; R73; R75; R76; R86; R87; R92B; L3; L4; L50	R81; R82; R88; R89; R90	-
Project-related Receivers			
Total Off-site Road Network plus on-site Earthworks and Infrastructure Construction Noise	R1K	R1M; R1N; R1L; R1O	-
Note 1: Out-of-Hours Construction Noise Management Level (CNML 40dB(A), Highly Noise Affected Level (HNAL of 75dB(A)).			
	Amendment to Table 34 in SLR (2020)		

The predicted daytime out-of-hours (Saturdays 1:00pm to 6:00pm) construction noise impacts at privately-owned residences and project-related receivers in the vicinity of the Mine Site and relocated Maloneys Road, are summarised below.

Out-of-Hours Construction Noise Levels at Privately-owned Residences:

- comply with the daytime out-of-hours CNML of 40dB(A) from the on-site earthworks and infrastructure construction activities;
- marginally (i.e. up to 5dB(A)) exceed the daytime out-of-hours CNML of 40dB(A) during the most intensive period of the off-site road network construction activity at fourteen residences (R25; R35; R36A; R36B; R73; R75; R76; R82; R86; R87; R92B; L3; L4; L50) with an approximate duration of 1 to 2 months; and
- moderately (i.e. >5dB(A)) exceed the out-of-hours CNML of 40dB(A) during the most intensive period of the off-site road network construction activity at four residences (R81; R88; R89; and R90) with a duration of approximately 1 to 2 months, while remaining well below the Highly Noise Affected Level (HNAL) of 75dB(A).

Out-of-Hours Construction Noise Levels at Project-related receivers:

Are likely to exceed the out-of-hours CNML of 40dB(A) at multiple residences as the majority of these are located in close proximity to the Mine Site. Impacts upon occupants of these residences (if any) would be managed in accordance with the requirements of the CNMP.

Out-of-Hours Noise Mitigation Measures

Construction noise from the Project would be managed by Bowdens Silver in accordance with an approved CNMP based on the general requirements of the ICNG (and any Development Consent requirements) to ensure that any potential construction noise impacts (particularly from the off-site activities associated with the construction of the relocated Maloneys Road) are minimised in terms of magnitude, duration and character.

5.18.6 Sound Power Levels

Representative Comment(s)

All sound power levels adopted for the noise predictions appear to be very low when compared to representative plant types from other mines (e.g. D11 dozer 113dBA in first gear).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

NVA Section 5.4, affirms Bowdens Silver's commitment to implement feasible and reasonable noise mitigation guided by the requirements of the NPfI Fact Sheet F. In particular, NVA Tables 26, 27, 28 and 29 present the indicative plant and equipment types, proposed source noise controls and adopted sound power levels (SWLs). The adopted SWLs are therefore by design low while being demonstrated as achievable with current technology (but not very low and or unachievable) and include the use of available 'extra quiet' plant and equipment types being consistent with the requirements of the NPfI Fact Sheet F (presented as follows).

Noise Policy for Industry

Fact Sheet F: Feasible and reasonable mitigation

'Feasible' and 'reasonable' mitigation is defined as follows.

A **feasible** mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. It may also include options such as amending operational practices (for example, changing a noisy operation to a less-sensitive period or location) to achieve noise reduction.

Selecting **reasonable** measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make such a judgement, consider the following:

- Noise impacts:
  - existing and future levels, and projected changes in noise levels
  - level of amenity before the development, for example, the number of people affected or annoyed
  - the amount by which the triggers are exceeded.
- Noise mitigation benefits:
  - the amount of noise reduction expected, including the cumulative effectiveness of proposed mitigation measures, for example, a noise wall/mound should be able to reduce noise levels by at least 5 decibels
  - the number of people protected.
- Cost effectiveness of noise mitigation:
  - the total cost of mitigation measures
  - noise mitigation costs compared with total project costs, taking into account capital and maintenance costs
  - ongoing operational and maintenance cost borne by the community, for example, running air conditioners or mechanical ventilation.
- Community views:
  - engage with affected land users when deciding about aesthetic and other impacts of noise mitigation measures
  - determine the views of all affected land users, not just those making representations, through early community consultation
  - consider noise mitigation measures that have majority support from the affected community.

Take into account the above considerations when determining the mitigation measures proposed to be incorporated into the development. In practice, the detail of the mitigation measures applied will largely depend on project-specific factors. These are the measures that minimise, as far as practicable, the local impacts of the project. Project approval conditions that flow from this process should be achievable. They need to provide clarity and confidence for the proponent, local community, regulators and the ultimate operator that the proposed mitigation measures can achieve the predicted level of environmental protection.

Representative Comment(s)

Sound power levels for plant have not been justified through reference documents as required by the NPfI (Section 3.3). Sound power level references should be provided by the proponent.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

The NVA Table 26 and Table 27 are supplemented with the relevant sound power level (SWL) references, as presented in **Table 5.13** and **Table 5.14**.

Table 5.13
Scenario 1 Mobile Equipment List and Design SWLs (dB(A) re 1ρW)

Item	Indicative Type	Source Noise Control	SWL1 per Item	Reference
Drill	PV-275	Low noise	115	Direct SWL measurement Duralie Coal Mine (Vipac, 2015)
Excavator	EX-1900	Low noise	114	New Acland (Global Acoustics, 2018)
	CAT 390 (70t)	Low noise	109	Manufacturer Specification
	CAT 336 (30t)	Low noise	105	Manufacturer Specification
Haul Trucks	CAT 777XQ	Low noise extra quiet	112	Manufacturer Specification
	Volvo A45G/35G	Low noise	110	Manufacturer Specification
Grader	CAT 16MXQ	Low noise extra quiet	108	Manufacturer Specification
	CAT 12M	Low noise	107	Manufacturer Specification
Front-end Loader	CAT 988K XQ	Low noise extra quiet	110	Manufacturer Specification
	CAT 950M	Low noise	107	Manufacturer Specification
	CAT 930F	Low noise	101	Manufacturer Specification
Dozer	CAT D11T XQ	Low noise extra quiet, 1st gear[2]	113	Manufacturer measurements conducted in the Hunter Valley
	CAT D9	Low noise, 1st gear[2]	109	SLR SWL database
	CAT D7	Low noise, 1st gear[2]	109	SLR SWL database
Water Truck	Volvo F724 (10,000L)	Low noise	106	Rocky Hill Coal Project (SLR, 2016)
B-double Truck	B-double Truck	-	108	Construction Noise and Vibration Strategy (TfNSW, 2018)
Truck Semi Tipper	Truck Semi Tipper	-	108	Construction Noise and Vibration Strategy (TfNSW, 2018)
Vibrating Roller	CAT CS54XT	Low noise	109	Construction Noise and Vibration Strategy (TfNSW, 2018)
Crusher/Screen	McCloskey J40 & S80	Nearfield barrier[3]	118	Construction Noise and Vibration Strategy (TfNSW, 2018)
Mulching Unit	Petersen 2710	-	115	Direct SWL measurement Northwest Recycling Centre (SLR, 2017)
Chain Saw	Husqvarna 455 R	-	114	Construction Noise and Vibration Strategy (TfNSW, 2018)

Note 1: SWL inclusive of noise reduction due to source noise control based on either: manufacture's acoustical specifications; or field noise measurements of the equipment type operating; or similar equipment operating and then adjusted.
Note 2: SWL inclusive of noise reduction due to 1st gear only when operating out of pit.
Note 3: SWL exclusive of nearfield barrier mitigation.

Amendment to Table 26 in SLR (2020)

Table 5.14
Scenarios 2, 3 & 4 Mobile Equipment & Fixed Plant List & Design SWLs (dB(A) re 1ρW)

Item	Indicative Type	Source Noise Control	SWL[1] per Item	SWL Reference
Drill	PV-275	Low noise	115	Direct SWL measurement Duralie Coal Mine (Vipac, 2015)
Excavator	EX-1900	Low noise	114	New Acland (Global Acoustics, 2018)
	CAT 390 (70t)	Low noise	109	Manufacturer Specification
	CAT 336 (30t) with Rock-breaker	-	122	Construction Noise and Vibration Strategy (TfNSW, 2018)
Haul Trucks	CAT 777XQ	Low noise extra quiet	112	Manufacturer specification
	Volvo A45G/35G	Low noise	110	Manufacturer Specification
Grader	CAT 16M XQ	Low noise extra quiet	108	Manufacturer Specification
Frontend loader	CAT 988K XQ	Low noise extra quiet	110	Manufacturer Specification
Dozer	CAT D10T XQ	Low noise extra quiet, 1st gear[2]	111	Manufacturer measurements conducted in the Hunter Valley.
	CAT D9	Low noise, 1st gear[2]	109	SLR SWL database
Water Truck	Volvo F724 (10,000L)	-	106	Rocky Hill Coal Project (SLR, 2016)
Fuel Truck	Road Truck	-	106	SLR SWL database
Service Truck	Road Truck	-	106	SLR SWL database
B-double Truck	B-double Truck	-	108	Construction Noise and Vibration Strategy (TfNSW, 2018)
Vibrating Roller	CAT CS54XT	Low noise	109	Construction Noise and Vibration Strategy (TfNSW, 2018)
Crusher/Screen	McCloskey J40 & S80	Nearfield barrier[3]	118	Construction Noise and Vibration Strategy (TfNSW, 2018)
Container Lifter	-	-	99	SLR SWL database
Telehandler	-	-	92	SLR SWL database
Primary Jaw Crusher	160kW Metso C130 (51 x 39)	Full enclosure[4]	108	SLR SWL database / Low Noise Specification
Jaw Crusher Dust Extraction Unit	-	Silenced	93	SLR SWL database / Low noise specification
50kW Conveyor Drive	-	Low noise	90	SLR SWL database / Low noise specification
150kW Conveyor Drive	-	Low noise	92	SLR SWL database / Low Noise Specification
Conveyor	27tph, 1m/s, 1,000mm belt	Low noise idlers	92dB(A)/ 100m	SLR SWL database / Low Noise Specification
Transfer Chute	-	Soft-flow chute	93	SLR SWL database / Low noise specification
Stockpile Discharge	-	-	100	SLR SWL database
SAG Mill	25 tph, 4.8 MW, 8.5 dia x 3.8 EGL	Full enclosure[5]	106	SLR SWL database / Low noise specification
Ball Mill	75 tph, 4.0 MW, 5.0 dia x 10 EGL			
Flotation Area (combined)	-	Full enclosure[5]	103	Calculated from SLR database / Low noise specification
Thickener Area (combined)	-			
	Amendment to Table 27 in SLR (2020)			

Table 5.14 (Cont'd)
Scenarios 2, 3 & 4 Mobile Equipment & Fixed Plant List & Design SWLs (dB(A) re 1ρW)

Item	Indicative Type	Source Noise Control	SWL[1] per Item	SWL Reference
Filter Area	500kW Isamill M1000	Full enclosure[5]	105	Calculated from SLR database / Low noise specification
Filter Air Compressors	-	Silenced	90	SLR SWL database / Low noise specification
Plant Workshop	Metal work (hand tools)	Partial enclosure[6]	94	Calculated from SLR database / Low noise specification
Mining/LV Workshop	Rattle Gun/Welding etc	-	99	SLR SWL database / Low noise specification
Water Pumps	85kL/hour	Enclosure / silenced	93	SLR SWL database / Low noise specification

Note 1: SWL inclusive of noise reduction due to source noise control based on either: manufactures acoustical specifications; or field noise measurements of the equipment type operating; or similar equipment operating and then adjusted.

Note 2: SWL inclusive of noise reduction due to 1st gear only when operating out of pit.

Note 3: SWL exclusive of nearfield barrier mitigation.

Note 4: Full enclosure (lower double clad) minimum penetrations 60% absorptive lining (or equivalent) - 10dB(A) reduction.

Note 5: Full enclosure with minimum penetrations and 60% absorptive lining - 10dB(A) reduction.

Note 6: Partial enclosure and 60% absorptive lining - 6dB(A) reduction.

Amendment to Table 27 in SLR (2020)

Representative Comment(s)

As a noise control, the assessment indicates that all dozer operating outside the pit would be in 1st gear with a low sound power level of 113dBA. The practicality of this assumption should be verified.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

Bulldozers, when pushing a full blade of material would invariably remain in first gear – and that is their key role outside the open cut pit. With respect to a bulldozer travelling from one location to another (referred to as "tramming"), the bulk of the WRE and stockpiles lie within 500m of the open cut pit, with the furthest extent being approximately 800m. Using the Cat D9T first gear forward speed of 3.9km/h, a tram time of approximately eight minutes is required to reach the bulk of the WRE and stockpiles, and approximately 12 minutes to reach the furthest extent.

These are practical tramming distances and times that would enable the fleet to meet operational requirements.

Representative Comment(s)

The Assessment does not provide sound power levels for the normal operation of the D11 inside the pit. The assumed sound power level for the normal operation of a D11 dozer should be provided.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

The operational noise scenarios were reviewed to ensure the adequacy of the selected noise modelling figurations and, if necessary, consider any additional noise modelling to check the noise levels with the bulldozer operating unrestricted in pit (i.e. normal in-pit operations). NVA Section 5.2 describes the mine operational noise modelling scenarios namely: Scenario 1 (Year 0), Scenario 2 (Year 3), Scenario 3 (Year 8) and Scenario 4 (Year 10).

Scenario 1 (Year 0) (NVA Annexure 15 Figure A) comprises daytime operations involving open cut pit development and construction of processing plant, tailings storage facility (initial embankment) and water supply pipeline. As the main open cut pit is in development, there is effectively no 'open cut pit' with mobile equipment operating at or near the surface and the D11 dozer would be restricted to first gear.

Scenario 2 (Year 3) (NVA Annexure 15 Figure B) comprises daytime ore processing plus open cut pit operations, southern barrier development, waste rock haulage and TSF raise. There are two D9 dozers in operation in this scenario, with one placed on the southern barrier at 622m AHD, and the other on the upper bench of the main open cut pit on the western side at 615m AHD. There are no D11 dozers operating in this scenario.

Scenario 3 (Year 8) (NVA Annexure 15 Figure E) comprises daytime ore processing plus open cut pit operations, southern barrier development, waste rock haulage and TSF raise. Scenario 3 (Year 8) has been modified to assess the noise impact from the unrestricted in-pit operation of the D9 dozer. The modified in-pit Scenario 3 (Year 8) relocates the restricted D9 dozer from the southern rock waste emplacement area (612m AHD) to the main open cut pit (adjacent to the EX1900 Excavator 505m AHD) with the D9 dozer operating unrestricted in 3rd gear with a SWL of 120 dB(A). There are no D11 dozers operating in this scenario.

Scenario 4 (Year 10) (NVA Annexure 15 Figure H) comprises daytime ore processing plus open cut pit operations, southern barrier development, and waste rock haulage. There are two D9 dozers in operation in this scenario, with one placed on the southern barrier at 620 AHD, and the other on the eastern rock waste emplacement area at 600m AHD. There are no D11 dozers operating in this scenario.

Based on the modified in-pit Scenario 3 (Year 8) where two D9 dozers are operating in an un-restricted manner, the predicted daytime operating intrusive noise levels for privately-owned residences in the vicinity of the Mine Site are presented in the **Table 5.15** under standard and noise-enhancing meteorological conditions together with the change intrusive noise relative to the Scenario 3 (Year 8) (NVA Table 35). A review of the predicted noise levels in **Table 5.15** indicates that the levels remain generally unaltered at all privately-owned residents by comparison with NVA Table 35.

Table 5.15
Daytime Standard and Noise-enhancing Intrusive $L_{Aeq(15minute)}$ Noise Levels (dB(A) re 20µPa)

Residence ID/Places of Interest[1]	Year 8 Modified In pit Scenario 3				% Frequency of Occurrence		Intrusive PNTL
	Standard	Change relative to the NVA	Enhancing Wind	Change relative to the NVA	Standard[6]	Enhancing Wind[7]	
R4	35	-0.1	42	-0.3	3	16	40
R6	14	-0.3	25	-0.2	3	16	40
R7	26	-1.3	39	-0.4	3	11	40
R9	12	-0.1	20	-0.1	3	16	40
R12	22	0.2	30	0.1	3	19	40
R13	11	0.0	19	-0.1	3	15	40
R15	13	-0.2	25	1.0	3	15	40
R16	11	-0.1	20	-0.1	3	15	40
R17	17	0.5	27	0.1	3	9	40
R19	15	-0.2	29	0.1	3	15	40
R21	22	0.0	36	-0.2	3	14	40
R22	19	-0.4	33	-0.2	3	15	40
R24	20	-0.6	33	-0.2	3	16	40
R25	24	0.0	38	-0.1	3	19	40
R27	26	-0.2	37	-0.2	3	16	40
R28A	17	-0.5	31	-0.1	3	15	40
R28B	17	-0.4	30	0.1	3	15	40
R28C	17	-0.2	26	-0.2	3	15	40
R28D	16	-0.2	27	-0.1	3	15	40
R31	19	-0.3	32	-0.2	3	16	40
R33	20	-0.2	28	-0.2	3	15	40
R34	18	-0.3	32	-0.1	3	14	40
R35	24	0.1	39	-0.2	3	20	40
R36A	28	0.0	42	-0.1	3	21	40
R36B	32	0.0	38	0.0	3	21	40
R37	21	0.1	38	0.0	3	19	40
R39	22	-0.8	36	-0.6	3	12	40
R40	23	-0.9	36	-0.9	3	12	40
R42	20	0.1	36	-0.1	3	18	40
R43	15	0.0	25	-0.5	3	16	40
R44	17	-0.3	33	-0.9	3	15	40
R45A	17	-0.3	33	-0.8	3	14	40
R45B	17	-1.0	33	0.0	3	15	40
R46	22	-0.9	36	-0.7	3	12	40

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Predicted $L_{Aeq(15minute)}$ intrusive noise level complies with the PNTL.
Note 3: Predicted negligible noise exceedance 1-2dB(A) above the PNTL.
Note 4: Predicted marginal to moderate noise exceedance 3-5dB(A) above the PNTL.
Note 5: Predicted significant noise exceedance >5dB(A) above the PNTL.
Note 6: Standard meteorological condition - wind speed up to 0.5m/s.
Note 7: Noise-enhancing wind - wind speed up to 3m/s; plus/minus 45 degrees with respect to the receiver.

Amendment to Table 35 in SLR (2020)

Table 5.15 Cont'd)
Daytime Standard and Noise-enhancing Intrusive $L_{Aeq(15minute)}$ Noise Levels (dB(A) re 20µPa)

Residence ID/Places of Interest[1]	Year 8 Modified In pit Scenario 3				% Frequency of Occurrence		Intrusive PNTL
	Standard	Change relative to the NVA	Enhancing Wind	Change relative to the NVA	Standard[6]	Enhancing Wind[7]	
R47	24	-0.8	36	-0.8	3	11	40
R48	21	-0.3	32	-0.3	3	11	40
R50	12	0.0	24	-0.1	3	12	40
R58	19	0.0	29	0.0	3	21	40
R60	18	0.0	32	0.0	3	19	40
R63	7	0.0	16	0.0	3	14	40
R68	16	0.1	29	0.0	3	11	40
R70	14	0.1	27	0.0	3	9	40
R73	20	0.0	35	0.0	3	14	40
R74	20	0.1	32	0.0	3	8	40
R75	25	0.0	36	0.0	3	9	40
R76	21	0.0	29	0.0	3	16	40
R80	13	0.0	24	-0.4	3	16	40
R81	28	0.0	37	-0.1	3	20	40
R82	28	0.0	38	-0.1	3	20	40
R83	25	0.0	35	-0.1	3	20	40
R84A	26	0.0	37	-0.1	3	20	40
R84B	25	0.0	35	-0.1	3	19	40
R85	24	0.0	36	-0.1	3	19	40
R86	27	0.0	39	-0.1	3	20	40
R87	28	0.0	40	-0.1	3	21	40
R88	25	0.0	33	0.0	3	20	40
R89	28	0.0	37	0.0	3	20	40
R90	29	0.0	38	0.0	3	21	40
R91	15	-0.4	30	-0.2	3	16	40
R92B	21	0.0	31	-0.1	3	21	40
R92E	17	-0.1	33	-0.4	3	17	40
R92F	17	-0.1	32	-0.4	3	17	40
R92G	17	-0.1	32	-0.4	3	17	40
R93A	17	-0.1	33	-0.5	3	16	40
R93B	16	-0.2	33	-0.5	3	15	40
R93C	16	-0.2	32	-0.4	3	16	40
R94A	17	-0.1	34	-0.6	3	16	40
R94B	17	-0.1	33	-0.5	3	16	40

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (NVA **Annexure 5**).
Note 2: Predicted $L_{Aeq(15minute)}$ intrusive noise level complies with the PNTL.
Note 3: Predicted negligible noise exceedance 1-2dB(A) above the PNTL.
Note 4: Predicted marginal to moderate noise exceedance 3-5dB(A) above the PNTL.
Note 5: Predicted significant noise exceedance >5dB(A) above the PNTL.
Note 6: Standard meteorological condition - wind speed up to 0.5m/s.
Note 7: Noise-enhancing wind - wind speed up to 3m/s; plus/minus 45 degrees with respect to the receiver.

	Amendment to Table 35 in SLR (2020)

Table 5.15 Cont'd)
Daytime Standard and Noise-enhancing Intrusive $L_{Aeq(15minute)}$ Noise Levels (dB(A) re 20µPa)

Residence ID/Places of Interest[1]	Year 8 Modified In pit Scenario 3				% Frequency of Occurrence		Intrusive PNTL
	Standard	Change relative to the NVA	Enhancing Wind	Change relative to the NVA	Standard[6]	Enhancing Wind[7]	
R95	17	-0.6	25	-0.4	3	15	40
L1	19	0.1	36	-0.3	**3**	**18**	40
L2	19	0.1	35	-0.1	**3**	**18**	40
L3	22	0.0	38	-0.1	3	**19**	40
L4	22	0.0	38	-0.1	3	**19**	40
L5	21	0.1	37	-0.2	3	**19**	40
L7	20	0.1	36	-0.3	3	**18**	40
L8	20	0.1	37	-0.3	3	**18**	40
L9	18	0.1	35	-0.4	3	**18**	40
L10	18	0.1	34	-0.5	3	**18**	40
L12	18	0.1	34	-0.5	3	**18**	40
L13	18	0.1	34	-0.4	3	**18**	40
L15	19	0.1	35	-0.3	3	**18**	40
L16	18	0.1	34	-0.4	3	**18**	40
L17	18	0.1	34	-0.4	3	**18**	40
L18	19	0.1	35	-0.3	3	**18**	40
L19	19	0.1	35	-0.3	3	**18**	40
L20	19	0.1	36	-0.2	3	**18**	40
L21	19	0.1	36	-0.2	3	**18**	40
L22	20	0.1	36	-0.2	3	**18**	40
L23	19	0.1	36	-0.2	3	**18**	40
L24	19	0.1	36	-0.2	3	**18**	40
L25	19	0.1	35	-0.2	3	**18**	40
L26	19	0.1	35	-0.3	3	**18**	40
L27	20	0.1	37	-0.2	3	**18**	40
L28A	21	0.1	37	-0.2	3	**18**	40
L28B	21	0.0	36	-0.2	3	**18**	40
L29	18	0.0	34	-0.3	3	18	40
L30	19	0.0	33	-0.3	3	18	40
L31	19	0.0	34	-0.4	3	18	40
L32	19	0.0	35	-0.3	3	18	40
L33	20	0.1	36	-0.2	3	18	40
L34	20	0.0	36	-0.2	3	18	40
L35	20	0.0	36	-0.2	3	18	40

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Predicted $L_{Aeq(15minute)}$ intrusive noise level complies with the PNTL.
Note 3: Predicted negligible noise exceedance 1-2dB(A) above the PNTL.
Note 4: Predicted marginal to moderate noise exceedance 3-5dB(A) above the PNTL.
Note 5: Predicted significant noise exceedance >5dB(A) above the PNTL.
Note 6: Standard meteorological condition - wind speed up to 0.5m/s.
Note 7: Noise-enhancing wind - wind speed up to 3m/s; plus/minus 45 degrees with respect to the receiver.

Amendment to Table 35 in SLR (2020)

Table 5.15 Cont'd)
Daytime Standard and Noise-enhancing Intrusive $L_{Aeq(15minute)}$ Noise Levels (dB(A) re 20µPa)

Residence ID/Places of Interest[1]	Year 8 Modified In pit Scenario 3				% Frequency of Occurrence		Intrusive PNTL
	Standard	Change relative to the NVA	Enhancing Wind	Change relative to the NVA	Standard[6]	Enhancing Wind[7]	
L37	21	0.0	36	-0.2	3	18	40
L38	21	0.0	36	-0.2	3	18	40
L39	21	0.0	36	-0.2	3	18	40
L40	20	0.0	36	-0.2	3	18	40
L41	20	0.0	35	-0.2	3	18	40
L42	21	0.0	36	-0.2	3	18	40
L43	21	0.0	35	-0.2	3	18	40
L44	20	0.0	35	-0.2	3	18	40
L45	22	0.0	36	-0.1	3	19	40
L46	21	0.0	36	-0.2	3	19	40
L47	22	0.0	36	-0.2	3	19	40
L49	17	0.1	34	-0.5	3	17	40
L50	21	0.1	38	-0.2	3	19	40
LPOI1 Rural Fire Brigade	20	0.1	37	-0.2	3	18	48
LPOI2 Lue Pottery	20	0.0	35	-0.2	3	18	48
LPOI3 Lue Public School	18	0.1	34	-0.4	3	18	43
LPOI4 Lue Hall	18	0.1	35	-0.4	3	18	48
LPOI5 Lue Railway Station Buildings	18	0.1	34	-0.5	3	18	48

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Predicted $L_{Aeq(15minute)}$ intrusive noise level complies with the PNTL.
Note 3: Predicted negligible noise exceedance 1-2dB(A) above the PNTL.
Note 4: Predicted marginal to moderate noise exceedance 3-5dB(A) above the PNTL.
Note 5: Predicted significant noise exceedance >5dB(A) above the PNTL.
Note 6: Standard meteorological condition - wind speed up to 0.5m/s.
Note 7: Noise-enhancing wind - wind speed up to 3m/s; plus/minus 45 degrees with respect to the receiver.

Amendment to Table 35 in SLR (2020)

5.18.7 Relocated Maloneys Road

Representative Comment(s)

Is it proposed that the section of the relocated Maloneys Road between the tailings storage facility (TSF) and the mine entrance will be used by the mine as a haul road and will also remain as a public road. The relocated Maloneys Road will be closer to sensitive receivers to the west of the mine.

…the NIA has assessed the construction associated with the relocation of the road against the construction noise management levels in the ICNG (i.e. against background + 10 dBA); and the operational aspects of the road (i.e. its use as a haul road) in accordance with the NPfI (i.e. background + 5 dBA).

EPA Request: *Road traffic noise associated with relocated Maloneys Road*

a). The NIA should be revised so that the 'construction' and 'operational' aspects associated with the relocation and subsequent use of Maloneys Road as a haul road (where it is located between the mine entrance and the TSF) is assessed in accordance with the NPfI to ensure that feasible and reasonable mitigation is identified to minimise the impact on the nearest sensitive receivers.

NSW Environment Protection Authority

Response

NVA Section 2 explains that the activities undertaken during the first 6 months of the site establishment and construction stage are activities assessable under the Interim Construction Noise Guideline (ICNG). SLR affirms the noise assessment methodology is appropriate with the construction of the relocated Maloneys Road being assessed under the ICNG, and does not agree with the EPA's view that the construction noise attributable to the construction of the relocated Maloneys Road during the first 6 months should be assessed in accordance the NPfI. SLR considers that the nearest privately-owned residential receivers would perceive the civil works associated with the construction of the relocated Maloneys Road as a precursor to the operational phase of the mine, which has been defined as commencing in Month 7.

Notwithstanding the foregoing (and as requested) the component of construction works associated with the relocated Maloneys Road (where it is located between the mine entrance and the TSF) has been re-assessed as daytime operational noise (in accordance with the NPfI PNTL 40dB(A)) to the closest four residential receivers R17, R73, R75 and R76, as presented in **Table 5.16**.

Table 5.16
Daytime Intrusive $L_{Aeq(15minute)}$ Noise Levels (dB(A) re 20µPa)

Residence ID/Places of Interest[1]	Offsite Road Network		On-site Earthworks and Infrastructure		Total Off-site plus On-site Construction Noise		% Frequency of Occurrence		Intrusive PNTL
	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard	Enhancing Wind	Standard[6]	Enhancing Wind[7]	
R17	15	29	19	25	20	31	3	9	40
R73	38	44	17	35	38	45	3	14	40
R75	33	39	23	36	33	41	3	9	40
R76	22	41	17	32	23	41	3	16	40

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Predicted $L_{Aeq(15minute)}$ intrusive noise level complies with the PNTL.
Note 3: Predicted negligible noise exceedance 1-2dB(A) above the PNTL.
Note 4: Predicted marginal to moderate noise exceedance 3-5dB(A) above the PNTL.
Note 5: Predicted significant noise exceedance >5dB(A) above the PNTL.
Note 6: Standard meteorological condition - wind speed up to 0.5m/s.
Note 7: Noise-enhancing wind - wind speed up to 3m/s; plus/minus 45 degrees with respect to the receiver.

Amendment to Table 32 in SLR (2020)

Assessment of construction noise from the relocated Maloneys Road shows that noise levels are predicted to comply with the intrusive PNTL under standard meteorological conditions at the four closest privately-owned residential receivers. Under noise enhancing conditions, negligible exceedances of up to 1 dB are predicted at R75 and R76, and a marginal to moderate exceedance of up to 5 dB is predicted at R73.

In assessing reasonable and feasible mitigation measures consideration should be given to the transient nature of road construction as the works progress along its length. Total construction time for the relocated Maloneys Road is four months and works would not be continuous in the one location for this length of time. As such, 'hard' noise controls such as noise barriers would not be considered reasonable as they would need to be extensive in length and be of limited benefit. Management of potential noise impacts during this construction should be considered such as:

- using the quietest plant and equipment that can complete the construction task; and
- scheduling plant and equipment so that they are geographically separated as much as practical.

With management of plant and equipment, and considering the short construction duration, any residual noise impacts are likely to be low and would not warrant additional at-property treatment measures.

Representative Comment(s)

b). To assess the operational noise impact for receivers located to the west of the relocated Maloneys Road, the NIA should clarify if the B-double truck movements along the relocated Maloneys Road were modelled as a line source with the equivalent truck movements per 15 minutes, or as a point source as shown in Figures A, B and D in Annexure 15.

NSW Environment Protection Authority

There appears to be no haul road noise sources to the TSF emplacement area. All noise sources should be reviewed in the model to ensure they have been included.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

NVA Table 5 lists the use of up to 6 B-double trucks undertaking two return trips per hour between the open cut pit NAF waste rock stockpile and the TSF NAF waste rock stockpile area, and NVA Annexures A, B and D are indicative of this daytime activity which includes the haulage route along a section of the Mine Access Road and the relocated Maloneys Road. However, the noise modelling of this activity involves 9 individual point sources evenly distributed along the haul route at approximately equal intervals with all B-double trucks considered in each scenario (sound power level of 108dB(A) per B-double) operating continuously. The assumption that all trucks operate continuously provides a level of conservatism as no adjustment has been made for any downtime as the trucks remain idle to undergo loading on the Mine Site and unloading at the TSF.

5.18.8 Noise Modelling

Representative Comment(s)

Council requests that the EIS demonstrate that the trucks used for the application of sufficient water to suppress dust, do not conflict with the noise modelling.

Mid-Western Regional Council

Response

The use of water trucks has been incorporated into the noise modelling. Consequently, there is no conflict.

NVA Table 5 nominates the use of two water trucks during first 6 months of daytime construction.

NVA Table 26 nominates the use of three water trucks during Scenario 1 (Year 0) daytime operation.

NVA Table 27 nominates the use of two water trucks during Scenario 2 (Year 3) and Scenario 3 (Year 8), and then 1 water truck during Scenario 4 (Year 10) daytime operation.

NVA Table 28 nominates the use of one water truck during Scenario 2 (Year 3) and Scenario 3 (Year 8) and Scenario 4 (Year 10) evening operation.

NVA Table 29 nominates the use of one water truck during Scenario 2 (Year 3) and Scenario 3 (Year 8) and Scenario 4 (Year 10) night operation. In practice, this would involve the driver alternating between operating the water truck and one of the haul trucks during night-time operations.

Representative Comment(s)

The assessment does not provide noise spectra for the sound power levels and the source heights. The sound power level spectra should be provided with the source heights to ensure noise predictions are accurate.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

The assessment identifies low frequency noise as not being an issue. This may be the case however the assessment does not provide noise spectra that were used for the assessment and therefore can not be verified.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 6

Response

The NVA Tables 26, 27, 28 and 29 are supplemented with the relevant sound power level (SWL) spectra and source heights, as presented in **Table 5.17**.

Table 5.17
Mobile Equipment List and Design SWLs (dB re 1ρW)

Item	Source Height (m)	Octave Band Centre Frequency (Hz) dB									Overall SWL	
		32	63	125	250	500	1k	2k	4k	8k	dBL	dB(A)
Mobile Equipment												
Drill	3 m	115	111	115	110	111	111	108	103	99	121	115
Excavator – EX1900	4 m	104	110	113	111	111	107	107	106	93	118	114
70t Excavator – Cat 390	3 m	111	123	114	106	107	103	100	96	88	124	109
30t Excavator – Cat 336	3 m	107	120	110	102	103	99	96	92	84	120	105
30t Excavator – Cat 336 with rock breaker	1.5 m	121	113	106	106	113	114	115	116	115	125	122
Haul Truck – CAT777XQ	3 m	103	107	113	111	110	107	103	98	91	118	112
Articulated Haul Truck – A45/35G	2.5 m	113	114	110	109	107	104	103	98	89	118	110
Grader – 16MXQ	3 m	105	115	111	109	101	104	100	96	86	118	108
Grader – 12M	3 m	104	114	110	108	100	103	99	95	85	117	107
Front End Loader – CAT 988K XQ	3 m	108	117	116	113	105	104	100	96	92	121	110
Front End Loader – CAT 950M	3 m	105	114	113	110	102	101	97	93	89	118	107
Front End Loader – CAT 930F	3 m	99	108	107	104	96	95	91	87	83	112	101
Dozer – D11T XQ	3.2 m	113	113	124	109	108	108	105	97	88	125	113
Dozer D10 XQ	3 m	101	102	106	106	106	109	103	96	91	114	111
Dozer – D9	3 m	103	104	107	106	106	104	102	98	95	114	109
Dozer – D7	3 m	103	104	107	106	106	104	102	98	95	114	109
Water Truck (10,000L)	2.5 m	99	103	110	105	101	102	98	95	87	113	106
B-double truck	2.5 m	101	105	112	106	103	104	100	97	89	115	108
Truck semi-tipper	2.5 m	101	105	112	106	103	104	100	97	89	115	108
Fuel Truck/Service Truck	2.5 m	99	103	110	104	101	102	98	95	87	113	106
Vibrating Roller CAT CS54XT	3 m	68	106	115	109	104	105	99	93	85	117	109
Mobile Crusher/Screen	3 m	116	129	120	116	113	114	109	104	100	131	118
Mulching Unit	3 m	109	113	114	109	111	110	108	104	101	120	115
Chainsaw	1.5 m	86	92	93	95	100	108	109	108	104	114	114
Container Lifter	2.5 m	104	110	101	99	96	94	89	81	72	112	99
Telehandler	2.5 m	97	103	94	92	89	87	82	74	65	105	92

Table 5.17 (Cont'd)
Mobile Equipment List and Design SWLs (dB re 1ρW)

Item	Source Height (m)	Octave Band Centre Frequency (Hz) dB									Overall SWL	
		32	63	125	250	500	1k	2k	4k	8k	dBL	dB(A)
Fixed Plant and Equipment												
Jaw Crusher	4 m	105	109	107	108	104	103	100	95	89	115	108
Jaw Crusher Dust Extraction Unit	4 m	92	94	88	88	92	88	85	78	71	99	93
50kW Conveyor Drive	1.5 m	94	92	89	94	87	84	80	71	67	99	90
150kW Conveyor Drive	1.5 m	96	94	91	96	89	86	82	73	68	101	91
Conveyor – CV01	1.5 m	87	90	88	85	85	82	76	69	62	95	86
Conveyor – CV02	10 m-19 m	97	100	98	95	95	92	86	79	72	105	96
Conveyor – CV03	3 m-5 m	95	98	97	93	93	90	84	77	71	103	95
Conveyor – CV04	3 m-6 m	90	93	91	88	88	85	79	72	65	98	89
Transfer Chute	5 m	89	92	90	89	92	89	84	77	67	98	93
Stockpile Discharge	20 m	101	93	90	90	92	94	95	92	89	104	100
SAG Mill and Ball Mill	10 m	97	102	100	101	103	101	99	96	90	109	106
Flotation Area and Thickener Area	4 m	94	99	97	98	100	98	96	93	87	106	103
Filter Area	5.5 m	96	101	99	100	102	100	98	95	89	108	105
Filter Air Compressor	2.5 m	89	91	85	85	89	85	82	75	68	96	90
Plant Workshop (hand tools)	1.5 m	53	57	55	57	65	74	85	90	90	94	94
Mining/LV Workshop	3.0 m	58	62	60	62	70	79	90	95	95	99	99
Water Pumps	1.5 m	97	95	92	97	90	87	83	74	70	102	93
	Amendment to Table 27 in SLR (2020)											

Representative Comment(s)

Waste rock is hauled to the WEA on both dayshift and evening shift. Dozer operation on the WEA is scheduled for dayshift only. The design of the WEA requires waste rock to be spread and track rolled in 2 metre layers. There is a risk that dozer spreading on dayshift only may not keep up with truck haulage and tipping on both day and evening shifts. This may require dozer operation on evening shift which is not included in the noise modelling.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

On average, a night-time shift may result in the delivery of 100 loads of waste rock to the WRE. Assuming a tipping height of approximately 2m, the area covered by a single load could be up to 66m². However, in practice, these loads would be tipped so that the piles overlap, thus reducing the maximum area required to less than the multiple of a single load area.

Nonetheless, assuming the maximum area covered by 100 single loads is 6 600m², with the loads tipped in 10 rows of 10 piles (60m x 110m), and given the Cat D9T first gear forward speed is 3.9km/h with the reverse speed being 4.7 km/h, the time required to level this area would be approximately 45 minutes. In practice, due to the overlapping of piles, the required area is likely to be approximately 70% of the maximum area. Consequently, the time required for blading and levelling would be reduced to approximately 30 minutes. This means there would be sufficient time during each dayshift to manage loads hauled during both day and evening shifts.

AMC estimated 5 000 hours for each of the two Cat D9T required for operations. These combined hours are equivalent to approximately 90% of the allowed excavator time and indicates there is capacity within the bulldozer fleet to deal with extended downtime periods, should they arise.

Representative Comment(s)

With regard to the 'lower embankment noise barrier', listed in Table 30 of the NIA, there are no details as to the proposed height to which it will be constructed, during which stage it will be constructed nor how it was modelled.

EPA Request:

a). The NIA should be revised to identify when the lower embankment noise barrier (on the WRE) will be installed and how/when it was incorporated into the reported predicted noise levels.

NSW Environment Protection Authority

Response

The lower embankment haul road and lower embankment noise barrier (see Annexure 15 Figure A) would be established progressively and are anticipated to be nearing completion by Month 8. The barrier is nominally 5m high and follows the route of the lower embankment haul road.

The lower embankment noise barrier would be constructed using trucks hauling and placing material to be pushed up and shaped by the bulldozer. These works would generally be undertaken from behind this barrier and as such noise levels predicted in Scenario 1 (Year 0) are considered representative of the formation of the lower embankment noise barrier and use of the lower embankment haul road.

As described in NIA Section 5.2, Scenario 1 (Year 0) has been selected to provide a conservative assessment of the site establishment and construction stage. The selected period (around Month 8) is representative of the most intensive period with the construction of the first stage of the TSF embankment and the initial extraction and transportation of ore for processing together with completion of the lower embankment noise barrier.

The lower embankment noise barrier is therefore incorporated in the base topographic data for Scenario 1 (Year 0) and remains in place for all other scenarios.

Representative Comment(s)

EPA Request:

b). The NIA should be revised to clarify how/when the 5 metre noise barrier in the waste rock emplacement area has been included in the noise modelling scenarios and what corrections (if any) have been applied to the reported predicted noise levels.

NSW Environment Protection Authority

Response

As described in NVA Table 30, mining operations during the evening involve an optimised waste rock haul route to maximise the barrier effect from the existing topography and short-term acoustic bunds within the active WRE areas. The 5m acoustic bunds associated with the WRE are included in the topographic model (for all periods) for Scenario 2 (Year 3), Scenario 3 (Year 8) and Scenario 4 (Year 10) and at optimised locations in each scenario.

The purpose of these barriers is to provide targeted noise reduction to trucks operating on the emplacement during active evening waste rock haulage and emplacement operations particularly during noise enhancing weather conditions. The relevant noise barrier on the WRE would be constructed during daytime operations in preparation for placement of waste rock to occur behind the barrier during the evening period. The placement of the barriers would be optimised to maximise the barrier effect from the active evening WRE areas. The NVA presents the resulting evening noise levels inclusive of all proposed noise mitigation and management measures including the short-term bunds.

Daytime operations in Scenario 2 (Year 3), Scenario 3 (Year 8) and Scenario 4 (Year 10) have trucks hauling and placing waste rock in comparatively more exposed locations than those considered during the evening scenarios (as the short-term barriers are not required during the daytime mining operations). During daytime operations, placement of waste rock on the WRE would be conducted in locations different to that of the evening and the 5m barriers are likely to have little (or no) impact on daytime predicted noise levels.

5.18.9 Operational Traffic Noise

Representative Comment(s)

The project traffic flows in Table 59 of the NIA do not appear to match those in Tables 11 and 12.

…it is not clear if the assessment of road traffic noise at R88 is only from the relocated Maloneys Road or if it also includes the Lue Road traffic.

EPA Request: *Operational road traffic noise assessment*

a). The NIA needs to clarify how the different traffic flows in Tables 11, 12 and 59 were used in the assessment of road traffic noise impacts from the proposal.

NSW Environment Protection Authority

Response

NVA Table 59 presents the existing and Project-related traffic flows on the road network for each of the roads assessed together with the breakdown of traffic levels during the daytime and night-time and forms the basis of the daytime and night-time noise predictions and road traffic impact assessments. NVA Tables 11 and 12 present the estimated daily traffic movements throughout the Project life and are therefore not appropriate for use in the road traffic impact assessments.

Representative Comment(s)

b). The NIA should confirm, as per the guidance in the RNP, that the relocated Maloneys Road has been designated as a principal haulage route by the local authority (Section 2.2.2 of the RNP). Where the local authority has not designated the relocated Maloneys Road as a principal haulage route, then we consider that the criteria that apply to the relocated Maloneys Road should be that of a new local road under the RNP.

NSW Environment Protection Authority

Response

Subject to the receipt of Development Consent, Bowdens Silver would apply to MWRC to designate the relocated Maloneys Road as a principal haulage route. This is in-principle consistent with the best practice to construct the relocated Maloneys Road to provide designated access to the Mine Site and to minimise as far as practical Project-related traffic passing through Lue village and local roads.

Notwithstanding, road traffic noise levels with peak hourly traffic flows of 42 light vehicles and 5 heavy vehicles during the daytime and 34 light vehicles and 5 heavy vehicles during the night-time have been calculated to the nearest privately-owned residence (R88) to the relocated Maloneys Road.

The predicted peak hour noise levels from the relocated Maloneys Road are daytime $L_{Aeq(1hour)}$ 43 dB(A) and night-time $L_{Aeq(1hour)}$ 42 dB(A) and therefore comply with the relevant hourly traffic noise criteria of daytime $L_{Aeq(1hour)}$ 55 dB(A) day and night-time $L_{Aeq(1hour)}$ 50 dB(A) respectively (applicable to existing residences affected by new local roads in accordance with the RNP).

As R88 is the nearest residence to the relocated Maloneys Road, compliance would also be achieved at all other receivers.

Representative Comment(s)

c). The NIA should assess the potential road traffic noise impact from all traffic in the vicinity of each receiver, not just from one portion of road. For example, R88, R89 and R90 are potentially impacted by road traffic noise from traffic on Lue Road (east and west directions) as well as the relocated Maloneys Road. Similarly, R38, R39, R40, R46 and R47 are potentially impacted by traffic noise on Lue Road as well as Pyangle Road.

NSW Environment Protection Authority

Response

NVA Section 11 presents the traffic noise impact assessment, which includes road traffic noise contributions from significant contributing roads in the vicinity of each receiver, with the traffic noise then predicted to a selection of the nearest most potentially affected receivers. For example, the road traffic noise contribution from the contributing roads to privately-owned receiver R88 (impacted by Lue Road and the relocated Maloneys Road) as well as R39 (impacted by Lue Road and Pyangle Road) are presented in **Table 5.18**. Since the EIS was finalised, agreements have been reached with the owners of R39 andR47 and these residences are now 'Project-related'.

Table 5.18
Traffic Noise Levels Construction and Site Establishment & Construction Stage (dB(A) re 20 µPa)

Residence ID/ Place of Interest[1]	Period and Descriptor	Base Traffic Noise Level	Total Traffic Noise Level	Project-related Traffic Noise Level Increase	Assessment Criteria
Corner of Lue Road and Pyangle Road – NVA Table 60					
R39 – Lue Road	Day – $L_{Aeq(15hour)}$	54	54	0.3	-
	Night – $L_{Aeq(9hour)}$	46	47	1.0	-
R39 – Pyangle Road	Day – $L_{Aeq(15hour)}$	43	50	7.4	-
	Night – $L_{Aeq(9hour)}$	38	46	7.3	-
R39 – Total Road Traffic	Day – $L_{Aeq(15hour)}$	54	56	1.4	60
	Night – $L_{Aeq(9hour)}$	47	50	2.6	55
Relocated Maloneys Road – NVA Table 61					
R88 – Lue Road	Day – $L_{Aeq(15hour)}$	43	43	0.3	
	Night – $L_{Aeq(9hour)}$	35	36	0.1	
R88 – Maloneys Road	Day – $L_{Aeq(15hour)}$	-	36	36.0	
	Night – $L_{Aeq(9hour)}$	-	34	34.2	
R88 – Total	Day – $L_{Aeq(15hour)}$	43	44	0.9	55
	Night – $L_{Aeq(9hour)}$	35	38	2.4	50
	Amendment to Tables 60 and 61 in SLR (2020)				

Representative Comment(s)

d). The proponent should confirm that the road traffic noise assessment in Section 11 for the Year 3 operational scenario includes truck movements associated with the relocation of the power transmission line.

NSW Environment Protection Authority

Response

NVA Table 59 presents the existing and Project-related traffic flows on the road network and forms the basis of the daytime and night-time noise predictions and road traffic impact assessments. In particular, NVA Table 59 considers existing and Project-related traffic flows for Scenario (Year 3) being exclusive of vehicle movements arising from the 500kV power transmission line (PTL) re-alignment works.

Road traffic generated during the construction and dismantling of the PTL would include six laden heavy vehicles (12 movements) and 15 light vehicles (30 movements) per day. All PTL related heavy vehicles and 12 of the light vehicles would travel to and from the site via Lue Road (west of the relocated Maloneys Road) and the relocated Maloneys Road. The remaining three light vehicles would originate from the east and travel through Lue and the relocated Maloneys Road. NVA Table 59 has been updated to include the PTL re-alignment works vehicles as presented in **Table 5.19**. As a result, the traffic noise assessment for the operational Scenario 2 (Year 3) inclusive of the PTL re-alignment works vehicles is presented in **Table 5.20**.

There has been no material change to the traffic noise assessment findings presented in the NVA as a result of these amendments.

Table 5.19
Projected Base, Project-related and Total Road Traffic Flows

Road and Representative Receiver Locations	Time Period[1]	Base Traffic Flows		Project Traffic Flows		Total Traffic Flows	
		Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Scenario 2 (Year 3)[5] inclusive of PTL re-alignment works vehicles							
Lue Road - West of Pyangle Road, East of relocated Maloneys Road Receivers: L10, LPOI3, R90, R94	Daytime	784	40	61	10	845	50
	Night-time	80	5	13	4	93	9
	Daytime - Peak Hour (1:00pm-2:00pm)[1]	52	2	1	1	53	3
Lue Road - East of Pyangle Road Receivers: R40, R39	Daytime	644	37	49	10	693	47
	Night-time	61	5	13	4	74	9
Lue Road West of relocated Maloneys Road Receivers: R92B	Daytime	693	88	97	30	790	118
	Night-time	71	10	17	4	88	14
Relocated Maloneys Road Receivers: R88	Daytime	16	1	106	40	122	41
	Night-time	1	0	30	8	31	8

Note 1: Daytime 7:00am to 10:00pm, Night-time 10:00pm to 7:00am.
Note 1: Base traffic flow coinciding with peak hourly project-related traffic movements during school hours.
Note 2: Base traffic flow coinciding with peak hourly project-related traffic movements.
Note 4: Assumes projected baseline traffic growth at 2021.
Note 5: Assumes projected baseline traffic growth at 2024.

Amendment to Table 59 in SLR (2020)

Table 5.20
Traffic Noise Levels Operational Scenario 2 (Year 3) (dB(A) re 20 µPa)Residence

ID/Place of Interest[1]	Period and Descriptor	Base Traffic Noise Level	Total Traffic Noise Level	Project-related Traffic Noise Level Increase	Assessment Criteria
Lue Road					
L10	Day - LAeq(15hour)	57	57	0.6	60
	Night - LAeq(9hour)	49	51	1.7	55
R90	Day - LAeq(15hour)	51	51	0.5	60
	Night - LAeq(9hour)	43	45	1.4	55
R92B	Day - LAeq(15hour)	55	56	1.0	60
	Night - LAeq(9hour)	48	49	1.2	55
R94	Day - LAeq(15hour)	52	53	0.5	60
	Night - LAeq(9hour)	45	46	1.4	55
R40	Day - LAeq(15hour)	55	55	0.6	60
	Night - LAeq(9hour)	47	49	1.6	55
LPOI3 Lue Public School	Day - LAeq(1hour) (when in use)	51	52	0.8	50
Relocated Maloneys Road					
R88	Day - LAeq(15hour)	43[2]	44	1.3	55
	Night - LAeq(9hour)	36[2]	38	2.3	50

Note 1: See Land Ownership and Surrounding Residences (**Annexure 4**) and Land Ownership Details (**Annexure 5**).
Note 2: Existing road traffic noise prior to opening of Relocated Maloneys Road.
Note 3: Traffic noise level complies with relevant daytime and night-time assessment criteria (**NVA Table 57**)
Note 4: Traffic noise level marginal exceedance of 1 to 2dB(A) above the relevant daytime and night-time assessment criteria (**NVA Table 57**).
Note 5: Traffic noise level moderate exceedance of 3 to 5dB(A) above the relevant daytime and night-time assessment criteria (**NVA Table 57**).

Amendment to Table 62 in SLR (2020)

5.18.10 Noise Monitoring

Representative Comment(s)

The NIA states that a minimum of two sites will be selected for long term noise monitoring of the site.

EPA Request: *Long term noise monitoring*

Further information should be made available on how these sites will be selected and how it will be demonstrated that the levels measured at these sites will be representative for the sensitive receiver locations. Given the sizable nature of the number of sensitive receiver locations in the vicinity of the proposed mine, the EPA request that the proponent consider grouping receiver locations into suitable noise management groups, with a nominated representative noise monitoring point for each group.

NSW Environment Protection Authority

Response

As described in NVA Section 7.6, a permanent real-time noise monitoring system would be installed at locations representative of rural receivers and residences in Lue.

Initial screening would be conducted to determine the appropriate noise monitoring locations for the real-time monitoring system. This would take into consideration the geographical location of receivers, mining operations and the results of operator-attended noise monitoring. The purpose of the screening would be to install the noise monitoring system at locations which enable mine noise emissions to be measured that are representative of 'noise management groups' surrounding the mine. It is envisioned that such groups would consist of residences to the south of the Mine Site (i.e. at receivers in Lue and rural receivers to the north of Lue), residences to the east/northeast and those to the west/northwest. This would give a broad coverage of receivers under different meteorological conditions at three noise monitoring locations.

The effectiveness of the noise monitoring system would be verified by operator-attended noise monitoring at various representative receivers within each noise management group to inform the continual calibration and validation of the system. The validation procedure would be developed in detail as part of the Operational Noise Management Plan (ONMP), however it would involve comparing operator-attended noise monitoring at various receivers within each noise management group and those measured simultaneously by the real-time noise monitoring system. Where it is found that real-time noise monitoring is not representative, or extraneous, local noise sources confound the system, alternative siting locations and/or additional noise monitoring locations would be considered.

As described in EIS Section 4.2.4.1**,** Bowdens Silver would review and update, if necessary, the monitoring component of the ONMP to reflect the experience/results of the monitoring undertaken during the preceding 12 months to enable the continual validation of the real-time noise monitoring system. Consideration may also be given to increasing or decreasing the number of real-time noise monitoring locations depending on the continued real-time system validation as well as current site operations. This is particularly relevant for receivers to the north/west during periods when no intensive works are being undertaken at the TSF embankment.

Representative Comment(s)

Council requests that the Noise Management Plan strictly implements a procedure to cease mining activities immediately should real time monitoring reveal an exceedance of any noise trigger levels.

Mid-Western Regional Council

Response

As described in NVA Section 7.6, appropriate measures will be included in the ONMP to alert mine management in the event the real-time noise monitoring system triggers an alert. EIS Section 4.2.4.1 notes that the ONMP would include a mechanism for the real-time noise monitoring system to provide feedback to influence operational decisions in the shortest timeframe practical. The ONMP will, depending on the alert received, prompt certain predetermined operational modes or implement mine management measures to reduce mine noise levels, including progressively shutting down equipment as may be appropriate. While the ONMP is yet to be prepared and approved in consultation with the relevant authorities, comparable (existing) mine operations that implement real-time noise system triggers typically with 'green, amber and red' alert levels. Indicatively, the settings may be set as: green (3 to 4dB(A) below the approved noise limit); amber (1 to 2dB(A) below the approved noise limit); and red (the approved noise limit).

5.18.11 Lue Public School

Representative Comment(s)

…high impact works and activities should, where possible, be undertaken outside of school hours.

NSW Education

Lue Public School is notified at least one week in advance of activities or works that could cause considerable noise and/or vibration impacts on Lue Public School.

NSW Education

Response

High impact works, i.e. higher noise-generating activities on the surface would be confined to operational areas within the Mine Site, i.e. 2.3km to 3.5km from Lue Public School. It is highly unlikely that these works would have a startle effect for school children and affect their learning activities. That said, Bowdens Silver would liaise with NSW Education regarding the preferred blasting time, i.e. around lunchtime, to avoid any (unlikely) startle effect for the school children whilst they are learning.

Representative Comment(s)

…appropriate monitoring and mitigation measures be required to be undertaken…should ongoing noise or vibration impacts cause concern to Lue Public School.

NSW Education

Response

Bowdens Silver would establish a long-term noise, ground vibration and airblast overpressure monitoring location within Lue. A program of monitoring would also be undertaken at a number of other locations within Lue, such as at the Lue Public School, to enable a range of short-term noise and vibration measurements to be collected to fully understand the relationship between the monitoring results at the long-term monitoring location and a number of other locations around Lue. This information would be collected irrespective of whether any concern is raised. Rather, Bowdens Silver is keen to demonstrate that the impacts of noise-generating activities and blasting at the school are consistent or less than the impacts predicted in SLR (2020).

5.18.12 Voluntary Land Acquisition and Mitigation Policy (VLAMP)

Representative Comment(s)

Council requests that access to the VLAMP *should remain open to any residents who may be impacted by noise in the future, where actual noise levels are greater than predicted noise levels.*

Mid-Western Regional Council

Response

Bowdens Silver agrees that in the event there are any residents that are regularly affected by noise impacts that are greater than the modelled and predicted impacts, the obligations and processes prescribed under the VLAMP would be offered.

5.18.13 Blasting

Representative Comment(s)

The blasting impact assessment indicates there may be some exceedances of the criteria in the ANZEC guidelines for blasting.

EPA Request:

It is recommended that the proponent design and manage the Maximum Instantaneous Charge of all blasts to ensure there are no exceedance of the criteria in the ANZEC guidelines at all sensitive receiver locations.

NSW Environment Protection Authority

Response

Agreed. NVA Section 10.3, adopted industry standard site laws and typical MIC values at the closest extent of the open cut mining areas to each receiver. Rather than rely upon industry standard site laws, a specific site law would be derived and validated from on-site blast monitoring and used to continually inform the design of future blasts.

Furthermore, NVA Section 10.7 describes the proposed blast noise and vibration mitigation and management which would be documented in accordance with an approved Blast Management Plan (BMP), which would include a program of blast emissions analysis and the establishment and maintenance of ground vibration and airblast overpressure site laws for the Mine Site to enable key blast design parameters to be modified and ensure compliance with the criteria.

Bowdens Silver would review and update, if necessary, the ground vibration and airblast overpressure site law components of the BMP on an annual basis to reflect the experience and results of the monitoring undertaken during the preceding 12 months.

Representative Comment(s)

Further information is to be provided regarding the details and locations of each blasting operation and an assessment of vibration associated with each blasting operation in terms of impact on the rail corridor for review and approval in accordance with John Holland Rail Blasting Guideline.

Transport for NSW

Response

NVA Table 54 presents a safe working distance (5% exceedance) of 130m is required to meet the relevant Peak Component Particle Velocity (PCPV) damage criteria of 100 mm per second for a railway. The distance from the nearest open cut boundary to the rail corridor is approximately 2.5km. 5% exceedance PCPV vibration levels at this distance are predicted to be less than 1mm per second. Additionally, NVA Section 10.5 details management procedures to enable blasting, in general, to result in either no flyrock or limited flyrock within approximately 100m from each blast site.

Stage 1 of the John Holland Rail (JHR) Blasting Guideline notes that JHR would undertake an initial appraisal and provide either 'in principle' approval to blast in close proximity to CRN infrastructure, or, reject the proposal. Prior to granting 'in principle' approval to blast where it has been identified that mining/quarrying operations may impact CRN infrastructure, operations or safety additional information would need to be supplied to JHR to assess likely impacts. Given that vibration levels are predicted to be significantly below safe working distances and flyrock impacts are predicted to be limited to approximately 100m from each blast site no impacts to CRN has been identified.

Representative Comment(s)

The over-riding premise of the John Holland Rail Blasting *guideline is that blasting operations must not have any long-term detrimental effect on CRN assets or operations, and not heighten the level of risk to the safety of people within the rail corridor and blasting in close proximity to CRN infrastructure.*

As a Guide:

- *Blasting between 600m and 200m is considered Category A type blasting.*
- *Blasting between 200m and 100m is considered Category B type blasting*
- *Blasting Less than 100m is considered Category B with specific engineering assessments and post*

Transport for NSW

Response

The distance from the nearest open cut boundary to the rail corridor is approximately 2.5 km. This distance falls well outside Category A type blasting. As such the JHR Blasting Guideline is not applicable to the Project.

5.19 PLANNING ISSUES

5.19.1 Overview

Several submissions included comments on general planning matters that principally related to the achievement of objectives for land zoning as described in the *Mid-Western Regional Local Environmental Plan 2012*. Bowdens Silver remains confident that the Project is both permissible and appropriate for mining and related development in the proposed locations.

5.19.2 Zone Objectives for RU1 Primary Production

Representative Comment(s)

The EIS document fails to address how the silver mine proposal satisfies the objectives of the RU1 zone.

Cameron Anderson of Mudgee, NSW (Submission SE-8648891)

Response

The Project indeed satisfies each of the objectives for the RU1 zone under the *Mid-Western Regional Local Environmental Plan 2012* and there is no material conflict with these objectives. EIS Section 3.2.3.6 reproduces the six RU1 objectives and provides an overall commentary on the low value grazing land to be removed from production during and following mine operations.

The following outlines how each of the individual RU1 zone objectives will be satisfied.

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*

  The land within the Mine Site is low productivity rural land which is either heavily timbered or carrying only small numbers of stock with limited cropping. As a consequence, the Project would not substantially or materially impact the availability of land resources for sustainable primary industry production.

  The other key resource used by agricultural enterprises is surface water which is predicted not to be substantially impacted immediately surrounding and downstream of the Mine Site. Predicted downstream impacts upon flows within Lawsons Creek Catchment during and after the Mine life would only decrease by 2.2% and 0.4% respectively, therefore maintaining water supplies, in the context of natural variability for existing and proposed agricultural activities.

- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*

  The scale of the Bowdens Silver Project is such that it would not materially affect the diversity of the various primary industry enterprises throughout the Lue district. Each of the agricultural land uses in the vicinity of the Mine Site which are discussed in EIS Section 4.1.4.2 would be able to co-exist with the Bowdens Silver Project without adverse impacts on their productivity.

- *To minimise the fragmentation and alienation of resource lands.*

  The Bowdens Silver Project focuses upon the recovery and processing of an ore body that covers a surface area of approximately 0.5km^2. This area, together with the area to be disturbed for infrastructure within the Mine Site

(approximately 3.7km^2) is a comparatively small area of resource land within Mid-Western Regional LGA which covers 8 737km^2. Its location will not fragment or alienate the rural land used for a range of agricultural purposes around the Mine Site.

It is noted that that the ore body on which the Bowdens Silver Project is centred, has been known for the past three decades and recognised as a future land use in this area. Its existence as a resource was first recorded in the *Rylstone Local Environmental Plan 1996.*

- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

  The mining and extractive industry operations throughout the Mid-Western Regional LGA are predominantly located in RU1 zones given the large landholdings in those areas and sparsity of residential dwellings and improvements. These operations collectively cover only a small portion of the agricultural enterprises throughout the LGA.

  At present, there are negligible land use conflicts within and surrounding the Mine Site. This is unlikely to change given:

  – Bowdens Silver's commitment to maintain agricultural production (to the extent of its capability) on land not required for mining and/or the associated proposed biodiversity offsets; and

  – the recognised history of coexistence over many generations between mining and agricultural activities without substantial impact on either of these activities.

- *To maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes and environmental and cultural heritage values.*

  The Bowdens Silver Project has been designed with the incorporation of a range of design and operational safeguards and mitigation measures to minimise the visual impacts of the operations in both the local and regional context. Details of the safeguards and mitigation measures are presented in EIS Section 4.9.4.

- *To promote the unique rural character of Mid-Western Regional and facilitate a variety of tourist land uses.*

  The rural character of the Mid-Western Regional LGA will be retained in the event that the Bowdens Silver Project proceeds. Its comparatively small scale and location on the slopes beneath the surrounding vegetated ridges would have negligible impacts on the existing land uses throughout the LGA and in the Lue district in particular. Bowdens Silver anticipates all existing tourist facilities in the Lue district will continue to operate successfully once the Project is operational and the facility operators recognise the over-stated impacts claimed by Project opponents have not materialised.

  No part of the Project including the mine, the processing facilities, the tailings dam facilities or any other infrastructure would be able to be seen from Lue.

5.19.3 Permitted Uses in R5 Large Lot Residential Zones

Representative Comment(s)

…the proposed pipeline route does not meet the requirements of the Mid-Western Regional LEP in that it will transverse RU5 (sic) *– Large Lot Residential Lands where water supply systems are prohibited.*

Central West Environmental Council of Summer Hill Creek, NSW (Submission SE-8598199)

Response

It is acknowledged that the proposed water supply pipeline is nominated as a prohibited use within the R5 zone. The pipeline would traverse approximately 3.5km of land on the eastern side of Ulan Road currently zoned R5 under MWR LEP 2012. The inclusion of the water supply pipeline in the Project reflects the provisions of the *Environmental Planning and Assessment Act 1979* (Section 4.38(3)) which states that "*development consent may be granted despite the development being partly prohibited by an environmental planning instrument*".

Bowdens Silver considers it is acceptable to propose the pipeline along the proposed alignment through the land zoned R5 given:

- it would be located near the edge of the zone;
- adjacent to or close to Ulan Road;
- the installation of the pipeline would occur over a comparatively short period; and
- the buried pipeline would not interfere with any ongoing uses on the larger lots.

5.20 PROJECT-RELATED ISSUES

5.20.1 Overview

Matters relating to the funding and operating costs associated with the Project were raised in the submission received from the Lue Action Group. Review of the items identified in the submission has prompted Bowdens Silver to clarify funding matters for the Project. However, it should be clear that Bowdens Silver has the experience and financial support to establish and operate the Project. The management of costs including the timing of expenditure and how this is accounted in documentation is a matter of operational management. The Project is considered to be economically viable, not least because of the thorough approach to planning and design but also due to the buoyancy of the commodity market, local and regional support for the Project and the Company's detailed understanding of the mineral deposit.

5.20.2 Project Capital Costs

Representative Comment(s)

No allocation for the re-alignment of the 500KV HV line…

This re-alignment is required by year 3 of the Project. The new line will be at least 3km in length and involve the construction of 10-14 new towers. This cost does not appear to be included in the project capital costings.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The realignment of the 500kV transmission line is required by Year 3 of operations and not immediately upon commencement of the Project. It has been calculated that by the time the costs of this component of the Project are required, the Project would be generating revenue that would be relied upon to fund the relocation. It is therefore not considered an upfront capital cost in the Feasibility Study but rather a component of sustaining capital requirements.

5.20.3 Mine Operating Costs

Representative Comment(s)

The Project has a number of high risk areas when it comes to negatively impacting operating costs. These include:

- *An owner-operated cost model was used for generating the 2018 Maiden Ore Reserves statement and the 2018 Feasibility Study. The EIS does not have mining equipment capital included so a there will be a higher operating cost per tonne to reflect contract mining costs which include capital amortisation and the contractor's margin.*

…This proponent is not a mine operator and has no experience in responsibly, safely and profitably running an operation like this.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The Board and management of Bowdens Silver and its parent company, Silver Mines Limited have significant experience across mining for many precious metals and other metal mines in Australia and around the world. This experience encompasses all aspects of exploration and discovery, assessment, financing and development and operation.

Whilst the 2018 Ore Reserve statement assumed owner operation, AMC costed the mining on a contract mining basis. To quote from the AMC Ore Reserve statement:

> *"Estimation of the numbers of primary and support items of mobile equipment fleet include indicative purchase cost and running cost sourced from AMC cost database assuming contractor operation for the fleet."*

Therefore, there is adequate contingency within the assumed costs for either an owner operation or a contract mining operation.

Truck cycle times being longer than expected requiring more trucks to haul the same tonnage. This directly impacts operating costs and noise and dust generation.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

As noted in Section 5.16, AMC is a highly experienced and internationally recognised mining consultancy who undertook the mining studies for the Project's Feasibility Study. During these studies, AMC undertook a detailed analysis of the mining cycle times and requirements for the

Project. From this analysis, AMC identified an initial requirement for three Cat 777 trucks, rising to four in the 8th year of operation and returning to three in the 14th year. Therefore, there is no basis on which to assert that longer cycle times and more trucks would be required.

Requiring more equipment than planned to meet the design requirements for placing PAF waste rock in 2 metre lifts and track rolling it.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Section 3.2 of Advisian (2020a) identifies the WRE construction sequence as involving compaction via bulldozer and trafficking of the mining fleet across the full width of each layer. As noted above, detailed cycle time analysis conducted by AMC determined that the mining fleet would have capacity to meet all movement and placement requirements for PAF waste rock material.

Requiring more equipment than planned to meet the design requirements for constructing the cover for the PAF waste rock cells.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Refer to comment above which equally applies to the construction of the cover overlying the PAF waste rock.

Not achieving pit design due to geotechnical and blasting problems. This can negatively impact ore reserves and production rates.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

A detailed geotechnical analysis was undertaken for the Project with the adopted design parameters considered conservative. Mining operations would be undertaken under survey control to achieve the design batter positions and angles.

Lack of water reducing mining or processing tonnages.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

A whole of site water balance has been prepared for the Project (WRM 2020). This water balance does not require full utilisation of the proposed water supply pipeline capacity. Therefore, any shortfall in water requirements can be made up from the proposed water supply pipeline.

The cost of external water.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The cost of water is nominal, however, it is not disclosed being a commercial in confidence matter.

Actual noise or dust emissions above modelled predictions resulting in mandatory reduced equipment activity and productivity.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The specialist consultants engaged to undertake modelling for noise (SLR Consulting Australia Pty Ltd) and dust emissions (Ramboll Australia Pty Ltd) were engaged due to their significant experience in these types of assessments. These assessments used technical information sourced from site specific monitoring data and Project specific studies (e.g. AMC mining studies). Therefore, there is no technical basis on which to assert that the Project would be unable to achieve the levels modelled.

Grade control issues resulting in less concentrate being recovered.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

All mining operations routinely undertake a reconciliation of produced concentrate to mill feed, mill feed back to the ore blocks, ore blocks back to the grade control model and the grade control model back to the reserve model. This is conducted to confirm that the dilution and ore loss parameters assumed in the reserve model are suitable for the process recovery algorithms which are used to estimate concentrate production. These routine reconciliations enable the early identification of any discrepancy. Should any discrepancies arise indicating less concentrate being recovered, an investigation into their cause would be undertaken to identify the required remedial actions, either in the processing plant or the open cut pits.

Metallurgical issues in the plant resulting in less concentrates being recovered.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Ore samples from the Project have been subjected to extensive metallurgical test work programs. It is usual that the performance of operational plant may vary slightly from that achieved in laboratory test work, often positively so. Bowdens Silver would employ a fulltime plant metallurgist who would constantly review plant performance and adjust parameters where required. It is noted that there are many variables in managing a sequential flotation plant and that each of these variables provides opportunity to fine tune performance, although, it is prudent to adjust one parameter at a time.

5.21 PROXIMITY TO LUE RESIDENCES

5.21.1 Lue

Representative Comment(s)

We are less then 2kms from the mine sight (sic) *& there's no way we will be able to stay on our property if this mine goes ahead.*

Carla Anderson of Pyangle, NSW (Submission SE-127386)

As a concerned property owner at 72 Cox Street Lue, it worries me that the mine will be working just two kilometers from my place of residence.

Arthur Eno of Lue, NSW (Submission SE-127896)

Response

The concern of some residents within the Lue community regarding proximity to mining has been acknowledged from the commencement of investigations and planning for the Project. The proximity of the Mine Site to Lue was one of the most commonly raised concerns in submissions (as discussed in Section 2.4). These comments are also consistent with the feedback received during stakeholder engagement for the Project (as described in Section 6.3 of the SIA). The Mine Site is located within the State suburb of Lue and approximately 2km north of the boundary of the village of Lue as presented in the land zoning maps within the *Mid-Western Regional Local Environmental Plan 2012*. Regardless of these formal boundaries, the potential environmental impacts for (any) privately-owned residence has been the focus of technical assessment presented in the EIS.

Section 1.7 of the EIS provides a detailed summary of other mining operations in NSW that operate in closer proximity to communities and have been doing so successfully for some time. Some rural centres have been established around mines while others have historically been agricultural centres, but which now benefit from the diversification of economic inputs. Mining has contributed significantly to the growth and sustainability of these areas. Existing mining operations such as these have provided useful templates and case studies for Bowdens Silver and its consultants in planning for a successful operation for the Project.

A comprehensive range of design controls have been proposed taking into account the proximity to Lue and feedback from its residents, including the following.

- Maloneys Road would be relocated to ensure that concentrate transport does not pass through Lue and a large proportion of Project-related light vehicles would avoid the village.
- The processing plant would be located near the northern end of the Mine Site, further away from Lue and at a lower elevation than was planned by the previous owner of the Project.
- Noise and visual barriers would be constructed in the southern part of the Mine Site and strategically placed barrier walls would be used in proximity to noise sources at various locations.

- Bowdens Silver is proposing a fleet of buses to transport workers to and from the Mine Site to reduce employee traffic in the locality.
- Bowdens Silver would not seek to directly extract water from Lawsons Creek or Hawkins Creek as this water source is relied upon by landowners in Lue and beyond.
- Operational planning would take into account the proximity of Lue for aspects associated with blasting, earthworks and progressive rehabilitation.
- The design of the crossing of Lawsons Creek within the relocated Maloneys Road has taken into account the potential for localised flooding impacts from the structure.

In addition, the proximity to Lue would remain a factor in planning for the rigour of operational monitoring programs including real-time air quality and noise monitoring. Further to this, the operations would be regulated in accordance with strict conditions of the Project's Development Consent and an Environment Protection Licence that specify performance targets for the Project both for construction and operation. The conditions of the Development Consent would also specify the triggers for the VLAMP policy and the circumstances under which voluntary negotiated agreements would be required of Bowdens Silver for mitigation or acquisition of land.

The presence and operation of the TSF within the Mine Site been subject to a rigorous design and assessment process which has determined that the potential risks are minimal and hence acceptable. It is considered that sufficient information has been provided regarding the preliminary design of the TSF to support approval of the Project and to inform the next stage in development of this structure. Design, operation and closure of tailings storage facilities at mine sites is common in NSW, in Australia and globally. It is a highly engineered process that is subject to detailed regulatory scrutiny and comprehensive structural and environmental monitoring. Section 5.25 discusses the TSF in more detail and Section 3.3 describes the outcomes of additional assessment of predicted seepage from the TSF.

Residents of Lue have also raised concerns regarding the potential generation of leachate (acid mine drainage). The potential for leachate from mining structures would be managed on-site with internal collection and storage proposed to prevent off-site impacts. It is expected that water collected in the majority of sediment dams would be suitable for discharge, however testing of this water would ensure this is the case before any discharge occurs. The engineered construction and progressive rehabilitation of these structures would be undertaken to prevent leachate generation post-mining.

Understanding the concerns of Lue and district residents and keeping the community informed of the progress of the assessment and report for the Project has been a key focus of Bowdens Silver and its consultants. Community open days, focused interviews and surveys are just some of the methods that have been used to engage with the community in Lue. In addition, Bowdens Silver has employed a dedicated Community Liaison Officer to provide a permanent contact for local engagement and this would be continued following any approval. Bowdens Silver is proud of the engagement to date and the fact that several rounds of engagement have been used to present the Project, record feedback and to assist with Project planning.

The outcomes of the technical assessments for the Project have clearly demonstrated that the distance between operations and residences cannot be considered simply 'as the crow flies'. The assessments have comprehensively taken into account the local and regional topography, local climate conditions, local geology and current use of land in considering potential risks and assessing residual impacts. In summary, the following general conclusions relate to the proximity of the operations on the Mine Site to Lue.

- No operations would be visible from residences or generally within the village of Lue due to the substantial intervening topography. The top of the most dominant ridge between the Mine Site and Lue is approximately 118m above Lue. This is clearly evident when viewing the 3D interactive model prepared for the Project[16]. The Mine Site would be visible to varying extents from six rural residences, two of which are Project-related, having entered into agreements with Bowdens Silver. Overall, visual amenity impact risks at residences are considered to be acceptable, excluding one residence. Bowdens Silver has discussed this impact with the relevant landowner.
- No health risk issues of concern have been identified for Lue and surrounds either during or post completion of operations. This includes assessment of multiple pathways of exposure including air-borne exposures, exposure through food grown on properties in the locality and exposure through water tanks (drinking water), amongst others.
- No occupants of residences within the village of Lue are predicted to experience intrusive noise impacts during operations. Noise levels that trigger the VLAMP have been predicted outside the village boundary and negotiated agreements have been discussed with each of the affected landowners. Offers of compensation relative to predicted impacts have been provided and in most cases the compensation offer exceeds what is required under the policy.
- No occupants of residences within Lue or surrounds are predicted to experience significant concentrations of particulate matter exposure that exceed air quality criteria.
- No occupants of residences within Lue or surrounds are predicted to be exposed to airborne metal concentrations (including lead) that exceed the relevant guidance levels.
- No occupants of residences within Lue or surrounds are predicted to be exposed to respirable crystalline silica concentrations that exceed the relevant guidance levels.
- No occupants of residences within Lue or surrounds are predicted to be exposed to hydrogen cyanide concentrations that exceed the relevant guidance levels.
- Any changes to water quality in Lawsons Creek would not be discernible from background water quality or would be within acceptable levels such that the ongoing use of that water by landholders within Lue and beyond would not be impacted.

[16] Available to download and view from https://bowdenssilver.com.au/

- The reduction in water naturally flowing to Lawsons Creek would be minor and difficult to discern (4.4% reduction to flows in the worst-case). Therefore, those residents using water from Lawsons Creek would not be restricted from continuing to do so.
- Blasting and blast fume generation would be managed in accordance with best practice. Given the highly controlled nature of these processes, blast fume generation is considered unlikely.
- Traffic generation is not predicted to impact amenity within Lue village as the low levels of heavy vehicle traffic would be accommodated on the surrounding road network with virtually no adverse impacts to road users or the condition of the road network. Most traffic travelling to and from the Mine Site would comprise light vehicles and buses.
- The potential for lighting impacts (including sky glow) on the local environment has been assessed to be minimal.

Many submissions were received that noted the likely benefits of the Project relevant to its proximity to Lue.

- The expanded Community Investment Program would focus on benefits to Lue and surrounding areas. Submissions noted the positive outcomes of Bowdens Silver's current involvement with the community.
- The local procurement strategy for employment and suppliers to the Mine Site would benefit local residents. It is anticipated that this would foster further engagement in the local community including the Lue Public School and volunteering with local service providers.
- It is anticipated that the Project would attract people to move into the area and Bowdens Silver would encourage workers with family to become part of the community. The Company already leases land to local families and would continue to do so.

It is reiterated that each component of the assessments undertaken to support the EIS for the Project has been accompanied by a description of the environmental management commitments that are proposed in order that:

- predicted residual environmental impacts remain acceptable;
- ongoing management, monitoring and reporting ensures that compliance is maintained;
- there are measures to ensure the community is aware of how environmental risks would be managed; and
- in the case of social commitments, benefits are distributed as equitably as possible.

This is directly intended to ensure that the Project has overall positive effects on the character and sustainability of Lue.

5.22 REHABILITATION AND POST-MINING LAND USE

5.22.1 Overview

Comments regarding rehabilitation of the landform and final land use were included in a number of public and organisational submissions. The comments varied from concern at the design and long-term risks associated with the proposed final landform including the final void and engineered closure of the TSF and WRE to the implementation of progressive and final rehabilitation and the financial security associated with the various closure commitments.

Rehabilitation of disturbed areas within the Mine Site would be an integral component of the entire Project. Bowdens Silver intends to progressively rehabilitate disturbed areas that are no longer required or have been completed in their final form. The use of trial rehabilitation areas across the Mine Site would assist Bowdens Silver to identify / confirm the most appropriate rehabilitation methods for the respective components of the Mine Site.

Mining would change the landform, however the overarching objective of rehabilitation would be to return land to its original land and soil capability and therefore land uses, where it is reasonable to do so. The risks associated with the final landform have been thoroughly assessed including the long-term implications of the open cut pit lake. Bowdens Silver would monitor and maintain all rehabilitated areas throughout and beyond the Project life until such time as the relevant Government agencies consider the standard of rehabilitation is appropriate for the mining lease to be relinquished.

Community expectations regarding defaults on rehabilitation commitments are not consistent with the expectations and conditional requirements that would be required by the NSW Government. This includes detailed planning, regular reporting and the provision of upfront financial securities that guarantee rehabilitation commitments are satisfied. Progressive and final rehabilitation are heavily regulated processes in NSW and Bowdens Silver welcomes such scrutiny, as successful rehabilitation outcomes have been an objective of the Project since initiation and a key factor in Project planning.

5.22.2 General

Representative Comment(s)

Bowdens have declared they will not rehabilitate the whole site.

Judith Brown of Camboon, NSW (Submission SE-8624625)

…there appears little plan for rehabilitation of the site when mining has finished, leaving the local community to deal with contamination risk in perpetuity.

(Name Withheld) of East Ryde, NSW (Submission SE-8628093)

Bowden's does not offer a suitable plan for rehabilitation of the mine. When the mine closes the tailings dam and all the PAF will remain forever.

Camilla Graves of Beaconsfield Upper, Vic (Submission SE-8367329)

The big issue is what is our local area going to be left with after the mine has finished.

(Name Withheld) of Bara, NSW (Submissions SE-8619580)

Response

Bowdens Silver has committed to rehabilitate all disturbed areas within the Mine Site. EIS Section 2.16 and Appendix 5.10 respectively outline what and how rehabilitation would be undertaken throughout the Project life. Considerable effort has been placed upon the rehabilitation planning for the entire Mine Site.

All eight rehabilitation domains would be rehabilitated to satisfy the short and long-term objectives outlined in EIS Section 2.16.2.

In the event the Project is approved, progressive and final rehabilitation requirements would be incorporated within the conditions of the Development Consent and the mining lease for the Project. It is standard practice for the NSW Resources Regulator to require detailed planning and commitments to rehabilitation. Bowdens Silver fully recognises the need for the rehabilitation of the Mine Site to be undertaken to a high standard to ensure that the fears expressed in many submissions do not occur. Rehabilitation would be undertaken progressively and with specific trials which would enable Bowdens Silver, relevant Government agency(ies) and the community to recognise as the mine develops that the rehabilitation methods would be effective in the long-term. Should any methods be identified as sub-optimal, each method would be reviewed, evaluated and upgraded to achieve the required outcome(s).

The final landform (EIS Figure 2.26) does in fact present what topography would be retained on site whilst EIS Figure 2.27 displays the progressive revegetation sequence.

Regardless of the above, progressive and final rehabilitation would be regulated by DPIE and the Resources Regulator through a Rehabilitation Management Plan, annual reporting and regular auditing.

5.22.3 Rehabilitation Planning

Representative Comment(s)

Rehabilitation planning includes land and soil monitoring to report on achievement of pre-mining land and soil capabilities or better.

NSW DPI – Agriculture

- *A more detailed and comprehensive monitoring plan for rehabilitation*;
- *Quantitative details triggering intervention*;
- *Details of post-rehabilitation management*; and
- *An assessment of rehabilitation techniques against objectives*.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

In the event the Project is approved, a Rehabilitation Management Plan (RMP) would be developed for the Project following the receipt of Development Consent and prior to the initial disturbance for the Project. The RMP would identify the success criteria for each component of the Mine Site to be rehabilitated focussing on the key long-term objectives outlined in Section 2.16.2 of the EIS.

It is standard practice and a requirement of the Resources Regulator for the detail of rehabilitation projects within a mine site to be presented in the mine's RMP. The detail would invariably reflect the considerable data that is continually assembled about all rehabilitation components particularly in terms of optimal procedures and procedures that are sub-optimal that should be re-designed.

Soil management measures would be identified in the RMP and include actions required to achieve the nominated success criteria. These actions would include procedures for stripping and soil stockpiling, requirements for weed control and measures to minimise loss of soil resources due to erosion. A robust monitoring program would be included in the RMP to monitor the effectiveness of management measures and ensure that land and soil capability is maintained or improved, wherever practicable.

The RMP for the Project would be regularly updated throughout the Project life to outline the plans for rehabilitation activities in the nominated years of operation and to reflect the information gained from on-site trials. The RMP would also present the results of all monitoring and maintenance activities and the progress towards the respective rehabilitation success criteria.

Representative Comment(s)

…demonstration of similar land rehabilitation programs from other mining developments be included in the design of the rehabilitation plan.

NSW DPI - Agriculture

Response

Section 2.16 and A5.10 of the EIS present detailed, site-specific rehabilitation objectives for the Project. These objectives are based on existing conditions within the Mine Site identified during the completion of the various specialist assessments undertaken for the Project. In particular, the Land and Soil Capability Assessment (SMD, 2020) provides a detailed baseline for land and soil capability and, as a direct corollary, agricultural production. Section 7.3 of Soil Management Designs (2020) describes the predicted changes in soil condition and land capability on the final landform following rehabilitation and the implementation of all practicable management and mitigation measures. The final land uses nominated in the EIS were chosen based on an assessment of the suitability of the land within each component area following rehabilitation. It is noted that an emphasis has been placed on returning land to agriculture and/or biodiversity conservation, wherever practicable.

It is further noted that the Rehabilitation Management Plan (RMP) would identify the success criteria for each component of the Mine Site to be rehabilitated focussing on the key long-term objectives outlined in Section 2.16.2 of the EIS.

Notwithstanding the above, numerous examples of mine rehabilitation that support agricultural production are available in the literature – some examples follow.

- New Acland Mine (New Hope, n.d.)
  New Hope has progressively rehabilitated approximately 490ha of disturbed land since 2002. Of this land, approximately 240ha has been returned to grazing between 75 and 100 head of cattle. Grazing trials indicate that cattle on mined land perform as well, or better than, cattle on unmined land (Ref: http://www.aclandproject.com.au/content/sustainability).

- Wilkie Creek (Peabody Energy, n.d.)
  Peabody Energy has largely rehabilitated its Wilkie Creek site following the completion of mining in 2013 with approximately 60% of rehabilitation now completed. This includes a final landform designed to support a final land use of grazing (Ref: https://minerals.org.au/sites/default/files/17_AUS%20Rehabilitation%20factsheet_Final%20low%20res.pdf).
- Commodore Coal Mine (Minerals Council of Australia, 2016)
  Approximately 250ha of land has been rehabilitated to grazing pasture by InterGen / Downer Mining at the Commodore Coal Mine (Ref: https://minerals.org.au/sites/default/files/17_AUS%20Rehabilitation%20factsheet_Final%20low%20res.pdf).
- Liddell Coal Operations (Mineral Council of Australia, 2016)
  Glencore has achieved high-quality rehabilitation of grazing pasture at its Liddell Coal Operations site. Successful grazing trials indicate that cattle on rehabilitated land grew faster and averaged an extra 79kg over cattle on neighbouring pasture (Ref: https://minerals.org.au/sites/default/files/17_AUS%20Rehabilitation%20factsheet_Final%20low%20res.pdf).

Representative Comment(s)

The rehabilitation of agricultural productivity should be reflected in the 'Rehabilitation monitoring and maintenance' list (Section 2.16.7) in accordance with the AIS Technical Notes Part 5.12.

NSW DPI - Agriculture

Response

The agricultural productivity would be included as one of the elements assessed during the annual monitoring program of the rehabilitated landform. The area of land maintained and/or returned to agricultural production would be documented in each Annual Review for the Project.

5.22.4 Soil and Land Capability

Representative Comment(s)

Clarify the commitment to maintain the pre-disturbance soil and capability class upon rehabilitation. In some circumstances, this may be difficult to achieve e.g. class 3 land located in footprint of Waste Rock Emplacement. In other areas, an improvement to land capability would be desirable and achievable.

NSW Resources Regulator

Response

Rehabilitation of all areas disturbed by mining-related activities would be an integral part of the Project. It would be an objective of the rehabilitation undertaken to return land to its original land and soil capability, wherever practicable. It is acknowledged that changes to existing landforms may limit the achievement of this objective in certain localised areas e.g. on the outer slopes of

the WRE. However, it is anticipated that suitable conditions for plant growth would be achieved in these areas, following lime and nutrient application, which would minimise any potential reduction to the land and soil capability class.

The land and soil capability classification of land within and immediately surrounding the Mine Site would be improved, wherever practicable. This commitment is demonstrated in Section 4.18.6 of the EIS which identifies that all pasture within the Mine Site (109ha) would be improved following the Project life.

5.22.5 Agricultural Activities

Representative Comment(s)

The Rehabilitation Goals (Section 2.16.2, Page 2-86 EIS) should include an objective to support productive and sustainable grazing activities.

NSW DPI - Agriculture

Response

Section 2.1.1 of the EIS identifies that a key objective of the Project would be "*to maintain a positive relationship with the surrounding agricultural industry and maximise productivity on land retained for agricultural production*". This objective would be achieved, in part, by supporting productive and sustainable grazing activities throughout and following the Project life.

As identified in Section 4.18.6 of the EIS, it is anticipated that approximately 1 170ha of land within the Bowdens Farm would be either retained for or returned to agricultural use beyond the Project life. This would include approximately 682ha (68%) of land within the Mine Site comprising 109ha (11%) of land for Grazing – Modified Pasture, 382ha (38%) of land for Grazing – Native Vegetation and 191ha (19%) of land used for Grazing – Controlled. It is anticipated that current farm management records and information provided in the Land and Soil Capability Assessment (SMD, 2020) would provide a baseline to determine the efficacy of these rehabilitation objectives.

5.22.6 Waste Rock Emplacement

Representative Comment(s)

Council requests that the Rehabilitation Plan sufficiently demonstrates how stockpiles of toxic waste material will be maintained over the long term, and indicates the safeguards that will be in place in perpetuity to ensure that no acid forming material leachates into the Lawsons Creek.

Mid-Western Regional Council

The long term (we are talking generations) success of encapsulating the tailings and preventing ingress of water is dependent on the long term integrity of this proposed cover. There is no the (sic) *track record to demonstrate this. In such an environmentally sensitive area as Mudgee this should be required.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Cover systems/barriers for encapsulated waste within either a WRE or TSF have been used for decades and, as with any engineered solution, are subjected to continuous improvements, in particular:

- an improved understanding, and more accurate modelling, of the environmental regime, including precipitation, evapotranspiration, run-off, vegetation establishment;
- improved mathematical and computational models;
- technological development of geosynthetic materials (High Density Poly Ethylene (HDPE), Geosynthetic Clay Liner (GCL)), bituminous liners, geotextiles, etc.);
- more accurate monitoring systems;
- improved designs based on previous experience;
- full scale trials; and
- more stringent regulations.

Given the importance of such systems, joint ventures between government agencies, regulators, industries and universities have been conducting extensive, long-term assessments of various cover systems installed over a range of materials in a variety of site conditions. Examples of these ventures are the Australian Alternative Covers Assessment Program (A-ACAP), the Contaminated Site Clean Up Database and the Alternative Cover Assessment Program (ACAP) from the U.S. Environmental Protection Agency (USEPA) and others. Additionally, technical conferences, symposiums and congresses related to mine waste solutions present numerous papers related to cover systems, the majority of them providing feedback regarding the performance of installed systems.

The proposed cover system for the Project is considered "state of the art" when assessed against current industry practice, as can be seen in the Australian Government Department of Industry, Tourism and Resources publication named "*Preventing Acid and Metalliferous Drainage - Leading Practice Sustainable Development Program for the Mining Industry*" published in September 2016.

It is noted that the proposed cover system is not only designed to prevent the ingress of the water and provide a medium for the establishment and development of vegetation. One of the most important functions of the cover system is to limit the ingress of atmospheric oxygen, which would ultimately oxidize the potential reactive iron sulphide minerals that would generate acid leachate.

5.22.7 Leachate Management Dam

Representative Comment(s)

There are no details in the assessment of how Bowdens Silver propose to manage the leachate dam post closure and the leachate that this dam collects.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

There is no clarity on how Bowdens Silver will manage the leachate dam when the mine closes.

Clare Hamilton of Rylstone, NSW (Submission SE-8628154)

Response

As noted in EIS Section 5.11.17, the final WRE landform includes a vegetated store-and-release capping and cover system that would limit rainfall ingress into the stored waste rock and subsequent leachate generation. The effectiveness of this system would be monitored and evaluated during operations, as the WRE is progressively rehabilitated. EIS Section 2.16.5 records that the leachate management dam would be retained until the leachate is no longer generated. Once the need for leachate collection no longer exists, the leachate management dam would then be removed and the former landform re-established in this area (as noted in EIS Section 2.16.5).

5.22.8 Final Void

Representative Comment(s)

Further information is required to demonstrate that void minimisation *has been adequately considered.*

NSW Resources Regulator

It is completely unacceptable that this company can lob into an area that has been settled for nearly 180 years, dig a 1.5 km by 300 metre deep hole in the ground and walk away and leave it.

(Name Withheld) of Nullo Mountain, NSW (Submission SE-8630649)

In this day and age how is it acceptable to leave an open mining pit with no rehab or ongoing monitoring?

(Name Withheld) of Lue, NSW (Submission SE-8420549)

SVL has consistently said the void will not be backfilled because "that would make the project financially unviable". leaving voids unfilled is not best practise in countries with more stringent environmental protocols than Australia and it is becoming less acceptable in Australia

Michael Boller of Lue, NSW (Submission SE-8757975)

Response

Bowdens Silver considers that the retention of a rehabilitated final void covering approximately 48ha is an appropriate outcome from the overall Project given the following.

- Ore would be extracted to the base of the main open cut pit up until the end of economic life of the Project and hence, there would be no opportunity for any potential acid forming (PAF) waste rock to be backfilled within the void.
- PAF waste rock would be progressively placed and effectively encapsulated within the WRE. This encapsulation removes the need to return this material to the final void as is sometimes necessary for some mining operations where insufficient volumes of NAF waste rock are available for the encapsulation of the PAF.

- Bowdens Silver's exploration to date has identified further mineralisation beneath the floor of the main open cut pit. In the event that this mineralisation is assessed to be economically recoverable using underground mining methods, the ore could be accessed from the base or near the base of the main open cut pit. Any such development would be the subject of a future application, i.e. it is not proposed at this time.
- Once the main open cut pit can no longer yield ore, using either open cut or underground methods, the final void could be used as a component of a future mining operations within a reasonable distance of the Mine Site.

Bowdens Silver specifically designed the extraction sequence for the open cut mining operation to enable NAF waste rock to be used to backfill the two satellite open cut pits to re-instate the pre-mining landform in those areas.

The groundwater impact assessment for the Project (Jacobs 2021) identifies that groundwater would progressively flow into the final void as the groundwater system re-establishes equilibrium with the pit lake that would form within the final void. Final void water balance modelling was undertaken for the Project to simulate long-term water levels in the pit lake (see Section 7 of WRM (2020)) using a range of climatic scenarios. This modelling identified that groundwater inflows, coupled with rainfall and evaporative losses would result in a maximum pit lake level that is approximately 20m below the 597mAHD overflow point from the final void. Section 7.10 of WRM (2020) also notes that the scenario closest to the average of all modelled scenarios (WI.M scenario), would result in a pit lake water level fluctuating between 24.5m and 30.5m below the overflow point.

It is not Bowdens Silver's intention to "walk away and leave it", nor would the open cut pit be left "with no rehab or ongoing monitoring". Rather, the final void would be rehabilitated to the extent that it is a passive landform that does not require active management. This would include ensuring that the landform is fully protected by a surrounding bund with the upper benches revegetated. In addition, runoff would be diverted around the final void to ensure this water is not causing fluctuations in pit lake levels. Although the landform would not require active management, monitoring of the landform would continue once rehabilitation is completed to ensure that any unexpected events or outcomes are addressed. This ongoing requirement would be reflected in the rehabilitation securities that would be held by the NSW Government that would reflect the risk that additional work would be required. Relinquishment of any liabilities for the rehabilitated state of the final void would be contingent on NSW Government agencies accepting that its ongoing management is appropriate.

Representative Comment(s)

Further information is required on the expected water quality and any post mining management options in the open cut void

NSW Resources Regulator

Response

Section 7.10 of WRM (2020) presents the expected electrical conductivity within the pit lake over time (i.e. 100 years to 500 years post-closure). This parameter was selected due to its relatively conservative behaviour. Full quantification of pit lake water chemistry and its chemical evolution over time is constrained by the geochemical and lithological heterogeneity of the main open cut pit. Bowdens Silver recognises that areas of the open cut pit faces would likely contain

zones of sulphide mineralogy and, as noted in the rehabilitation activities presented in EIS Section A5.10.3.4, proposes to expedite the formation of the pit lake in the final void to a level of approximately 574m AHD. Once this level has been reached, runoff from upstream catchments would be re-directed to limit further inflows to the pit lake. Expedited pit lake formation would assist the recovery of groundwater levels as well as retarding the oxidation of any remaining sulphide minerals exposed on open cut pit faces. This limitation of sulphide oxidation would reduce generation of low pH contact waters and dissolved metals such that any increase to dissolved solid loads would be principally governed by additions from rainfall and runoff and evaporative concentration. Furthermore, it is expected that, due to the depth of the pit lake and surrounding topography, thermal and density stratification would occur within the water column. This could potentially create a reducing environment, at depth, which would naturally attenuate dissolved metals, metalloids and sulphate concentrations.

Notwithstanding this, Bowdens Silver would routinely monitor water quality of the in-pit sumps and map zones of PAF material on the open cut pit faces as part of operations. A key focus of these activities would occur as open cut development focus shifts from the eastern section of the open cut pit with formation of a nascent pit lake, albeit shallow, occurring in this section. All collected data would be used to further understand potential pit lake water quality and inform management measures that ensure successful rehabilitation outcomes.

Post-mining management options for the final void were discussed in the previous response.

5.22.9 Tailings Storage Facility

Representative Comment(s)

the dam will be less than 1km from Lawson Creek… They are capped and remain in place forever - that is, until they leak or collapse. What a dangerous legacy to leave our children!

Julie Reynolds of Cassilis, NSW (Submission SE-8620539)

The Rehabilitation Plan must also specifically address decontamination of the proposed tailing dam, which is located in an upper catchment from which runoff directly feeds into Lawsons Creek.

Mid-Western Regional Council

Who will maintain this dam, who will see to it that no damage is ever to come from the toxic waste?

Harry White of Mudgee, NSW (Submission SE-127413)

When the life of the mine is over what commitment does our local community have that the tailings dam will be maintained, monitored and repaired? What Agency will do this forever?

Mudgee District Environment Group of Mudgee, NSW (Submission SE-8622333)

Response

The TSF would be designed, constructed and operated using best engineering practice and in accordance with the design guidance requirements of the NSW Dam Safety Committee and the Australian National Council on Large Dams. This would ensure the long-term stability of the embankment of the facility and together with the state-of-the-art TSF cover would provide a stable long-term landform within the upper reaches of the Walkers Creek valley.

Bowdens Silver does not propose to decontaminate the TSF. Rather, the Project involves encapsulation of the contained tailings through the construction of a stable embankment and an appropriate cover as discussed in EIS Appendix 5 – Section A5.10. This is an engineered process common in metalliferous mining projects across NSW and nationally. This process would be subject to ongoing regulation by DPIE, NRAR and the Resource Regulator and Bowdens Silver would need to provide financial security in the form of a bank guarantee to cover the anticipated cost of rehabilitation. The quantum of this security would need to be agreed with DPIE and would only be relinquished once Bowdens Silver can demonstrate that rehabilitation requirements have been addressed.

Bowdens Silver recognises that its commitment to the long-term stability of the TSF would involve monitoring and maintenance of any components of the facility that may be adversely impacted by meteorological events. The duration of the monitoring and maintenance undertaken by Bowdens Silver would be determined in consultation with the relevant Government agency(ies).

5.22.10 Biosecurity Measures

Representative Comment(s)

Biosecurity measures should also be included under the pest and weeds management section that will identify any other disease risks in this area on and adjacent to the mine site e.g. animal health.

NSW DPI - Agriculture

Response

Biosecurity measures, including specific requirements for both pest and weed management, would be included in the Landscape Management Plan (LMP) which would be prepared for the Project in the event the Project is approved and prior to the commencement of operations.

The Bowdens Farm would also continue to operate in accordance with a "Farm Biosecurity Plan" which would be periodically reviewed and updated by the Farm Manager to address specific biosecurity concerns relating to the management of the farming operation including pest management, weed management and animal health.

5.22.11 Vegetation on the TSF / WRE Cover

Representative Comment(s)

Clarification is required that the proposed cover design can adequately support the vegetation proposed, including tree species nominated in Table A5.11 of the EIS.

NSW Resources Regulator

How can Bowdens Silver guarantee the prevention of colonisation of trees and shrubs associated with both native vegetation and introduced species with potential to penetrate roots deep into the TSF and WRE in the long term after the project has been completed ?

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

The seal on top of the waste rock emplacement (WRE) requires that trees cannot be grown on the surface as it could create breaches in the multiple layers. How will they stop trees recruiting on the surface of the WRE for the next several hundred years?

Bruce Christie of Monivae, NSW (Submission SE-8635417)

Response

It is acknowledged that EIS Appendix 5 - Section A5.10.5.5 refers to the retention of the store and release cover on the surface of the WRE and TSF with no trees and substantive shrubs planted on the surface. Bowdens Silver has reviewed this approach and considers it more appropriate to focus upon the use of a range of grasses to initially stabilise the surface of the TSF with the intent of identifying a range of shrubs and trees that could be planted on the final surface. Bowdens Silver has revised its approach to the planting of shrubs and trees on the WRE surface following advice from Advisian that it is impossible to prevent long-term growth of shrubs and trees on the surface. It would be preferable that an appropriate suite of shrub and tree species are planted on the surface to provide a seed stock for the long-term propagation of suitable shrubs and trees on the TSF surface.

The shrub and tree species nominated in EIS Table A5.11 relate to all landforms within the Mine Site that would be disturbed throughout the Project life. Bowdens Silver would review the rooting structure of each of the possible shrubs and trees to identify the most appropriate shrubs and trees that could be planted on the proposed final cover on the TSF (and WRE). The shrubs and trees selected for revegetation of the TSF would be used in the initial trials for the cover and rehabilitation of the TSF. It is proposed that the shrubs and trees selected to revegetate the surface of the TSF would be shallow rooted and have delicate root systems unlikely to be able to penetrate through the TSF cover. As discussed in the response in Section 5.22.5, when punctured by roots, the bentonite within the geosynthetic clay liner would hydrate and expand causing the layer to close around the intruding root and thereby preventing long-term seepage of water into the underlying PAF waste rock.

The selected liner barrier (GCL) has a "self-healing" effect for small holes. When punctured by materials such as roots, the bentonite hydrates and expands when in contact with moisture (refer **Plate 5.2**). Additionally, the geotextile that overlays the GCL is highly resistant to root penetration.

5.22.12 Vegetation on Final Void Benches

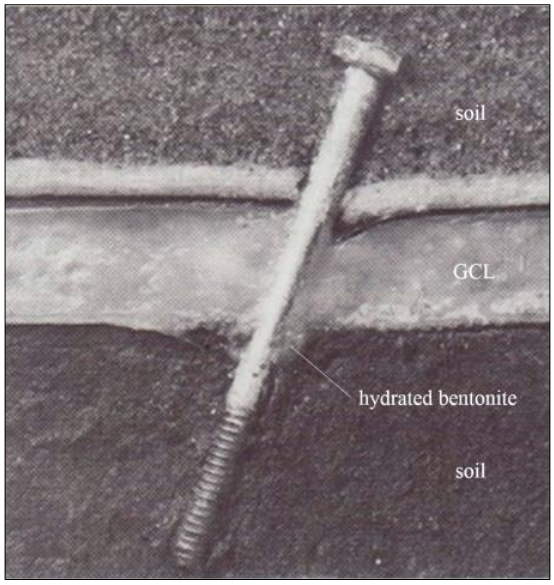
Representative Comment(s)

Clarification why vegetation screening in the final void has been stipulated for upper benches only i.e. limited to those above 590 m AHD…

NSW Resources Regulator

Response

Establishment of vegetation on the upper benches above 590m AHD is proposed given these benches would be visible from vantage points outside the Mine Site. Planting of vegetation on benches below 590m AHD would have little benefit as they would not be visible from outside the Mine Site and would ultimately be covered by the rising water within the main open cut pit.



(Source: Kong et al. 2017)

Plate 5.2 Self-Healing of GCL pierced by a Bolt

5.22.13 Soil Volumes

Representative Comment(s)

The volume of available soil is estimated however an estimate of the amount of soil required for progressive and final rehabilitation and including operational loss must also be calculated. If these calculations indicate a deficit of available soil means of procuring the difference should be determined.

NSW DPI - Agriculture

Response

Bowdens Silver recognises the critical role of soil resources in achieving successful rehabilitation outcomes for the Project. In order to manage rehabilitation risks associated with soil resources, Bowdens Silver would:

- adopt the soil stripping and stockpiling measures presented in EIS Section 4.13.4;
- accurately record volumes of stripped topsoil and subsoil at the time of their removal; and
- maintain a soils inventory that contains up to date records of stockpiled topsoil and subsoil available for rehabilitation activities.

Indicative topsoil and subsoil stripping depths were identified from the results of a detailed soil survey of the Mine Site that was undertaken in mid-February 2017 by accredited soil scientists, Dr David McKenzie and Mr Adrian Harte of Soil Management Designs (SMD, 2020). Based on these depths, indicative volumes of topsoil and subsoil for stripping and subsequent use in rehabilitation activities were estimated and presented in EIS Table 4.74. This table identifies there would be approximately 840 000m^3 of topsoil and 1 580 000m^3 of subsoil available for use during progressive rehabilitation and closure activities. The rehabilitation measures proposed in the EIS

(see Section A5.10 and Table 3 of Advisian (2020b)) were developed using these volumes and consideration of suitable topsoil and subsoil depths and the utilisation of available soil resources, with some contingency.

These rehabilitation measures would require approximately 830 000m^3 of topsoil and 1 370 000m^3 of subsoil to meet rehabilitation and mine closure objectives. Therefore, based on the estimated volumes and proposed measures, the Project would have a surplus of 10 000m^3 topsoil and 210 000m^3 subsoil resources available to meet the proposed rehabilitation and closure objectives. In any event, all topsoil recovered from within the Mine Site would be used to achieve the best standard of rehabilitation for the site.

5.22.14 Tree Hollows

Representative Comment(s)

Will Bowdens be retaining hollow-bearing trees cleared from the development footprint and reinstating them on areas of rehabilitation?

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

Response

Bowdens proposes to retain suitable hollow-bearing sections of trees removed during the tree clearing process for placement principally within the proposed biodiversity offset areas within and immediately adjacent to the Mine Site. Should it be practical to recover some of the hollow-bearing sections of trees from the biodiversity offsets towards the end of the Project life, Bowdens Silver would place these sections of trees within the most appropriate sections of the Mine Site being re-established with native woodland vegetation.

5.22.15 Post-Mining Landform

Representative Comment(s)

The EIS does not provide consideration of geomorphic design for rehabilitated landforms. Consideration of geomorphic landforms should be assessed for the Waste Rock Emplacement to ensure the final landform is stable and of similar characteristics of the surrounding natural landscape.

NSW Resources Regulator

Response

As far as is practical, the outer slopes of the WRE have been designed to generally follow a similar profile to the underlying natural surface, i.e. to have a convex upper slopes and concave lower slopes, thereby avoiding straight sides with drainage lines and depressions. This, along with the outer slopes (infilled with subsoil and topsoil to remove any stepped landform) would reduce the “engineered” appearance of the WRE. The proposed outer slopes would be designed at a maximum of 1:3 (V:H) and are comparable with many of the slopes on nearby ridges and hills. The crest level of the WRE would also vary thereby creating a ridge and avoiding extensive flattened, geometric plateaus.

The detailed design for rehabilitated landforms would be confirmed during preparation of the Rehabilitation Management Plan that would be ultimately approved by the Resources Regulator. It is considered that the current design provides sufficient information on the proposed final landform and final land uses for the purpose of assessing the development application.

5.22.16 Post-Mining Land Use

Representative Comment(s)

Further information is required to clarify the vegetation communities that will be reinstated on disturbed areas.

NSW Resources Regulator

Response

EIS Table A5.11 lists a wide range of native grass, shrub and tree species suitable for revegetation of the ridges, mid slopes, flats and valleys. Bowdens Silver proposes to identify the relevant species for each domain within the respective annual rehabilitation plan submitted to the Resources Regulator. The species would be selected based on factors such as aspect, typical moisture requirements and preferred substrates. Bowdens Silver would maintain detailed records of the growth of the respective vegetation throughout the Project life to ensure that the selected species are successful in achieving the nominated success criteria.

Representative Comment(s)

Further analysis of the post mining management and maintenance is required for the intended post mining land use of "grazing controlled" nominated for the Tailings Storage Facility and Waste Rock Emplacement areas.

NSW Resources Regulator

Response

It is recognised that the use of controlled grazing on the TSF and WRE would require careful management. The controlled grazing would be of considerable value during the early stages of revegetation to control the grass fire risk and to remove the tall / rank grass that typically develops during the early stages of stabilisation with grasses. Careful control of grazing would be necessary once the shrub and tree species are introduced.

5.22.17 Post-Mining Rehabilitation Management

Representative Comment(s)

There seems to be no the guaranteed plan for post mining management of the site.

Luciana Smink of Breakfast Creek, NSW (Submission SE-8627359)

Response

Bowdens Silver is committed to the successful rehabilitation of the entire Mine Site and has committed to the ongoing monitoring and maintenance of the rehabilitation beyond its completion to ensure that a stable and sustainable vegetated and low-maintenance landform is present prior to the relinquishment of the mining lease for the Project (see EIS Section 2.16.2).

5.22.18 Rehabilitation Costs

Representative Comment(s)

The mine rehabilitation and closure costs are estimated in the EIS to be $39.4M.

Spend is identified as 1% per year for years 2-15. 21% in the final operations year (Year 16) and 51% in Year 17 when the tailings facility would be capped.

This is not consistent with the EIS TSF closure plan which has an estimated 3-5 years of time to cover the TSF post the final year of processing.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

It is acknowledged that the proportion of costs assigned to the rehabilitation of the Mine Site are not strictly consistent with the planned staged rehabilitation, however it is noted that the EIS refers to a seven-year rehabilitation period (that is, from Year 17 to year 23). The 51% of rehabilitation funding should be allocated over this period rather than just to Year 17. Bowdens Silver is committed to the allocation of funds for the appropriate rehabilitation for all components throughout and beyond the Project life until the mining lease is relinquished. It is noted that Bowdens Silver expects the mining lease to be relinquished progressively once the rehabilitation in the respective areas satisfies the relevant rehabilitation success criteria.

5.22.19 Post Closure

Representative Comment(s)

…a marginal project like this runs the risk of being abandoned during its life, resulting in an abandoned ruin that isn't rehabbed, or maintained.

(Name Withheld) of Totnes Valley, NSW (Submission SE-127486)

Response

The Project is not a marginal Project, based largely on the design of the mine to optimise mineral recovery and the economic evaluation set out in EIS Section 4.19.

In the unlikely event that the Project needs to close earlier than outlined in the EIS, Bowdens Silver would be required to implement an approved rehabilitation plan relevant to the full extent of disturbance at the site at that stage. The community's concern regarding premature closure with sub-optimal rehabilitation is understood, however, the current requirements of the NSW Government for progressive rehabilitation and substantial securities should effectively remove the concerns expressed.

Representative Comment(s)

The long term implications of the mine is of a contaminated site for hundreds of years after the mine has ceased operating…The EIS does not address the long term effects of acid mine drainage and potential leaking of the acidic, heavy metal laden water into the waterways and creeks of the Lue/Mudgee area.

(Name Withheld) of Rylstone, NSW (Submission SE-8617899)

Response

The EIS does address the key rehabilitation components to be implemented to ensure the potentially acid forming waste rock and tailings do not generate long-term impacts upon the surface water of the Lawsons Creek valley. The design of the cover for both the WRE and TSF represent state-of-the-art techniques that have been operational within the international mining industry for a couple of decades. These techniques are regularly reviewed and optimised, all of which would be assessed for the applicability for the Project.

Bowdens Silver is committed to the adoption of the state-of-the-art procedures outlined in the EIS to ensure there are no legacy issues created for the local and downstream communities.

Comprehensive testing and checks of all mine components would be undertaken continuously throughout the Project life to ensure that the active components and the rehabilitated landforms are consistent with their designs and have been correctly constructed.

5.22.20 Rehabilitation Security

Representative Comment(s)

SVL should also be providing a substantial Bank Guarantee up to the government, say $50M.

(Name Withheld) of Berowra, NSW (Submission SE-8603544)

I would like to have access to the levels of rehabilitation that are reported in the Annual Report and would like to see Bowdens pay a bond held by the appropriate Government Agency, the Department of Planning presumably, which would be adequate against any environmental liabilities which Bowdens creates.

Bernadette Harvey of Rylstone, NSW (Submission SE-8648137)

Response

Bowdens Silver would be providing a substantial security to the Resources Regulator to cover rehabilitation costs in the unanticipated event that Bowdens Silver defaults on its rehabilitation commitments. Whilst the EIS nominated a proposed security of approximately $39.4 million, the actual quantum of the security would be established prior to the commencement of on-site disturbance consistent with the approved project components. The initial security paid would relate to a nominated period of the Project life, such as 3 years. The quantum would be determined using the proforma calculation managed by the Resources Regulator where the rehabilitation cost of each component would be calculated in detail. The security would progressively increase throughout the Project Life as the area of disturbance and rehabilitation works required increases. The calculation tool does provide for reductions in the security, to account for successful progressive rehabilitation.

Bowdens Silver would document the planning and rehabilitation achievements throughout the Project life in each annual rehabilitation report to inform all Government agencies and the local community about the rehabilitation progress on site.

5.23 SOCIAL IMPACTS

5.23.1 Overview

Community engagement and research undertaken by Bowdens Silver and its consultants to inform and educate the community about the Project and to inform the Social Impact Assessment (SIA) for the Project identified that the concerns regarding the Project varied across stakeholder groups and geographic location. The level of support or objection and the matters raised in organisation and public submissions is consistent with this conclusion. A detailed analysis of the submissions received has been presented in Section 2 and confirmed the following.

- There is overwhelming support for the Project generally (79% of all submissions support the Project).
- There is overwhelming support for the Project in the Mid-Western Regional Local Government Area (74% of submissions from this area support the Project).
- Within the area described as 'Lue and surrounds' 95 submissions objected to the Project (62%) and 57 submissions supported the Project (37%).
- For those submissions that listed their address as being within Lue, 45 submissions opposed the Project (52%) and 40 supported the Project (46%). This is consistent with feedback in community surveys completed for the SIA.

Consistent with the feedback received through engagement processes, the principal issues raised in submissions related to change that might affect the local sense of community and sense of place, health and wellbeing and social amenity. Equal consideration should be given to submissions that comment on the social benefits of the Project including employment opportunities, maintaining sustainable communities and the ongoing resilience of these communities.

Comments drawn from a review of the SIA commissioned by LAG have also been considered and a response included in this subsection. It is noted that the review focused on Lue only and not the surrounding towns and local communities. The review was based on review of the EIS and SIA without review of other relevant assessments and with limited community engagement. It is therefore considered to provide an unbalanced focus on the opinions of members of LAG as opposed to the broader community.

It should be noted that there are linkages that exist between the social matters identified in submissions and the outcomes of other assessments or matters that are addressed elsewhere. The following matters are directly relevant to the consideration of social impacts.

- Aboriginal heritage values (addressed in Section 5.2)
- Economic benefits and impacts (addressed in Section 5.10)
- Health risks (addressed in Section 5.12)
- Historic heritage values (addressed in Section 5.13)

- The proximity of the Mine Site to properties and Lue (addressed in Section 5.21)
- The attraction of tourists (addressed in Section 5.27)
- Visual amenity (addressed in Section 5.29)

This is notwithstanding the personal values held regarding assessment outcomes such as biodiversity, noise, vibration, air quality, water access and quality and traffic. It is acknowledged that any changes associated with the Project may have a social impact.

A comprehensive program of community engagement and research was undertaken by Umwelt, a leading consultancy in this field and presented in a detailed SIA (Umwelt, 2020). The research has identified the anticipated and likely social risks of the Project and resulted in a range of social enhancement strategies being recommended and that would be implemented by Bowdens Silver. With the implementation of these measures, the social benefits of the Project would be maximised and negative social impacts would be minimised.

Review of community submissions and the peer review commissioned by the LAG has resulted in a number of matters being clarified. This review has not changed any of the outcomes of the SIA, that is, the identified social risks have not changed and no new social impact mitigation is considered necessary.

Overall, Bowdens Silver is confident that the outcomes of the SIA reflect community expectations and the potential social impact risks for the Project. Notwithstanding, it is acknowledged the outcomes of the Project would be experienced differently in the community. Ongoing meaningful engagement throughout the Project life is proposed to ensure that mitigation programs are refined over time to minimise negative effects and ensure the benefits of the Project are distributed as equitably as possible.

5.23.2 Health and Wellbeing

Representative Comment(s)

The Applicant has provided expert assessments of toxicity risks and these assess the risks as low or acceptable. However, the Lue Action Group (LAG) has obtained assessments of risk which are critical of those provided by the Applicant, and raise concerns about their adequacy. That is, the assessment of these risks is contested. In my opinion, contestation and accompanying uncertainty add to the risks associated with proximity and toxicity. The SIA offers suggested responses to levels of risk assessed as low or acceptable. In my opinion, these do not constitute adequate mitigation of the risks involved and this is particularly the case for impacts which may have been underestimated.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

The issues raised by the LAG assessments, including the level of "toxicity" risk, has been responded to as part of the responses to the air, health and lead submissions (see Section 5.5, 5.12 and 5.15 of this document). These responses confirm that the risks presented within the EIS and supporting AQA and HHRA assessment reports, which conclude low potential health risks, remain unchanged. Furthermore the methodology and outcomes of these assessments has been

confirmed by peer review[17] to be comprehensive, appropriate and reasonable. Therefore, whilst the opinions within the above submission are noted, the assessed level of "toxicity" risk relied upon within the SIA remains appropriate.

Furthermore, whilst the SIA includes reference to management and mitigation of air quality, health and lead, the management and mitigation measures relevant to these specific matters are provided in full within the respective AQA and HHRA as well as the EIS and reference should be made to these documents. The proposed management and mitigation measures within these documents are considered best practice (see further discussion below).

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Living with on-going risks to health evident in the fact of regular testing for lead in soil and water.

Anxiety due to the risks to health particularly affecting young people and potentially realising that adverse health impacts had occurred.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

The SIA does not adequately assess the social implications for the residents of Lue of higher levels of air, soil and water contamination than the application indicates. Further, the applicant's experts may believe that likely levels are acceptable or low risk, but the monitoring regime to be put in place makes it clear that these estimates may turn out to be wrong. The SIA does not deal with the implications of this, namely that

i. the residents of Lue would be expected to live with uncertainty about pollution levels not only for the life of the mine but for the long term, and

ii. there is apparently no ready solution if higher levels of contamination are measured other than to seal residents in their houses via such devices as double glazing, air conditioning and regular flushing and cleaning of water supply.

These consequences and their social, psychological and financial costs would be borne primarily by residents.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

The risks posed to public health from dispersion of and exposure to lead and other toxic dusts, acid mine drainage and operational noise, amount to risks to the social viability of the village of Lue. This is because there is no safe level of exposure to lead.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

[17] Peer Review of AQA undertaken by ERM (2019). Peer Review of HHRA undertaken by Priestly Toxicology Consulting (2020).

Response

The following subsections respond to the above submissions through reference to the following subheadings relevant to the consideration of the social implications of health risks.

- Assessed Health Risks and Impacts
- Monitoring
- Management and Mitigation

It is acknowledged that there is uncertainty for some members of the community regarding the potential health risks of the Project, but it should be clear that the HHRA identifies no health risk issues of concern for the local community.

In addition, Bowdens Silver has been disappointed by the campaign run by some individuals and groups that oppose the Project and the spread of misinformation that has occurred. There is no doubt that the conflict between what is provided by these groups and the conclusions of technical assessment has contributed to the anxiety in the community and the understanding of the Project and its potential risks. This situation has been raised in some of the submissions received for the Project such as the following.

> *Disagree with bullying tactics from Action Group dividing the local community with their lies.* (Steve Battye of Lue, NSW - Submission SE-8691502).

Assessed Health Risks and Impacts

As noted above, the SIA has assessed the social implications for the predicted impacts to air, soil and water as specified within the EIS and supporting documentation. The SIA does not (and could not) assess the social implications for higher levels of impact suggested by assessments provided by LAG following completion of the SIA. It is also noted that the HHRA outcomes remain unchanged (following two peer reviews of the assessment).

Notwithstanding, the SIA records that impacts to health and wellbeing were key concerns raised during engagement across a range of stakeholder groups. For residents and landholders in the locality (including the proximal rural localities of Lue, Monivae, Pyangle, Bara and Havilah) the most frequently identified perceived social impacts in relation to the Project centred around the potential for contamination of air, water, and soil from lead exposure, and subsequent impacts on human health and wellbeing. In particular, concerns were raised regarding the potential impact to children in Lue attending the Lue Public School. The impacts of lead contamination on river systems, was also raised in relation to a potential for failure of the TSF on the Mine Site.

Given the level of stakeholder concern, impacts to health and wellbeing from exposure to lead in dust and water was rated as a high perceived stakeholder risk for proximal residents and landholders in the locality, highlighting community fears and uncertainty related to potential health risks associated with the Project. The SIA recognises that health concerns also relate to increased stress and anxiety that may be experienced by local residents, with mental health issues also noted by residents and landholders in the locality in relation to the Project. Respondents cited the uncertainty regarding the future of the Project and how the Project may impact on their quality of life, sense of community and rural lifestyle / amenity. This was identified as a moderate perceived impact by residents and landholders in the locality, based on the responses received.

Impacts to health and wellbeing, including mental and physical health, are also assessed in Section 7.3 of the SIA, again acknowledging the level of uncertainty expressed by residents in relation to health issues. Given the level of concern relating to health and wellbeing issues, a HHRA was required to be prepared by the SEARs for the Project and was undertaken as part of the broader EIS and an independent peer review of the HHRA was also completed. The HHRA assessed the potential for impacts as being low and specifically the HHRA concludes that "*no health risk issues of concern have been identified for the off-site community*". Consequently, given the outcomes of the HHRA, the impacts of air quality on human health have been ranked as a *low* social impact (based on the technical assessment undertaken by health experts).

The outcomes of the HHRA do not, however, reduce the level of concern voiced by some members of the community, with the SIA outlining that if the Project is approved, it is important for Bowdens Silver to further communicate with community stakeholders, in relation to the outcomes of the HHRA and the ongoing monitoring of lead in air and water (see discussion below on Monitoring).

Monitoring

In relation to monitoring, it is an inappropriate conclusion to suggest that proposing to undertake monitoring is an indication of the lack of confidence in the accuracy of the assessments. Furthermore, the statement that "*the residents of Lue would be expected to live with uncertainty about pollution levels…*" is contradictory to the submission's concerns about monitoring being proposed in the first place. It is considered much more likely that a lack of information and uncertainty about the extent of impacts that are actually occurring could be a significant contributor to community member's anxiety.

As such, the monitoring that is proposed to be undertaken to demonstrate that 'pollution' levels remain within acceptable limits is more likely to alleviate anxiety, particularly as summaries of the monitoring results would be regularly updated on the Bowdens Silver website and a review and discussion of the monitoring results would be publicly provided annually through the Annual Review process. The transparent communication and sharing of relevant data would be critical in reducing uncertainty and was a strategy identified during the engagement program with residents. Such communication strategies would be further articulated in the Social Impact Management Plan (SIMP) for the Project, should the Project be approved.

Management and Mitigation

In relation to adaptive management measures, a range of proactive management measures have been included within the assessments. For example, the use of a proactive air quality management system which would include real-time meteorological (including wind speed and direction) and air quality monitoring. The principles of real-time monitoring are well understood and include measures such as use of alerts from real-time monitoring stations that inform site personnel prior to an exceedance of the respective air quality criteria. This enables a swift response relevant to the activities being undertaken. Proactive air quality response examples are provided in Table 4.25 of the EIS. The cost of such management measures would be borne by the Applicant, not surrounding residents.

As the Project progresses, and with demonstrated compliance with relevant air and water quality criteria, the level of stress and anxiety regarding these matters would be expected to reduce. Notwithstanding, it is acknowledged that residual social and psychological effects would remain

for some residents. These residual mental health effects would be further mitigated through proposed support for health services as part of Bowden Silver's Community Investment Program. This and other management measures for mental health and the SIA's assessment of mental health impacts are provided in Section 7.3.2 of the SIA. Further discussion regarding mental health is also provided in EIS Section 4.8.8.

Representative Comment(s)

…although the Umwelt SIA appears to suggest that any adverse impacts would be limited to the life of the mine's operations (e.g. in its summary of physical health impacts[1]), this appears to be an unwarranted assumption. As a result, residents remaining in Lue would not be able to look forward to a cessation of impacts and this would add to the adverse impacts engendered by the Project.

1 Umwelt SIA Table 7.34 p 373 summarises the duration of social impacts arising from exposure to lead in dust and water as 'Mine life (approx. 16.5 years)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

Given that mine disturbances would be rehabilitated both progressively and then completed after mine closure, the physical health impacts for the surrounding community addressed in Table 7.34 of the SIA would be limited to the life of the mine. The basis for this being an unwarranted assumption are not explained within the submission.

Notwithstanding, it is noted that both the HHRA and Surface Water Assessment assess potential impacts far beyond the life of the mine. In particular, the Surface Water Assessment models the potential for outflows from the final void for a 500 year period, confirming nil outflows. The HHRA applies conservative assumptions for community exposure to the predicted dust / metal levels. For example, dust deposition to soil has been assumed to occur for 70 years (compared with 16.5 years) and it is the concentration in soil that occurs at the end of 70 years that has been used to calculate exposures.

As such, no health risk issues of concern have been identified for the off-site community either during or post completion of operations.

5.23.3 Sense of Community / Sense of Place – Community Sustainability

Representative Comment(s)

The township just will not survive.

(Name Withheld) of Hayes Gap, NSW (Submission SE-128115)

The likely social impact on the village of Lue, and residents of the suburb of Lue, of a silver, zinc and lead mine within 2km is a decline in the social viability of the village due to risks to health, noise and dust intrusions in daily life, loss of sense of place and amenity and population decline.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

These impacts are likely to detrimentally affect social cohesion in the village and potentially its social viability.

…there are no strategies to address the loss of sense of place that would result from this mine.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Please do not make Lue another GHOST TOWN.

Arthur Eno of Lue, NSW (Submission SE-127896)

For residents of Lue, the proposed mine would mean…

Loss of permanent residents despite the fall in property values.

Reduction in neighbourly cooperation and volunteering due to loss of permanent residents.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

The village of Lue represents a vibrant community and is a popular stop on the tourism trail connecting the towns of Mudgee, Rylstone and Kandos. Council has concerns for the future viability of the Lue village and the local primary school if any of the project impacts… contribute to a decline in liveability

Mid-Western Regional Council

Influx of migratory workforce, up to 80% during construction, has a high potential for negative social impact.

Agness Knapik of Carcalgong, NSW (Submissions SE-8652626)

We can't let the culture of the town be completely changed so that a private company can profit.

Justin Petersen of Roseville, NSW (Submission SE-8367895)

My friends will leave the village.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

I think it is a tragedy to see the small town in rural Australia being targeted by mining and these small towns becoming ghost towns as the mine takes over. Wollar and Bylong are classic examples.

Sam Broinowski of Mullamuddy, NSW (Submission SE-8626437)

…this project has already begun to divide our community and is destroying the friendly, welcoming nature of the local people. Even the strong holds like the Rural Fire Service, which I have been Senior Deputy Captain of for several years, is being destroyed due to the affects this proposal has already had on our community.

Carl Tubnor of Lue, NSW (Submission SE-8645238)

I've lived in Lue for 40 years, and have never seen such a disruption to divide the village.

(Name Withheld) of Lue, NSW (Submission SE-8757404)

There is a reduced feeling of community spirit in the area and as a direct result some find that attending the local hotel is no longer an enjoyable experience for them from the anxiety of the mine issue.

Lisa Tubnor of Lue, NSW (Submission SE-127672)

If the lead was to increase at a school like Lue Public school (sic) *it would be required to be shut down. This would be a devastating loss to the community and to the unique students who access this school.*

Mali Boller of Pyangle, NSW (Submissions SE-8514672)

Response

The above comments have been collated under the heading of sense of community / sense of place as they all refer to the sustainability of Lue and match with Bowdens Silver's objective to preserve the existing character of Lue. Bowdens Silver has already become an active community member and encourages its employees to contribute to the community wherever possible. This would continue and be expanded during operations. The Bowdens Silver Community Investment Program currently provides funding to local events, initiatives and sporting teams and the feedback to date has indicated the appreciation of the community for this involvement. Bowdens Silver has a clearly communicated objective to engage with the local community, to be involved in local initiatives and enhance liveability in Lue. It is anticipated that, as the mine develops (subject to approval), much of the anxiety felt by members of the community would dissipate as community members realise that the predictions made in the EIS are realistic and conservative.

Concerns regarding the viability and survival of Lue, changes to population and the community cohesion and culture are all addressed together in the following subsection. A key task of the SIA has been to identify and assess potential impacts associated with these matters and as noted in Section 5.32.2 of this response, information collected during engagement with the community has been considered in Project planning and a number of changes made to accommodate concerns held by some members of the community. It is important to also note the supportive commentary (presented in Section 4) that includes statements such as the following.

> *I feel the mine should be a great asset to Lue and surrounding areas for future prosperity* (Submission SE-8685129 from a resident of Lue)
>
> *It is a job opportunity for my children when they grow up and get in to the work force* (Name Withheld) of Lue, NSW - Submission SE-8655578)
>
> *Our towns need[s] this to be approved to help with our survival.* (Submission-SE-127727 from a resident of Rylstone).
>
> *Will keep our struggling businesses open to benefit locals and improve tourism* (Jo Brown of Breakfast Creek, NSW - Submission SE-8623533)
>
> *It is great for area and should be allowed to go ahead so that the region can live with some reasonable standards of living* (Tracy Boxsell of Rylstone, NSW – Submission SE-128167).

> *The Bowdens project stands to provide a much needed boost to the local economy, and the company to date has done a commendable job of ensuring that wherever possible, local businesses are engaged and given priority over non-local businesses* (Name Withheld) of Camboon, NSW – Submission SE-8407532)
>
> *The Mine will mean work for the local villages and towns. This will also mean more business / customers to the towns and villages.* (Deborah Ann Holla of Kandos, NSW – Submission SE-8603651)

It should be noted that division in the community has not been solely generated by Bowdens Silver, with many local supporters of the Project not comfortable including their names on submissions for fear of being stigmatised in the community. This is consistent with many applications of this nature where strong opinions are held both for and against a project.

Community Feedback

Concerns relating to community sustainability and viability of Lue, including a decline in population, were raised during the SIA engagement process. This impact has been considered as an impact on sense of community and is described in Section 6.3.3 of the SIA. During engagement, residents of Lue and its surrounds raised concerns that the Project may potentially change the nature of Lue – its character, culture, cohesion, sense of place and community.

Some residents also raised concerns that Lue's population may decline as a result of the presence of the Project, with references made to the recent experience in Wollar as a result of the presence of the Wilpinjong mine, owned by coal mining company Peabody Energy Inc. The approval of this development has resulted in Peabody Energy purchasing the majority of properties in the small hamlet of Wollar, with only four homes remaining privately-owned (see Table 5.4 and Section 6.3.3 of the SIA). Given the experience of the Wollar community, these concerns were particularly heightened in relation to the Bowdens Silver Project. Bowdens Silver has not and does not intend to take the same approach with Lue. There are properties that trigger acquisition and/or mitigation under the VLAMP but these properties are not within Lue. Bowdens Silver has acquired property to facilitate the mining Project but this has mostly involved rural properties outside of Lue.

Lue's existing sense of community was also perceived to be impacted as a result of the presence of the Project, either through people choosing to relocate out of the area, or as a result of the changing nature of the population that may ensue as a result of new people moving to Lue to take up employment (see Section 6.3.3 of the SIA). Some residents indicated that this had already started to occur with neighbours leaving the locality, due to Bowdens Silver proactively purchasing properties in the area.

In addition, fears relating to a loss of population and sense of community, and the erosion of local community networks, cohesion and sense of place, was ranked in the SIA as being of *high* concern for locality residents.

However, other stakeholders and regional community members highlighted that the Project may see a renewed sense of community for Lue and other towns in the LGA as a result of an increase in population and flow-on benefits to local businesses and services. These comments are reflected in Section 6.3.2 and 6.3.3 of the SIA and in the following comments in supportive submissions.

> *It will also bring money back into Rylstone, Kandos and stop shops closing and will put money back into the local economy and help support local businesses and families.* (Tony Schneider of Rylstone, NSW - Submission SE-8691508)
>
> *I support the project because I think it will boost the economy in Lue and the surrounding area by creating local jobs they have always sponsored local events and sporting teams and I would like to see more of this in the area as well as supporting local businesses.* (Cody Hulme of Lue, NSW - Submission SE-8361273)

Population Change

Changes to population are fundamental impacts which are assessed in a SIA, given that the size, diversity and behaviours of a community are underpinned by its population and characteristics. Population change (influx and outflux) is usually described as a first order social impact which has the potential to create second order social impacts, such as impacts on community infrastructure and services, changes in sense of community, social cohesion and community networks etc.

As discussed in Section 7.1 and 7.4 of the SIA, population change associated with the Project, and subsequent impacts on sense of place and community, may occur as a result of:

- an influx of construction workers (temporary impact during construction only);
- a new operational workforce (and their families) moving into the area (during operations of the Project); and
- acquisition of residential land in proximity to the proposed Project (permanent change).

The influx of the workforce is only likely to result in approximately a 1.0% population change in the Mid-Western Regional LGA (under the worst-case Scenario 1) for the construction workforce and approximately a 1.8% change for the operational workforce under the same Scenario (assuming that the operational workforce is more likely to move with families). While the Mine Site is located in close proximity to Lue, the lower levels of access to housing and temporary accommodation options, make it unlikely that a significant proportion of the workforce would be able to be housed in Lue itself. Therefore, the impact of population change, as a result of workforce influx, in the Lue locality has been ranked as a low social impact (refer to Section 7.1.1 and 7.1.2 of the SIA).

Section 7.1.3 of the SIA identifies that population change is likely to occur in Lue and surrounding localities as a result of the Project due to property acquisition. While the net population change due to the Project is not expected to be significant at the scale of the Mid-Western Regional LGA, this change still has the potential to result in changes to the existing sense of place due to the loss of some permanent residents within Lue and its surrounding rural localities. As a result, a range of management measures have been proposed (discussed below).

Community Volunteering

Community service providers engaged during the SIA raised concerns that the Project and the associated changes to the population could lead to a decrease in volunteering in the Lue area, as it was assumed that mine workers would live outside of the locality and would not participate in local activities including the RFS. Similarly, it was mentioned that mine workforce hours and rosters would limit the ability of workers to participate in these voluntary organisations (refer to Section 6.6.3 of the SIA).

Levels of participation in volunteering activities are higher for all study communities, and the LGA, compared with the NSW average. In Lue, 20% of those aged 15 years and over had spent time participating in voluntary work through an organisation or group over the preceding 12 months compared with 18% across NSW (ABS, 2016). Members of the Bowdens Project team are currently and are likely to continue to volunteer with the local RFS.

It is acknowledged that people involved in volunteer services in the region noted some difficulties in sourcing volunteers in emergency situations, especially during work hours. However, Bowdens Silver is also aware of the strong social cohesion that currently exists in the area and is a strong driver of volunteer participation. It is anticipated this would be improved by local procurement strategies and practices to encourage the mine workforce to reside locally.

Bowdens Silver is supportive of current and future volunteering efforts involving its staff and sees this as an important component of contributing to the local area.

Sense of Community and Lue Public School

Section 7.4 of the SIA outlines the predicted impacts that the Project may have on sense of community, social cohesion and sense of place as a result of population change. The SIA has identified that the Project has the potential to impact on sense of community for Lue (and surrounds) and this has been ranked as a high social impact.

As noted in Section 7.4 of the SIA, social impacts of mining are often experienced more acutely by those located in close proximity to the mining operation. While mining projects can result in significant positive economic benefits, the negative impacts experienced such as a reduction in sense of community, community cohesion and participation, due to population change and displacement over time, and increased Company ownership of land, need to be equally considered.

The SIA also identifies that the Lue Public School is considered by the community as an important asset to Lue and an important built feature within the Lue community (Section 5.4 of the SIA). During engagement for the SIA, participants noted concerns relating to the potential for the Project to impact on Lue's sense of community and, in particular, the school (see Section 6.3.3 of the SIA).

Some residents and landholders in the locality expressed concerns that the Project would cause parents to withdraw their children from the Lue Public School, due to its proximity to the Mine Site. However, others felt that the influx of operational workforce and their families to the region, may see further utilisation of Lue Public School, resulting in the need for additional classes and teaching staff. During engagement for the SIA, a representative of the Lue Public School stated they would welcome a growth in student numbers, should the operational workforce be situated close to the Mine Site and should workforce families choose to send their children to the local school (refer to Section 7.2.6 of the SIA). At the time of SIA reporting, only 11 of the 22 children at the school were resident in Lue itself. Since that time, the school has continued to grow and attract government funding based on that growth. This funding has been dedicated to extra support staff and other areas identified for improvement. This indicates that although the community is aware of a possible mining operation, enrolments have continued to grow. Bowdens Silver would proactively encourage families with school age children to move to the area to work in the mine and already leases properties owned by Bowdens Silver to families whose children attend the school. Bowdens Silver has maintained a positive relationship with the

Lue Public School throughout its involvement with the area and would continue to do so under approved operations. Support for Bowdens Silver's involvement at the Lue Public School is clearly expressed in submissions such as the following.

> *The mine supports the local Lue Public School which my three children attend. They are always helping us out with labour or funds to benefit the kids at the school* (Meredith Pennell of Camboon, NSW - Submission SE-8744762)

Impact on Tourism

Potential impacts upon tourism are discussed in Section 5.27 of this response document. In summary, given the Mine Site would not be visible from Lue and noise levels within Lue are predicted to remain below relevant noise criteria even under adverse meteorological conditions it is not anticipated that the Mine would result in any significant adverse impact on tourism. Furthermore, Bowdens Silver proposed to expand the existing Community Investment Program. Potential projects identified through engagement undertaken during the SIA include investment in heritage and tourism through funding of events, programs and further development of the heritage trail through the region.

Management of Impacts

As noted in the SIA Guideline (DPE, 2017), as part of the SIA, strategies need to be developed to demonstrate how significant social impacts are to be mitigated and benefits enhanced as part of the Project. Strategies to be implemented may differ in their effectiveness and/or ability to alleviate impacts, with some residual social impacts remaining. Certain measures may also collectively address a number of different negative social impacts and potentially enhance positive impacts.

In order to address the issues raised by the community relating to the perceived impacts on sense of community and sense of place, Bowdens Silver proposes to expand the existing Community Investment Program with a focus on Lue and other key communities in the Mid-Western Regional LGA (refer to Table 7.36 of the SIA). As discussed in Section 8 of the SIA, a key objective of the Community Investment Program would be to maintain sense of community, through enhancing Lue and its key community assets, including the Lue Public School and heritage buildings. This strategy attempts to incorporate some of the enhancement measures identified by the community through the SIA engagement program.

In addition, Bowdens Silver proposes to:

- lease back Bowdens Silver-owned properties to the community, where possible and has already been doing this successfully for a number of years;
- implement a range of mitigation measures under the Property Mitigation Program; and
- develop and implement a Social Impact Management Plan for the ongoing monitoring and management of social impacts.

The SIA has demonstrated an understanding of the nature of the communities in which the Project is located and has identified potential impacts of the Project on sense of community, cohesion, character, and sense of place (refer to Section 7.4.2 of the SIA). The existing Community Investment Program would be expanded during mine development and would provide opportunities to work with local community members to identify projects which may assist in facilitating a stronger sense of community throughout the life of the Project and beyond.

5.23.4 Social Amenity

Representative Comment(s)

The social impacts would arise as a consequence of risks to public health from dispersal of toxic chemicals, noise and loss of sense of place and visual amenity.

For residents of Lue, the proposed mine would mean…

Having to choose between tolerating unmitigated noise and dust and living in a fully closed (airconditioned) dwelling. (emphasis added)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

The SIA preparer appears to believe that people living in rural settings should keep their doors and windows closed during the day so that air conditioning and double glazing can have some effect on noise reduction.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

For residents of Lue, the proposed mine would mean…

Loss of many amenities of a rural way of life including home grown food, open windows, line clothes drying.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

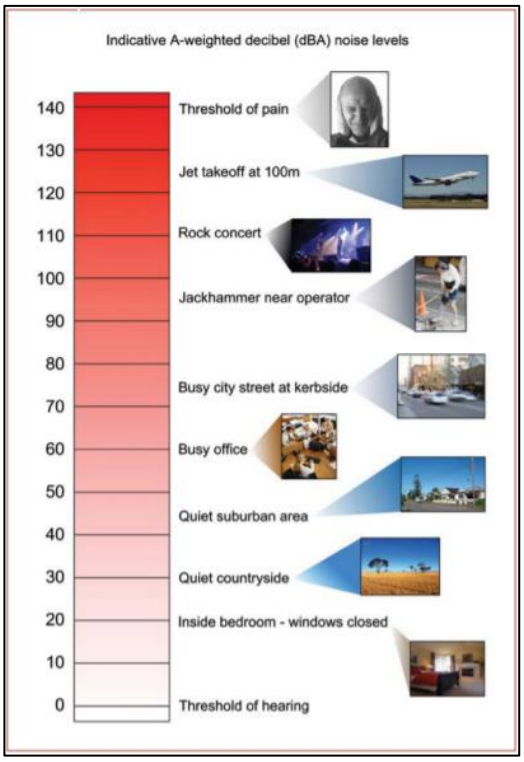
Response

Social Amenity - Noise

Local residents engaged as part of the SIA frequently identified concerns about impacts on social amenity as a result of potential noise from the operation including blasting noise and noise at night. Such impacts were perceived to be of particular concern given the rural nature of Lue and the existing peace and tranquillity highly valued by local residents (refer to Section 6.3.4 of the SIA). The impact of noise on health and wellbeing e.g. sleep quality was also raised. As a result, the perceived impact of noise on social amenity, for residents and landholders in the locality, was ranked as of high concern/sensitivity to locality residents.

The SIA draws on the assessment of noise and associated impacts that was undertaken as part of the EIS and in accordance with the Noise Policy for Industry (SLR, 2020).

To contextualise the outcomes of the noise assessment, noise levels were assessed at a total of 123 residences. Of these, 112 had no predicted exceedances of the relevant noise criteria, including under adverse meteorological conditions. For residents in Lue, no exceedances are predicted. It is acknowledged that the operations would be periodically audible external to residences typically within approximately 3km of the Mine Site. For the Lue Public School, the maximum noise levels within the classrooms during mine operations and under noise enhancing weather conditions would be 28dB(A) (Scenario 1), 26dB(A) (Scenario 2) and 22dB(A) (Scenario 3), i.e. well below the 35dB(A) internal criterion. The following diagram further places these sound levels in context.



Source: Noise Guide for Local Government (EPA, 2013)

As such, residents within Lue or students at Lue Public School would not need to keep their doors and windows closed at any time of day in order to mitigate noise.

However, as outlined in the noise assessment and EIS (see EIS Table 4.14) there remain 11 residences closer to the Mine Site, at which exceedances of the noise criteria at varying times and under certain climatic conditions during the Project life. Of these, one is located within the 'acquisition zone' (>5dB(A) exceedance), four are located within the marginal to moderate zone (up to 3 to 5dB(A) exceedances) and six are located within the negligible zone (up to 1 to 2dB(A) exceedances).

In accordance with the voluntary acquisition rights outlined in the government's VLAMP (2018), Bowdens Silver has offered to acquire the residence within the acquisition zone or to enter into a compensation agreement with the owner. Discussion with the owners within the marginal to moderate impact zone have continued and as noted in Section 4.2.2.5 of the EIS, these landowners have been offered mitigation measures that include installation or upgrading of air conditioning, double glazing, architectural treatments to improve insulation and financial subsidies for electricity costs. The architectural improvements required would be determined during an inspection of each residence by an acoustic specialist and experienced builder and would be tailored to that specific residence.

Whilst the VLAMP does not provide for landholders within the negligible impact zone to request noise mitigation works, Bowdens Silver has also offered to each of the six landowners within this zone that Bowdens Silver would enter into an agreement to install relevant mitigation measures by paying for an acoustic specialist and experienced builder to undertake an inspection of their residence to identify the most effective manner in which to reduce noise levels generated by the Project and to undertake nominated works once agreed by the landowner.

The HHRA also examined the health impacts of noise from the Project and has predicted that all noise levels during the day, evening and night, are considered below the health-based thresholds for any adverse health effects. Some minor exceedances, however, during worst-case meteorological conditions may occur at four properties. These properties have been identified in the noise assessment, with mitigation measures offered to these households to reduce noise levels to below the relevant thresholds.

As outlined in SIA Section 7.6.1, in order to minimise impacts on social amenity as a result of noise, Bowdens Silver has undertaken significant Project design changes and identified noise mitigation measures to further reduce potential noise impacts associated with the Project. These changes have also taken into consideration mitigation and enhancement strategies identified by stakeholders during consultation and engagement. Key Project design changes include the following.

- Relocation of the processing plant further north on the Mine Site, further away from Lue and at a lower elevation.
- Noise and visual barrier in the southern part of the Mine Site.
- Strategically placed barrier walls in proximity to noise sources at various locations.

Bowdens Silver would also offer acoustic treatments to residents in both marginal to moderate and negligible impact zones (as defined under the VLAMP).

In addition, as an acknowledgement of potential impacts on social amenity, Bowdens Silver would also offer these residents within the management zones:

- installation of first flush systems on rainwater tanks;
- cleaning of rainwater tanks once a year; and
- tree planting.

Bowdens Silver is also committed to trialling a Community Monitoring Diary, to better understand impacts on these local residents, after the Project commences (see Section 8.3 of the SIA).

Social Amenity – Dust/Air Quality

During the SIA, participants raised concerns relating to the impacts to social amenity and health and wellbeing as a result of dust from the Project. Project aspects considered to be the key determinants of dust included construction and operational activities, such as blasting, mining and transport of mineral concentrates (Section 6.3.1 of the SIA).

Dust issues were most commonly raised by residents and landholders residing in proximity to the Mine Site, with concerns relating to the potential dust impacts of the Project on their way of life, that is their ability to spend time outside and have their doors and windows open (see Section 6.3.1 and 6.3.4 of the SIA). There was also concern that potential lead contamination in dust could also impact on the quality of water in domestic water tanks, and in turn human health, due to run-off from rooftops. Additional stakeholders also raised concerns that the Project was an incompatible land use and would impact on rural residential lifestyle and agriculture. In particular it was mentioned that grazing animals and home grown produce could potentially become contaminated from dust from the Project (refer to Sections 6.3.1 and 6.3.9 of the SIA).

In the preparation of the SIA, the outcomes of the Air Quality Assessment were considered. The Air Quality Assessment predicts no air quality exceedances, including no exceedance of annual average TSP, PM_{10} and $PM_{2.5}$, maximum 24-hour average PM_{10} and $PM_{2.5}$, or dust deposition criteria at any privately-owned residences or receivers, either from the Project alone or cumulatively. Furthermore, no exceedances of the impact assessment criteria are predicted at any Project-related or private residences for metal dust concentrations, respirable crystalline silica or hydrogen cyanide.

In addition, the HHRA report has considered the potential for accumulation of metals in home-grown produce that may be consumed. In this regard, the HHRA did not identify any risks of concern for human health relating to this practice.

As such, residents should not need to shut doors and windows, cease growing home produce or drying their clothes on the line outside etc.

5.23.5 Visual Amenity

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Loss of sense of place and visual amenity.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

Visual impacts were raised as a concern by residents and landholders in the locality during engagement undertaken for the SIA. Participants in proximity to the Mine Site commented that they currently have 'great views' from their properties and that the Project had the potential to impact on their visual vista, changing the nature of their views of the landscape, with the additional potential for light spill from the Project at night. The impacts to visual amenity were of high concern to residents and landholders in the locality (refer to Section 6.3.4 of the SIA).

As outlined in Section 7.6.5 of the SIA, a visual impact assessment was conducted for the Project and concludes that the Project:

- would not be visible from Lue;
- would be visible from sections of Pyangle Road and Powells Road, and distant sections of Lue Road; and
- would be directly visible from six privately-owned residences (two of which are Project-related, having entered into agreements with Bowdens Silver) within approximately 5km of the Mine Site.

In addition, the visual impact assessment outlines a number of recommendations to mitigate the impacts on visual character and quality of the Mine Site, which include the following.

- Progressive construction and rehabilitation of the southern barrier and WRE, to limit the area of light-coloured material that would be visible from the public road network and affected local residences.
- Maximise retention of existing natural vegetation on the Mine Site.

- Protect and maintain areas of natural vegetation between the main open cut pit and crushing and processing area.
- Include in the Vegetation Management Plan, control of weeds and enhancement planting of buffers to the south of the processing plant, crusher/ROM pad and at the perimeter of the WRE, oxide ore stockpile and southern barrier.
- Continue and expand the existing buffer tree planting program.
- Adopt planting schedules that maximise the use of appropriate indigenous native tree and shrub species.
- Upgrade existing fencing of buffer plantings to rabbit-proof status and provide rabbit-proof fencing to new vegetation buffer areas, to ensure higher establishment rates and to control incidental damage to vegetation.
- Provide irrigation for at least two years to buffer plantings to assist in initial establishment.
- Re-plant or replace dead or unhealthy plants on a two-year cycle.
- Advance plant a permanent tree buffer to the east, south and southwest of the southern barrier and WRE.
- Paint buildings and structures within the Mine Site in appropriate colours to integrate them into existing view contexts.

Considering community values relating to rural amenity and visual amenity, the lighting and visual assessment outcomes and proposed mitigation measures, the visual amenity impact of the Project is assessed as having a high (mitigated) impact from six proximal residences (two of which are Project-related, having entered into agreements with Bowdens Silver) from which views of parts of the Mine Site would be visible and a low (mitigated) impact at other residences within the locality. The Project activities would not be visible from Lue and as such would not impact the visual amenity within Lue.

Impacts to sense of place are addressed in Section 5.23.3 above.

5.23.6 Livelihood – Decline in Property Values

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Anxiety due to loss of property values and inability to realise the previous capital value of homes and property because of the proximity of the mine.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

…the risk to property values arising from the proximity of a lead mine within 2 km of the village has not been given adequate consideration in the Umwelt SIA and as a result a significant social impact risk has not been adequately addressed.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

Concerns relating to decreasing property values, as a result of the Project, were also identified in Project consultation, as described in Section 6.3.8 of the SIA. Some community members were concerned that the value of their properties would be reduced as a result of the presence of the Project, making their homes more difficult to sell. Conversely, a small number of engagement participants felt that property prices in the area may increase as a direct result of the Project, due to a greater demand for housing in the area.

The SIA extensively assesses the impact on livelihood as a result of declining property values in Section 7.8.2 of the SIA. Furthermore, Section 5.5.4 of the Economic Assessment addresses the potential effects upon housing prices and property values.

In summary, the impact on housing and rental prices across the local area is expected to be positive but negligible. In relation to property values, there has been much conjecture about the impact of mines on surrounding property values but little rigorous study. Conceptually, if surrounding properties are likely to be impacted by noise, odour, vibration or visual impacts, then there would be some impact on property values, with the greatest impact on property values being felt by properties experiencing the greatest impacts from the Project. Where noise, dust, vibration, air, and visual impacts are contained, negligible impacts would be expected to occur.

As outlined in Section 5.23.5 and 5.23.6, no adverse air quality impacts are predicted at any surrounding private properties or residences. A total of 11 residences are predicted to experience varying degrees of noise exceedances at varying times and six residences within approximately 5km would have direct views of the Mine Site (of which two are also within the noise management zone). The owners of these properties have been offered a range of mitigation measures and/or compensation.

The Mine Site would not be visible from Lue and no noise or air quality exceedances are predicted within Lue. As such, these aspects would be unlikely to result in any significant effect on property values within Lue.

Bowdens Silver is not aware of any impacts to local property prices as a result of the proposal for the Mine or in direct response to the EIS and assessment outcomes. Conversely, there has been continued growth in prices (some substantial) which reflects the attractiveness of the local area even with the prospect of a well-managed mine commencing operations in the locality.

5.23.7 Voluntary Land Acquisition and Mitigation Policy (VLAMP)

Representative Comment(s)

These inadequately specified strategies fail to take account of the following:

- *The RVLAMP policy permits exceedances 'in the public interest' but does not address a situation in which there is no safe level of exposure.*
- *The RVLAMP system is designed to address problems which are predicted before construction commences, but it is unclear whether or how it applies to impacts which emerge when the reality of dust and water pollution become apparent – that is when the damage to health has already commenced.*

- *The RVLAMP policy does not provide landowners with a right to compensation where the predicted impacts of the development and/or where the effectiveness of relevant voluntary mitigations are disputed.*
- *The RVLAMP policy pits individual landowners against the might of a large mining company with which each landowner has to deal separately. A process in which a landowner must demonstrate to a mining company that the level of impact is unacceptable, and have the costs of doing so borne by the mining company, is uncertain[4] and these factors in themselves have adverse social consequences.*
- *The RVLAMP processes may take years[5] during which residents' health is damaged both physically and mentally due to the continuing erosion of the local community and its social infrastructures.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

This comment refers to perceived failings of the Voluntary Land Acquisition and Mitigation Policy (VLAMP) to argue that compensation applied under the policy is a flawed process and therefore does not properly account for the possible loss in land value associated with residual impacts from the Project.

The VLAMP recognises that, while mining and extractive industries are major contributors to the NSW economy:

> '*developments can have significant noise and dust impacts on surrounding communities, which may warrant comprehensive mitigation and management, including the application of voluntary land acquisition rights to landowners in some circumstances*' (DPIE 2018, 5).

The VLAMP goes on to note that:

> '*The NSW Government has established a range of policies and guidelines to guide the assessment of the potential impacts of mining, petroleum and extractive industry developments in NSW. These policies and guidelines include assessment criteria to protect the amenity, health and safety of people. They typically require applicants to implement all reasonable and feasible avoidance and/or mitigation measures to minimise the impacts of a development*' (DPIE 2018, 5).

The VLAMP states that voluntary mitigation or land acquisition should only be applied when the predicted impacts exceed the relevant criteria, and the consent authority is satisfied that the development is in the public interest and should be approved. Further, the VLAMP (2018: 5-6) states that:

> '*it is important to recognise that:*
>
> - *not all exceedances of the relevant assessment criteria equate to unacceptable impacts;*
> - *a consent authority may decide that it is in the public interest to allow the development to proceed, even though there would be exceedances of the relevant assessment criteria, because of the broader social and/or economic benefits of the development; and*

- *some landowners may be prepared to accept higher impacts on their land, subject to entering suitable negotiated agreements with applicants, which may include the payment of compensation'.*

As discussed in Section 5.23.5 above, for the Project, a total of 11 residences have predicted exceedances of noise criteria, of which one is located within the 'acquisition zone' for which VLAMP provides voluntary acquisition rights, four are located within the marginal to moderate zone for which VLAMP provides for voluntary mitigation. The remaining six are located within the negligible zone for which the VLAMP requires no specific measures. However, whilst not required to, Bowdens Silver has also offered to enter into an agreement with each of the six landowners to install relevant mitigation measures at their properties. The provisions of the VLAMP have not been triggered at any other properties.

Beyond the provisions of the VLAMP, should the Project be approved, the Development Consent would specify noise criteria which must be complied with. Furthermore, a range of conditions would be included providing for the following.

- Monthly reporting of monitoring results on the Bowdens Silver website and an Annual Review including a statement of compliance.
- Notification of both government agencies and landholders of any recorded criteria exceedances recorded for their property.
- The ability of landholders to request the Secretary of DPIE to independently review the impacts of the Project on their land if they consider the Project is exceeding the relevant criteria.
- A dispute resolution process.
- A regular (typically 3 yearly) independent environmental audit of the Project.

As such, ongoing monitoring and confirmation of compliance would occur via multiple processes and demonstrate that any exceedances are not occurring beyond those predicted and addressed through the VLAMP. Should an exceedance occur, a process for reporting and rectifying any further exceedance would be required. Furthermore, should landholders have concerns, in addition to a dispute resolution process, they may request an independent review at no financial cost to themselves.

Therefore, the VLAMP in and of itself is only one part of the regulatory process to protect the rights of landholders. Each of these measures is intended to ensure that the predictions made in assessment of projects such as this one are realistic. Should unexpected impacts occur post-approval and these cannot be managed through additional mitigation or design changes, the VLAMP would apply to those impacts.

The following is a response to the specific comments on the perceived flaws of the VLAMP.

- It is not the VLAMP that permits exceedances "in the public intertest". It is the decision of the consent authority that predicted exceedances under worst-case conditions and at levels described in the guideline are acceptable. Aside from the benefit of direct compensation, this approach acknowledges:
  - the broader social and/or economic benefits of some development;

  - the conservative nature of assessment and the application of reactive management; and
  - that compensation in accordance with the VLAMP is considered reasonable.

  Further, all "exposures" must be considered in determining if the Project is in the public interest. It is assumed this statement refers to erroneous assumptions or statements about the outcomes of assessment for the Project.

- There is nothing in the VLAMP that limits negotiated agreements being made post-approval in accordance with the policy. If exceedances have specific health implications, there are higher levels of regulation to be considered than the VLAMP in reviewing the possible implications (that is, forced shutdown or significant compliance penalties).
- The dispute resolution process is incorporated in the VLAMP to provide landowners with an avenue to dispute outcomes from negotiation or review of impacts. It permits the active involvement of an independent party to ensure practical and equitable outcomes. It is not intended to deny landowners mitigation or acquisition where it is due.
- The VLAMP does not provide for a stand-off between affected landowners and mining companies. The assessment of impact (monitoring) and the criteria against which the impact is considered is a scientific technical process. The VLAMP clearly provides for the rights of affected landowners and is not a tool by which developers may have a State-sanctioned impact (as is inferred by the submission).
- It is not clear what cases or examples have been relied upon in commenting that the VLAMP processes take years. The outcomes of assessment for a Project that triggers the policy are clearly stated in the development consent for the Project and must be implemented as a matter of compliance.

5.23.8 Post-mining land use and management

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Living with one or more of the following realisations, namely that:

- *Although the mine is proposed to operate for 15 years, the owner may apply to extend this – that is the end date cannot be relied on;*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

Section 2.13.3 of the EIS states the following.

> *"The Project life may be extended depending on the results of future exploration and drilling activities, particularly at depth beneath the main open cut pit. That said, the Feasibility Study for the Project indicates that the previously defined mineral resources beneath the main open cut pit do not contain sufficient mineral grades to warrant their extraction."*

If the proposed Project is approved, any changes to the life of mine or extent of mining would be subject to an additional development application and assessment process in accordance with legislative requirements. Whilst a future expansion may exacerbate final landform impacts, it could also provide a positive impact on intergenerational equity in the form of sustained employment and community investment.

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Living with one or more of the following realisations, namely that:

- *There appears to be no mechanism to ensure that the residential areas of Lue are fully protected from lead particles;*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

This matter has been addressed extensively in Sections 5.5, 5.12, 5.15 and 5.23.3 of this response document. In summary, no exceedances of lead (or other metals) concentration criteria are predicted at any surrounding residences and no adverse health impacts are predicted. A range of proactive and reactive management measures and monitoring are also proposed.

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Living with one or more of the following realisations, namely that:

- *There appears to be no effective mechanism to ensure that once extraction ceases the pit is fully rehabilitated;*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

A conceptual mine closure plan has been developed as part of the EIS which provides for a sustainable land use plan and rehabilitation for the mine; with opportunities for alternative land uses to be considered. Preparation of a conceptual closure plan from the onset of the Project provides assurance that the bulk of the Mine Site would, at a minimum, be returned to a sustainable land use, to ensure that future generations are not left with any significant environmental costs associated with the Project.

There are multiple mechanisms that would ensure that rehabilitation occurs. Specifically, prior to commencement of operations, a Mining Operations Plan / Rehabilitation Management Plan & Forward Plan would need to be prepared. These documents specify both the progression of rehabilitation (consistent with the EIS) and performance indicators / completion criteria against which the success of rehabilitation is to be measured and progress reported annually. The required rehabilitation works must also be costed through a Rehabilitation Cost Estimate and this cost secured through a bank guarantee in favour of the NSW Government. Rehabilitation must be completed as agreed before the bank guarantee may be relinquished (and effectively returned to Bowdens Silver). As such, there can be high confidence that progressive rehabilitation would be undertaken to the required standard.

Representative Comment(s)

For residents of Lue, the proposed mine would mean…

Living with one or more of the following realisations, namely that:

- *There appears to be no means of ensuring that after the proposed 15 years of operation, the village will be a safe place for people and especially young people, to live.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

The principal concern raised appears to be one of potential contamination of Lue, for example, by lead or other metals contained within dust or water. As discussed in Section 5.23.3, both the HHRA and Surface Water Assessment assess potential impacts far beyond the operational life of the mine and no health risk issues of concern have been identified for the Lue community either during or post completion of operations.

5.23.9 Inter and Intra-generational Equity

Representative Comment(s)

Why should the short term economic benefit of a few have such a significant negative impact on a whole community that has lived in this area for generations and intend to do so for generations to come?

Sophie Hamilton of Rylstone, NSW (Submission SE-8634552)

No mention of intra-generational or distributional equity. The proposed future mitigations are merely a set of possible ideas not a mitigation.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

Section 6.1.3.4 of the EIS provides discussion regarding social equity including inter-generational equity (between generations) and intra-generational (within a generation) equity. In summary, the Project would be consistent with the principles of intra-generational equity as the economic benefits would be experienced throughout Australia, NSW, and within the local community including Lue, Rylstone, Kandos and Mudgee, as well as for individuals employed within the Mine Site. The significant economic benefits to the Mid-Western Regional LGA, NSW and nationally through the payment of taxes, royalties and wages would also provide funding for the development of local infrastructure and services that would be a direct benefit to future generations.

Support for the inter-generational benefits of the Project is expressed in submissions that comment on the opportunities for youth and for training.

> *The mine supports the local Lue Public School which my three children attend. They are always helping us out with labour or funds to benefit the kids at the school.* (Meredith Pennell of Camboon, NSW - Submission SE-8744762).

> *Employees sourced locally will in put money back into this area, keep family dynamics' as a whole, maintain Schools, Health and help and most importantly help Close the Gap with the Indigenous in our Area.* (Patricia Ridley of Kandos, NSW - Submission SE-8605538)

Despite the proposed management and mitigation measures, it is recognised that local residents would principally bear the residual negative costs of the Project. Therefore, as outlined in the EIS and the SIA, measures such as the Community Investment Program and aspects of the Planning Agreement that would be entered into with Mid-Western Regional Council would maximise the local distribution of benefits. Individual landowners have also been consulted on predicted outcomes and where appropriate, offered compensation or contingency measures in the event of unacceptable changes to their environment. The residual environmental impacts of the Project are predicted not to be prolonged such that they may represent an unacceptable cost to future generations.

In relation to mitigation measures being merely a set of possible ideas, the proposed mitigation measures outlined within the EIS would be required to be complied with via the mandatory requirements specified within the Development Consent. The Development Consent would also condition the preparation of various management plans that require review by relevant government agencies and approval by DPIE. The Bowdens Silver Community Investment Program is established and operates successfully throughout the local communities.

5.23.10 Community Services

Representative Comment(s)

If the NSW Government is to approve the Bowden Onslaught, they must ask themselves if they have budgeted for the necessary increase in Police, Schools, Medical Facilities, Sewerage, Water and many more utilities that we take for granted but will not be able to survive the onslaught of Bowdens employees.

(Name Withheld) of Camboon, NSW (Submission SE-8499300)

Response

Section 7.2 of the SIA provides an assessment of potential impacts to community services. In summary, there is a low risk that the Project would result in significant population change within key communities in the Mid-Western Regional LGA such that there would be additional pressure on local community facilities and services. Notwithstanding, Bowdens Silver has committed to a range of mitigation and enhancement strategies to reduce any impacts of population change as a result of the Project and subsequent impacts to access to and use of community services. These include:

- support for the appointment of a general practitioner or medical officer on a contract basis;
- sponsorship and support for community and youth events;
- provision of Company-owned properties for community rental (where possible); and
- local training and employment opportunities.

Notwithstanding the above, many submissions supporting the Project shared a different view to this opposing submission. Many feel that projects such as this are vital to ensuring that the services remain available to communities and noted that the improved infrastructure that are components of the Project would have extended benefits.

> *The project will create more jobs and increase infrastructure in the area and be good for the regional community and boost much needed resources to the area* (Name Withheld of Sydney, NSW - Submission SE-8405614)
>
> *It will be great to see an updated road in that part of our region and will be an asset for continued tourism* (William Murphy of Cooks Gap, NSW – Submission SE-8502472).

5.23.11 Coverage of Social Impacts in Lue

Representative Comment(s)

A SIA…principally addresses impacts on the MWRLGA as a whole rather than the suburb of Lue which is within the LGA and 2-3 km from the Project site.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

A recurring feature of this SIA… is a failure to see Lue as a discrete social entity with intrinsic social and cultural value.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Fails to identify the distributional inequity in what is proposed. Unclear on what basis SIA then concludes the 'perceived stakeholder ranking is considered a moderate positive impact for locality residents.' The assessment seems to refer entirely to the region not to Lue (p422) and to disregard the divide in local community opinion noted in Table 7.61 p425

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

The *Social Impact Assessment Guideline for State significant mining, petroleum production and extractive industry development* (the SIA Guideline) states the following.

> *Social impacts from resource projects are rarely fully contained within the immediate surroundings of the project or local community. Supply chains, haulage of resources, transport of goods, materials and equipment, and the movement of workers (including fly-in-fly-out and drive-in-drive-out working arrangements) will often result in social impacts being spatially and/or temporally dispersed.* (DPIE 2017, 17)
>
> *The EP&A Act requires the consent authority to give consideration to social impacts in the locality when considering the likely impacts of a proposed development. The term 'locality' does not have a prescribed meaning or refer to a fixed, pre-defined geographic boundary. Rather, the scale of the locality should be construed on a case-by-case basis, having regard to the nature of the proposed development and its impacts. Social impacts in and beyond the project's locality, both positive and negative, may also be relevant to the consent authority's consideration of the public interest and the suitability of the site for the project.* (DPE 2017, 18).

Given the above, the locality in closest proximity to the Project is defined in the SIA as Lue and the surrounding rural localities of Pyangle, Monivae, Havilah and Bara (refer to Section 3.6 of the SIA). These geographic localities (as defined by the Australian Bureau of Statistics (ABS)) are those located most proximal to the Mine Site.

In the SIA, the terms 'residents and landholders in the locality' or 'locality residents' are used to denote communities (of place) in closest proximity to the Project (further described in the 'Commonly Used Acronyms and Terms' section of the SIA). In the SIA, when considering community concerns relating to the Project (SIA Section 6.3), and the assessment of social impacts (SIA Section 7), social data obtained for these localities (through engagement and secondary data review) has been analysed and considered collectively. In predicting social impacts associated with the Project, impacts on relevant stakeholders/target groups have also been considered, with local residents and residents that may be located within potential acquisition and management zones, clearly identified as those likely to experience a greater level/magnitude of impact as a result of the Project.

Section 5.14 of the SIA outlines the historical development of Lue. In addition, this section provides context of the key community assets and values identified by local residents that reside in Lue itself or in the proximal rural localities surrounding the Mine Site. 69 residents and landholders from Lue and surrounding localities were interviewed in Round 1 engagement for the SIA, with 60 participating in Round 2. The following quotes provide some examples of the values identified (refer to Sections 5.7 and 5.9.1 of the SIA)

> *We pull together when we need to. We can call anyone if we need a chat or help.*
>
> *It's a friendly place if you are willing to go out of your way and participate. There's a community feel where we barter with others (e.g. with sheep).*
>
> *We enjoy the tranquillity and privacy of Lue. It's a good community and it's good knowing everyone.*
>
> *A good community where everyone pitches in to help people. Although we're close, I also enjoy that we mind our own business.*
>
> *People look after the town [Lue].*
>
> *If push comes to shove you can rely on people here.*
>
> *It's quiet and peaceful.*
>
> *Tranquillity - A good lifestyle, fresh air, and natural beauty.*
>
> *It's quiet and peaceful, a beautiful little place.*

Other communities are profiled and discussed in the SIA, this is not to indicate that the level of impact would be comparable to that which may be experienced in Lue and surrounding localities, but to indicate the Project's wider social area of influence, and to identify other stakeholders that may be impacted (both positively and negatively) as a result of the Project's presence within the locality and the broader region. For example, the major towns in the LGA would benefit from employment and procurement from the Project, while those residents living in closer proximity to the Mine Site are more likely to also experience direct impacts relating to the Project.

In Section 7 of the SIA, the impacts on local residents are assessed separately to the impacts that relate to the regional community. This has been undertaken to highlight that impacts (positive and negative) would not be evenly distributed across the LGA, with stakeholders experiencing

varying degrees of impact depending upon their location and circumstance. Table 7.64 of the SIA identifies the extent of the impact and the affected parties. There are some instances where the impact is only assessed at the regional level. These include:

- impacts of the construction workforce on access and use of community services (including housing and accommodation; health; emergency; youth and recreation and public utilities); and
- impact of operational workforce on access to, and use of, community services (including housing and accommodation; childcare services; health; emergency; education and training services; youth and recreation and public utilities).

The above impacts were assessed at an LGA level due to the potential influx of workforce associated with the Project to the region. Given limited accommodation options and community services available within Lue, the impact on services more broadly within the region has been assessed. However, it is acknowledged that a small number of housing blocks (11 lots at the time of SIA reporting) may be available to house the Project workforce within Lue itself, with the potential for workforce families to access the local Lue Public School, potentially increasing student numbers.

Therefore, the SIA has recognised Lue and neighbouring proximal localities as discrete social entities, identified the values of these residents, and considered the impact of the Project to Lue and broader region.

In relation to the query on the basis for concluding the perceived stakeholder ranking being a moderate positive impact for locality residents, this applies to employment, procurement of local business and community investment. The positive economic benefits, including at a local scale, were raised extensively during the SIA engagement program (as summarised in Section 6.3.2 of the SIA) and in many of supportive submissions such as the following (discussed in detail in Section 4).

> *I hope to gain employment, also it will create more jobs, which will bring more money to our little town.* (Stephen Hulme of Lue, NSW – Submission SE-8609293)

> *Job creation, financial boost to our local community. Will keep our struggling business open to benefit locals and improve tourism.* (Jo Brown of Breakfast Creek, NSW – Submission SE-8623533)

5.23.12 Identification of Social Impacts

Representative Comment(s)

The basis for selecting these five social impact factors is unclear…

- *Population change;*
- *Community infrastructure and services;*
- *Social amenity;*
- *Health and wellbeing; and*
- *Sense of community*

There then follows a long list of social impact issues (itemised in Table 1 below). This list is different to previous lists and runs to more than 100 pages (pp 316-428). In short, this approach to identifying social impact issues results in several lists but fails to identify the critical issues at stake with this Project.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

Section 7 of the SIA outlines the process for assessing and ranking the social impacts identified in relation to the Project, with the aim of determining anticipated changes to the current baseline social environment as a result of the Project proceeding.

The SIA Guideline outlines a range of social impact categories that are to be considered in identifying and predicting the social impacts of a project on relevant stakeholder groups. The SIA subsequently identifies the following social impact themes as being of direct relevance to the Project, as identified through engagement with key stakeholders in the early phases of the SIA program. These social impact themes include:

- Population change;
- Health and wellbeing;
- Sense of place and community;
- Engagement and decision making;
- Impacts on surroundings and social amenity;
- Access to and use of ecosystem services (including water access and use);
- Livelihood impacts and personal and property rights; and
- Community culture and heritage.

In addition, the impact of the Project on community services, while not raised by the community as a salient impact of the Project, is also considered a social impact theme of direct relevance to the Project given the likely workforce population influx that may occur should the Project be approved.

Each of these nine social impact factors / themes are then further considered under respective sub-headings in Section 7 of the SIA (not a "*long list*"). Potential impacts relating to each of these themes have then been further assessed and their significance evaluated considering, who is expected to be affected (including their level of concern relating to the impact), the timing in the Project that such an impact may be experienced, the extent, duration, severity and sensitivity of the impact, and the consequence of the potential social impact and its likelihood of occurring. Where relevant, consequence definitions have been provided to assist this evaluation (refer to Table 7.2 of the SIA).

This process is in line with the approach proposed in the SIA Guideline which states the following.

> *In relation to the evaluation of social risk, the definitions and scale assigned to each of the likelihood and consequence categories need to be relevant to the impact that is being evaluated, explained and justified in the SIA component of the EIS. For example, for consequences to human health and safety, 'catastrophic' may be classified as an impact that results in fatality, while 'minimal' may be classified as*

> *an impact that results in no injury. Where possible, the consequence scale should be based on established measures and standards. As a starting point, the Australia New Zealand standard on risk management provides a generic guide for managing risk, which can be adapted and applied to a social impact context. The SIA component of the EIS should explain and justify the logic, evidence and assumptions used to complete the evaluation for each negative social impact.* (DPE 2017, 42)

As is clearly highlighted in the SIA, social amenity and sense of place and community impacts were seen to most likely affect local residents residing in Lue and its surrounding rural localities.

Furthermore, the outcomes of the assessment for each of these themes have then been used to inform the Project assessment and planning process and resulted in a number of significant changes/refinements to the Project design from the Project previously proposed, including the following.

- Reduction to 30 million tonnes of ore / low grade ore and 47 million tonnes of waste rock;
- Reduction in processing to 2 million tonnes per annum of ore;
- Lower water requirements averaging 1.9 GL per year;
- New water supply pipeline proposed from the Ulan Coalfield;
- No major water storage required on site;
- Relocation of the processing plant further north, away from Lue;
- No worker accommodation on site;
- Tailings Storage Facility located to the west, capacity of 30 million tonnes; and
- New road access to the west of Lue, resulting in no concentrate transportation through Lue or Rylstone.

As such, the process has been effective at identifying issues of concern to the community and informing Project planning to avoid and/or minimise issues of concern and which issues require further consideration as part of ongoing management.

Representative Comment(s)

The matters for assessment in the SIA seem to have been derived from perceived community concerns. The section of the SIA reporting perceived community concerns runs for 102 pages (pp 213-315). These perceived concerns are reported as a list of 27 items (as shown in Table 1) presented in no apparent order. While perceptions are important and it is necessary for an SIA preparer to understand them, an SIA should relate community perceptions to the empirical facts of the matter and, where possible, research findings in comparable circumstances, so as to be able to assess their import and significance. This requires the preparer to identify the social impacts which matter and to investigate these. In my opinion this has not been done.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

SIA is an approach to predicting and assessing the likely consequences of a proposed action in social terms and developing options and opportunities to improve social outcomes. Best practice SIA is participatory and involves understanding impacts from the perspectives of those involved in a personal, community, social or cultural sense, to provide a complete picture of potential impacts, their context and meaning (Ross, 1992).

The SIA for the Project has identified the social impacts that matter to different stakeholder groups, through engagement with a range of stakeholders, in the early stages and throughout the SIA program. This engagement has asked stakeholders to consider what they perceive as the positive and negative impacts of the Project (refer to SIA Section 3.6 and 3.7 for methodology and number of stakeholder consulted) with the outcomes of this engagement presented in SIA Section 6. SIA Figure 6.1 provides a summary of the frequency of the perceived impacts as identified through engagement with key stakeholders, and in doing so provides an indication of the level of importance of each impact theme to the varying stakeholder groups consulted. This prioritisation is then used to inform the impacts to be further assessed, alongside other social impacts of relevance to the Project, in SIA Section 7. For instance, the impacts on local services such as accommodation, health, education etc, as a result of a potential influx in construction and operational workforces associated with the Project, was not considered a very salient social impact in the scoping phase of the Project, however, this is a key social impact that has been assessed in the SIA report.

In addition, the SIA has drawn on a range of secondary data to inform the development of the social baseline and to provide a basis for the assessment and evaluation of impacts. This baseline work has utilised data from a range of sources that addresses the scale and nature of the Project, stakeholders likely to be affected, values and aspirations of key stakeholders, natural and built features, demographic, social and cultural trends, previous development in the locality and related projects and local history. For example:

- Section 5.5 of the SIA draws on existing projects in the region to develop an understanding of the process of social change and communities' response to this change. For example, there has been the closure of Cement Australia's project at Kandos, the Charbon Coal Mine and the Sibelco Mining operation in Tallawang. KEPCO's Bylong Coal Project was not yet determined at the time the SIA was completed but has since been refused approval and may not proceed. Conversely, the Peabody Energy Wilpinjong Coal Mine Extension project has commenced operations.
- Section 7.4 of the SIA draws on case studies of recent major projects in NSW where loss of sense of community has been highlighted as a critical social impact of proposed project development. For example, Peabody Energy's Wilpinjong Coal Mine, KEPCO's Bylong Coal Project and Gloucester Resources Limited's (GRL) Rocky Hill Coal Mine.
- Section 7.3.1.2 of the SIA discusses further case studies of other metalliferous mines including those located at Mount Isa, Queensland and Cadia Valley Operations, NSW, highlighting health concerns relating to these projects and differences/similarities with the Project.

In Section 7 of the SIA, the evaluation of social impacts has drawn on both community perceptions as provided through engagement for the SIA as well as a range of other data sources including outcomes of the EIS studies for the Project and social baseline data.

As such, the SIA has identified the social impacts that matter to the community, has used secondary data and research conducted on similar projects, and used Project specific data from the studies for the EIS to inform the matters to be assessed within the SIA and to support the assessment outcomes.

5.23.13 Social Impact Mitigation Measures

Representative Comment(s)

Scrutiny of the *121 'community needs and potential mitigation/enhancement strategies'… reveals that they are generalised ideas, lacking specificity or tangibility* and is*…best described as a wish list rather than a commitment by Bowdens Silver to key actions which will protect local residents from the adverse impacts on health and social wellbeing which they clearly envisage.*

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

The SIA identifies key community needs and potential mitigation strategies that have been raised by community members during engagement and through a review of social data. Table 8.2 of the SIA provides a summary of these strategies to address perceived Project impacts. As noted in the relevant parts of SIA Section 7, a number of these strategies have been agreed to by Bowdens Silver and are incorporated in the proposed suite of mitigation and enhancement strategies to be implemented, should the Project proceed. The environmental and socio-economic measures that have been committed to are summarised in Section 5 of the EIS.

In addition, Bowdens Silver has committed to a process to manage social impacts. These include the development of the following strategies and programs should the Project be approved.

- Expansion of the Community Investment Program that already provides substantial investment in community programs.
- Property mitigation program in accordance with (and broader than) the requirements of the VLAMP.
- Good neighbour program.
- Local employment and procurement strategy.

These programs and strategies would be prepared in consultation with the community and key stakeholders, and further detail would be provided in a dedicated Social Impact Management Plan for the Project in the event it is approved.

Representative Comment(s)

There is no commitment to deliver the potential mitigation. Further, the proposed expenditures are short term and fail to consider the future of the village when the mine is exhausted or abandoned.

There are no strategies to address the loss of sense of place that would result from this mine.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

As outlined in SIA Section 8.2, Bowdens Silver is proposing to expand the existing Community Investment Program, to enhance positive outcomes of the Project and mitigate (to the extent possible) the predicted negative impacts of the Project. A key objective of the Community Investment Program would be to invest in long-term community outcomes in Lue and townships within the region, that contribute to community sustainability.

Overall, the objectives of the Community Investment Program include:

- Working collaboratively with near residents/landholders and key stakeholders to develop environmental and community benefits for the Lue, Rylstone, Kandos, Mudgee Gulgong and surrounding localities;
- Facilitating enhancement initiatives specifically for those residents living in closest proximity to the Mine Site;
- Developing projects and programs that are consistent with community needs, values and aspirations; and
- Contributing to local communities and better targeting investment locally while continuing to support a range of existing community partnerships.

Given that impacts to sense of community (including sense of place) were identified as key matters of concern, both the Community Investment Program and the Social Impact Management Plan would address this impact where possible and ensure continued investment in the community, with community engagement.

5.24 SURFACE WATER

5.24.1 Overview

This subsection provides responses to submissions that raised matters concerning:

- water resources of Lawsons Creek;
- access to water and water quality risks, reflecting the rural nature of surroundings and the likelihood of local residents relying on surface water to drink, water stock or irrigate and for recreation;
- the proposed management of surface water resources within the Mine Site and how this may result in external impacts;
- the inputs to the surface water assessment including stream flow, rainfall (climate change) and some assumptions used for assessment; and
- potential risk from flooding, reflecting past exposure to flooding in the local area.

Bowdens Silver commissioned WRM Water + Environment Pty Ltd to undertake a comprehensive Surface Water Assessment that is referenced as “WRM, 2020”. This assessment was commissioned to consider the potential impacts of the Project on downstream water quality, water availability, flooding, Mine Site water management and water demand. Further to this, Bowdens Silver commissioned Hydro Engineering & Consulting Pty Ltd to independently peer review the modelling and results of WRM (2020) (HEC, 2020). HEC (2020) concluded that the assessment of surface water related impacts was fit for purpose.

WRM's assessment utilised site-specific data, best practice methods and modelling approaches to characterise and predict the response of the local and regional surface water system to the Project. The peer-reviewed assessment (WRM, 2020) confirmed that the Project would not increase the risk of flooding on neighbouring landowners nor would it pose a risk to water quality as modelling of the proposed water management system demonstrates it would have sufficient capacity to retain and manage runoff from areas disturbed by Project-related activities. Whilst WRM (2020) predicted the Project would marginally reduce downstream flows via the interception and retention of runoff within the Mine Site during operations, most of this reduction would be reversed post-closure as rehabilitated catchments are re-instated and allowed to discharge. Any loss of downstream flow would not increase the overall demand on local water resources as all Project-related demand would be accounted for using existing rights and entitlements.

Whilst the following responses to a range of representative comments provide further clarification and information where necessary, there are no changes to the following findings of WRM (2020).

- The prevailing hydrologic regime, including the local and regional catchment response to rainfall has been established and verified using sub-regional rainfall and gauge data.
- The Project would not increase demand on available water resources and would not significantly reduce access to, or availability for downstream water users.
- The Project is legally entitled to water resources greater than that predicted to be lost from the system as the result of the Project.
- The proposed water management system, encompassing the TSF, WRE, leachate management dam and processing area dams can retain all runoff in the containment zone based on modelling of historic rainfall and runoff conditions.
- The Project would not significantly impact downstream water quality.
- The Project would not lead to flooding of neighbouring properties.

Bowdens Silver has confidence in the data collected to date, the surface water assessment undertaken by WRM (2020) and the proposed industry best practice design and management measures. In order to provide the community and the regulators with confidence in the outcomes and proposed management, the surface water assessment was subject to detailed peer review by HEC (2020) and further scrutiny by the EPA, DPIE Water and the public. It is reiterated that the proposed monitoring, reporting and auditing commitments and requirements for the Project would ensure that management is scrutinised and regulated throughout the Project life.

5.24.2 Lawsons Creek Streamflow

Representative Comment(s)

The streamflow of Lawson creek is grossly overestimated…The data used for estimating Lawson creek streamflow was from the Cudgegong River above Rylstone. There is no similarity in rainfall, vegetation or geological issues...this is highly inappropriate.

Lyn Coombe of Lue, NSW (Submission SE-8621920)

Does the Cudgegong River Upstream of Rylstone gauge (station 421184) have a similar catchment area, geology, and soils as the local catchments to the site? Not clear why this gauge provides suitable data to be used at the site. (Section 3.5.3)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The approach adopted by WRM to characterise streamflow in Lawsons Creek is considered current industry best practice, fit for purpose and appropriate.

The parameters adopted for WRM's modelling of Lawsons Creek streamflow (and Mine Site runoff), were tested and ultimately selected based on a calibration that used data collected at the Cudgegong River (Upstream of Rylstone) streamflow gauge (421184).

Section 3.5.3 of WRM (2020) notes that, in the absence of site-specific long-term data (i.e. stream gauge data) to characterise Lawsons Creek streamflow in the vicinity of the Mine Site, the Australian Water Balance Model (AWBM) approach was adopted.

The AWBM is a widely accepted and used method in Australia to simulate rainfall and runoff relationships in ungauged catchments. While there are published recommended values for the AWBM parameters, the best practice approach is to calibrate the parameters to real data from similar catchments.

There are few other gauges with long-term streamflow records within 100km of the Mine Site and this gauge, approximately 21km southeast of the Mine Site, is the closest NSW government streamflow gauge to the Mine Site. As shown on **Figure 5.9**, a comparison of monthly rainfalls over the same period identifies similar monthly totals with an R^2 value of 0.93 that shows a strong correlation between the gauge and Mine Site rainfall data. In addition, the Cudgegong River and Lawsons Creek catchments are adjacent, have similar shapes, elevations and land uses with a summary of catchment characteristics provided in **Table 5.21**. Of note is the similarity in slope, elevation and land-use which all influence the catchment response to rainfall. Both catchments are also broadly comprised of similar geology (sedimentary uplands with floodplains of Quaternary alluvium).

Whilst parts of the upper Mine Site catchments are steeper and have shallower soils than much of the Cudgegong River catchment, it could be argued that in these areas, runoff rates might be higher than indicated by the Cudgegong River gauge record. However, it should be noted that the water management system has been configured to ensure undisturbed areas are diverted away from active mining areas and make up only a proportion of the land use areas. Notwithstanding, the sensitivity of the water management system response to higher rates of runoff from undisturbed areas was tested under the High Runoff Scenario. Under this scenario, average annual runoff rates from undisturbed areas were increased by a factor of 2.8 from the base case.

Furthermore, the AWBM model and impact assessment prepared by WRM was subjected to a peer review, by Hydro Engineering & Consulting Pty Ltd (HEC, 2020). HEC (2020) concluded that the assessment (and AWBM) was fit for purpose. It is also important to note that no NSW Government regulatory agency has questioned the approach taken by WRM.

Therefore, Bowdens Silver maintains that the approach adopted by WRM to characterise streamflow in Lawsons Creek is current industry best practice, fit for purpose and appropriate.

Figure 5.9 Monthly Mine Site and Cudgegong PPD Rainfall Comparison

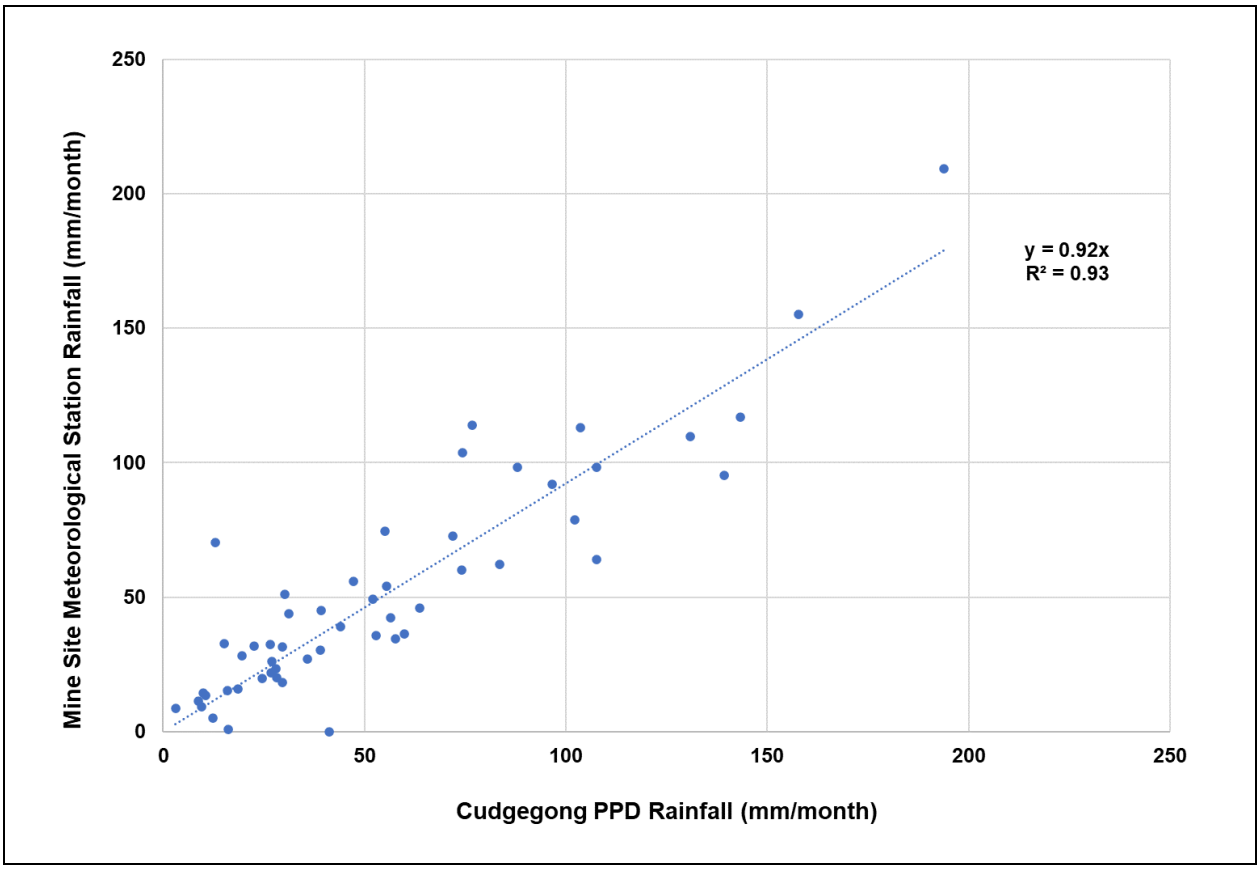


Table 5.21
Cudgegong River and Lawsons Creek Catchment Characteristics

Attribute	Cudgegong River to Gauge	Lawsons Creek to Hawkins Creek
Catchment Area (km^2)	511	222
Catchment Slope (%)	0.85	1.1
Catchment Length (km)	32km	20km
Catchment Width (km)	22km	12.5km
Length:Width (ratio)	1.5	1.6
Land-use (approximate %)		
Rural/urban	19	24
Minimal use	81	76
Elevation (mAHD)	590-865	560-780

Representative Comment(s)

The EIS states that the Lawsons Creek flow rate is at 1 Megalitre/day 81% of the time. I find this very hard to believe. How did they come to this figure?

The EIS has consultants using modelling for inflows into Lawsons Creek, based on the flow rates of the upper reaches of the Cudgeegong (sic) *River. The headwaters of the Cudgeegong* (sic) *River are to the east of Rylstone where it is subject to easterly rainfall events and receives a very different amount of rain compared to the head of Lawsons Creek. One is a creek and one is a river.*

William Brown of Breakfast Creek, NSW (Submission SE-8630760)

Response

EIS Section 4.7.2.4 states that modelled Lawsons Creek flows, downstream of Walkers Creek, exceed 1ML/day 81% of the time. This text was based on WRM's AWBM streamflow modelling for Lawsons Creek that is described in Section 8.5 and graphically presented in Figure 8.3 of WRM (2020). Based on the results of WRM's AWBM modelling, average flows in Lawsons Creek, downstream of Hawkins Creek, are approximately 19.5ML/day (see EIS Section 4.7.2.4 and Section 3.5.2.2 of WRM (2020)).

As noted above, no gauge data is available for Lawsons Creek and the AWBM model for the Project was therefore calibrated using gauge data from the nearby Cudgegong River (Gauge ID 421184). The Cudgegong River and Lawsons Creek catchments are adjacent, have similar shapes, elevations and broadly comprise similar geology (sedimentary uplands with floodplains of Quaternary alluvium) and land use (forested uplands and cleared pasture in the lowlands). The Lawsons Creek catchment is approximately 222 km^2, which is of a similar order of magnitude to the gauged catchment.

As stated above, Bowdens Silver considers the approach adopted by WRM to characterise streamflow in Lawsons Creek is current industry best practice, fit for purpose and appropriate.

Representative Comment(s)

It is unclear why some of the local gauge data, that could provide data for the analysis, was not used in the assessment. The outcomes from the assessment provides average runoff rates that are 60% of the average regional runoff rates published by WaterNSW.

Data from only one of the two Hawkins Creek flow gauges data used in the assessment. This data was subsequently not used nor compared to in runoff estimates. No explanation as to why only one gauge is reviewed. (Section 3.5.1)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

As described in Section 3.5.3 of WRM (2020), no long-term data was available to characterise Hawkins Creek and Lawsons Creek streamflow, or Mine Site runoff. Subsequently, catchment yields were derived from a peer-reviewed AWBM model calibrated to data collected at the Cudgegong River upstream of Rylstone streamflow gauge (421184) operated by WaterNSW. This gauge is approximately 21km southeast of the Mine Site and located within a catchment with similar attributes to that of Lawsons Creek.

Hawkins Creek stream gauge (Powells Road and Bingmans Crossing) data was not used as:

- there are no rainfall stations located within the Hawkins Creek catchment upstream of the Mine Site; and
- the streamflow data captures a 4-year period of records, an insufficient timeframe to calibrate a catchment yield model used to generate extended streamflow timeseries.

In addition, the Powells Road gauge was not used for daily flow analysis because the record included long periods when the sensor did not register low flows which were evident in the Bingmans Crossing gauge record. This may have been due to problems with the sensor or due to low flows bypassing around the measuring weir.

However, data from both Hawkins Creek gauges was used for the flood assessment (see Annexure B of WRM (2020)) whereby high flow data was used to validate the results of hydrological modelling. The results of this validation are provided in Annexure B Section 4.4.2 (WRM, 2020) and include figures comparing recorded and modelled peak discharge hydrographs for the three validation events using both the Powells Road and Bingmans Crossing stations.

Representative Comment(s)

I am concerned that creek flows mentioned in the EIS are overstated. The period of measurement in 2017 is not representative of water availability for modelling.

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

It is unclear as to the reference *"the period of measurement in 2017"*. In the absence of site-specific long-term data in Hawkins Creek and Lawsons Creek, the peer-reviewed AWBM model was used to represent the runoff characteristics of local catchments. The period utilised for the AWBM was between 27/06/2009 to 30/12/2017. This data was collected from WaterNSW's gauge on the Cudgegong River, upstream of Rylstone (gauge ID 421184).

As shown above, this dataset encompasses a period greater than a single year.

Representative Comment(s)

No clear method for analysis of flows in each creek system and how these have been estimated – no reference to the local gauging. No recorded or modelled flow duration curves. No estimate of "dry days" for each creek system provided. (Section 3.5.2)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

As noted above, the nearest streamflow gauge with a long and reliable period of record, is on the Cudgegong River upstream of Rylstone. Data from this gauge was used to characterise streamflow in the nearby creek systems. Figure 3.9 of WRM (2020) presents the frequency curve for recorded flows in the Cudgegong River, which indicates that "dry days" (with runoff less than 0.0001 mm/d) occur about 4% of the time (15 days per year) on average.

Representative Comment(s)

No analysis of effects on Hawkins Creek streamflow or other tributaries. No discussion of potential impact of the project on dry days in the creek systems or impacts on cease to pump triggers. (Figure 8.3 – Location C)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Section 8.4.2 and specifically Table 8.1 of WRM (2020) presents information on potential streamflow losses as the result of the Project. Any potential impacts would be limited to certain sections of relevant watercourses, namely a 3.5km section of Hawkins Creek extending upstream from its confluence with Lawsons Creek. During operations (i.e. maximum catchment loss), this section of Hawkins Creek would experience streamflow losses up to 86.2ML/year. Whilst this

represents a 4.4% loss from the 1 958ML/year mean annual streamflow, losses would reduce post-closure as catchments would be largely re-instated following rehabilitation activities. This notwithstanding, it is noted there are no licensed water users within this section of Hawkins Creek that is almost entirely within Bowdens Silver's landholding.

With respect to Lawsons Creek, which has registered water users downstream of the Mine Site who may be subjected to cease to pump rules, Table 8.1, Section 8.5 and Figure 8.3 of WRM (2020) present the results of the assessment of streamflow loss. The maximum predicted streamflow loss in Lawsons Creek (188.3ML/year) represents 2.2% of the 8 735ML/year mean annual streamflow.

Lawsons Creek flow below 0.1ML/day was assumed to represent the cease to flow condition. The peer-reviewed modelling undertaken by WRM predicted the Project would increase the annual frequency of low flow conditions from 9.8% to 10.4% of the time (i.e. 2 days per year increase on average).

Of the maximum predicted 188.3ML/year streamflow losses, 139ML/year would be accounted for by WALs with Bowdens Silver also entitled to construct harvestable rights dams with a combined capacity up to 141.1ML. Subsequently, the predicted streamflow losses are well below the bounds of Bowdens Silver's licensed and permissible entitlements.

No other tributaries were assessed as their flow condition was considered ephemeral and thus not reliable water sources for licensed water users.

5.24.3 Surface Water Availability

Representative Comment(s)

Of the existing 76 dams on the site 25 dams are to be removed, leaving 51 dams totalling 33.3ML. Based on a Maximum Harvestable Right Dam Capacity of 141.1ML from a 2016ha landholding 107.8ML of dam capacity will remain. Additional dams can therefore be constructed where appropriate.

DPIE – Water and NRAR

Response

Bowdens Silver acknowledges this comment and would further assess requirements for additional water storages under maximum harvestable rights provisions as the Project progresses.

Representative Comment(s)

I have a 69 megalitre unmetered water licence and pay an annual levy to retain this licence, I am yet to irrigate from what is already a creek system under significant stress…the regular extraction of significant volumes of water from Lawson Creek (and/or its catchment area) pose an unacceptably high risk to all the various forms of agriculture along the length of the Creek.

Stewart McNeill, NSW (Submission SE-8639822)

In the summer of 2019/2020, we were unable to utilise a single litre of our 77 megalitre Water Access License from the Lawson Creek simply because there was no water to pump.

Jack White of Havilah, NSW (Submission SE-8643209)

Response

Bowdens Silver recognises the significant importance placed on water resources by agricultural users and the broader community, of which it is a part. The Project would result in a maximum 550ha reduction of the Lawsons Creek catchment. This area represents 2.1% of the 272km^2 Lawsons Creek catchment area (downstream of Walkers Creek). Based on the results of the peer-reviewed water balance model, management of site water to intercept runoff generated on catchments disturbed by mining activities (e.g. the TSF) would reduce flows (on average) by 177ML/year (refer Section 8.2.1 of WRM (2020)). In addition, the peer-reviewed groundwater model (Jacobs, 2021), predicted that baseflow (groundwater) contribution to flow in Hawkins and Lawsons Creeks would be reduced by a maximum 12.9ML/year as the result of open cut pit development.

In response to this, Bowdens Silver would utilise the following permissible approach, that is open to all prospective users of water resources, namely:

- externally source water via a water supply pipeline;
- obtain the requisite licensing and volumetric entitlements for water resources unavoidably "taken" from the Lawsons Creek water source of the Macquarie-Cudgegong Unregulated and Alluvial Water Sources as the result of the Project; and
- exercise its basic landholder rights regarding the permissible capture of runoff on its land.

In accordance with relevant NSW legislation, regulations and policies, Bowdens Silver is required to secure volumetric entitlements and water access licences (WALs) for the water "take" from the Lawsons Creek water source as the result of runoff intercepted by the TSF and the baseflow loss. These required volumetric entitlements, total 135.9ML/year and are as follows:

- 123ML/year for the TSF (as it is on a third order stream); and
- 12.9ML/year for the maximum predicted loss of Lawsons Creek baseflow during operations from open cut pit development.

Bowdens Silver has secured WALs thus licensing the "take" of water from the Lawsons Creek water source entitling it to 139ML/year, which is more than sufficient to cover the volumes identified above. These entitlements have been sourced from existing WALs issued for the Lawsons Creek water source.

In addition, as a landholder, Bowdens Silver is permitted to collect a proportion of the runoff on its property for storage in one or more dams, up to a certain size, without requiring a WAL. This is known as the 'harvestable right'. As noted by NRAR (see above), based on its 2 016ha landholding and using the permissible harvestable rights multiplier of 0.07ML/ha, Bowdens Silver is entitled to harvestable rights dams with a capacity of 141.1ML.

In summary, the Project would not create additional demand on the Lawsons Creek water source greater than that currently available to all authorised and licensed users nor does it pose an unacceptably high risk to agricultural activities in the Lawsons Creek catchment.

Representative Comment(s)

We have farmed this country for five generations, producing fine wool, beef and fat lambs. We rely on Lawson Creek for all our stock and domestic water as we have a five kilometre frontage to the Lawson Creek…

After mining begins, the level of water in the Creek will drop by one metre which will mean in dry times we will have no water…

Bowdens proposes to take more water from the Lawson Creek catchment than all the existing Lawson water users.

Elizabeth White of Paddington, NSW (Submission SE-8484710)

Response

Water levels in Lawsons Creek are not predicted to decrease by 1m. This may be a misinterpretation of the 50-year post mining residual groundwater drawdown (see EIS Figure 4.6.5) predicted by the peer-reviewed groundwater modelling (Jacobs, 2021) which does intersect minor reaches of Lawsons Creek. However, as noted in EIS Section 4.6.7.3, predicted drawdown would result in a maximum 0.024ML/day reduction of Lawsons Creek baseflow. As noted above, the maximum impact of the Project on water availability to downstream users would be negligible.

A review of the NSW Water Register identifies 48 WALs with volumetric entitlements totalling 1 496ML have been issued for the Lawsons Creek water source in the current water year (2020 – 2021). This volume significantly exceeds Bowdens Silver's predicted 188ML/year "take" that is fully accounted for under current NSW regulatory arrangements.

Representative Comment(s)

Nobody has ever extracted the quantity of water the mine is going to use from the Lawson Creek so we just don't know what the consequences of taking 5 megalitres a day are going to be.

(Name Withheld) of Stony Creek, NSW (Submission SE-8601366)

The business has a 60 megalitre water licence attached to Lawsons Creek to provide water for haymaking, cropping and cattle production. Due to the resent drier seasons water from these sources has been unreliable and will be even more so when Bowdens commence using the proposed 2050 Megalitres of water each year including 780 Megalitres of water from Lawsons Creek.

Stephanie Gordon of Milroy, NSW (Submission SE-8609819)

This will severely affect the hydrology of the Lawson Creek and threaten the community below the site who rely on this water for themselves and livestock for not only the life of the mine but for at least 100 years while the drawdown continues into the mining pit.

Julie Reynolds of Cassilis, NSW (Submission SE-8620539)

the creek is our life line as it is for many others up and down stream, to take 5 mega litres of water from that catchment everyday I feel is determental (sic) *to my operation*

Harry White of Mudgee, NSW (Submission SE-127413)

Our creek will dry up to a few ponds because they plan to take an average of 806 million litres of rainfall and runoff every year, all the rainfall and runoff from their site.

(Name Withheld) of Budgee Budgee, NSW (Submission SE-8400061)

Response

The Project would not take 5ML/day, 780ML/year or 806ML/year of water from Lawsons Creek. As shown on Table 8.1 of WRM (2020), approximately the estimated peak impact of the Project on mean annual Lawsons Creek streamflow would be 188ML/year.

This flow reduction represents 2.2% of the 8 735ML/year mean annual Lawsons Creek flow at the measured point (downstream of Walkers Creek confluence). Following closure and rehabilitation activities that would reinstate catchment areas, the predicted reduction would be 0.4%.

Figure 8.3 of WRM (2020) presents the impact of catchment reduction associated with the Project on Lawsons Creek flow frequency at the measured point. This figure was prepared using outputs from the peer-reviewed maximum disturbance, pre and post-mining AWBM models.

Figure 8.3 of WRM (2020) shows that flows greater than 1ML/day (approximately 12L/s):

- currently occur about 81.0% of the time; and
- would occur approximately 80.5% of the time during peak catchment reduction from Project disturbance.

This reduced frequency equates to 2 days per year on average.

Similarly, the Project's impact on cease-to-flow periods would be minimal, with flows greater than 0.1ML/day reducing in frequency from 90.2% to 89.8% of the time during operations, and 89.6% of the time after decommissioning (WRM, 2020).

Furthermore, due to catchment contributions from other tributaries, the relative impact of predicted flow reduction would significantly diminish with increasing distance downstream. Therefore, the maximum impact of the Project on water availability to downstream users would be negligible.

5.24.4 Water Quality

Representative Comment(s)

The EIS does not address the SEAR requirements relating to the water quality monitoring program and response management plan.

The EIS does *however document that (Section 1.8.2) that the Water Management Plan (yet to be developed) would provide details of the Water Quality Monitoring Program and Trigger Action Response Plans.*

The EPA notes that the EIS does not adopt a guideline value for iron and cobalt.

NSW Environment Protection Authority

Response

Section 4.7.6 of the EIS and Sections 9.2 and 9.3 of WRM (2020) discuss the surface water monitoring program that would build upon the substantial dataset collected as part of Bowdens Silver's current ambient water quality monitoring program. In addition, these sections identify that trigger action response plans would be developed as part of an approved Water Management Plan. This plan would be prepared by Bowdens Silver and in consultation with DPIE, DPIE Water and the NSW EPA.

It is noted that neither DPIE Water, BCD nor the ANZ Guidelines provide any freshwater guideline values for cobalt or iron. Bowdens Silver currently monitors water quality at various locations in Hawkins and Lawsons Creeks and has built an extensive dataset that may be used to derive site specific trigger values for these analytes that are representative of the location condition.

Representative Comment(s)

This toxic mess will get into Lawson Creek then flow on to Mudgee and into the Cudgegong River devastating the water supply to countless families, livestock, wildlife and vegetation right through the area - not to mention ruining the wine industry too!

Nicole Hendy of Hayes Gap, NSW (Submission SE-8358931)

All the water in Lue and the creek will be acidified and undrinkable.

(Name Withheld) of Budgee Budgee, NSW (Submission SE-8400061)

The assessment of any changes to the quality of water is ignored.

B. Wannan of Lue, NSW (Submission SE-8654059)

The creek is also a source of water for our swimming pool and a favorite (sic) *place for recreational activities in summer.*

Catherine McNeill of Mount Knowles, NSW (Submission SE-8482164)

Response

As described in EIS Section 4.7.5.4, potentially contaminated water would be retained within the Mine Site (containment zone) and prevented from entering the downstream environment where it could have adverse impacts on water quality.

Assessment of the Mine Site water management system's ability to retain all water in the containment zone (including the TSF) was undertaken by WRM using a peer-reviewed GoldSIM model. The results of this assessment identified that all water in the containment zone could be contained on the Mine Site without release to the receiving environment (refer Section 5.7 of WRM (2020)).

In addition, all catchments with potentially sediment-laden runoff (i.e. those not containing exposed, potentially reactive material), would have this runoff directed to suitably designed sediment dams for containment and treatment before release to receiving waters. This release would only occur after testing to ensure any discharge is of suitable quality.

Furthermore, the assessment of human health risks (EnRiskS, 2021) concluded that there would be no health risks of concern for the Lue community as a result of changes to surface water or groundwater quality associated with the Project.

Subsequently, Project-related quality impacts to surface water and groundwater resources would be negligible.

Representative Comment(s)

Historical water quality data appears to be influenced by, for some analytes, most readings being below the LOR. The LOR exacerbates this, in some analytes, being set not low enough. Hence a lot of historical data has had to be discarded from the analysis. This produces water quality ranges in the local creeks and samples that are statistically higher than they would be if either a lower LOR was selected or samples at <LOR were included using the LOR value. (Section 2.5.2 – Annexure A Watercourse Assessment)

Lue Action Group, NSW (Submission SE-8654995)

Response

The laboratory limit of reporting (LOR) for analysing samples was determined by the NATA accredited analytical laboratory. Whilst Bowdens Silver recognises the LOR influences statistics, the selected LOR were below the trigger values for aquatic ecosystem protection identified in water quality guidance (e.g. ANZG 2019) and therefore suitable for characterising water quality.

Representative Comment(s)

Geochem NAF water quality exceeds creek 80th percentile and ANZECC guidelines. How is this to be managed?

Where is Corkery review Section 4.4.1.2 (page 6-56) – on what basis was this made?

Lue Action Group, NSW (Submission SE-8654995)

Response

Bowdens Silver recognises that the information presented in Table 4.1 of WRM (2020) shows that in, some instances, the median values derived from NAF waste rock leachates exceed background water quality statistics or guidelines. However, the median NAF water quality values were derived from a program that used laboratory-controlled columns to assess NAF waste rock weathering behaviour over time (see Section 3 of Graham Campbell and Associates (GCA 2020)). The testing program for a given column ceased once steady time trends in the leachate analyses were established. As noted in EIS Section 4.7.5.4, the measured metal concentrations in leachates generated under these conditions can overestimate expected runoff concentrations under site conditions. This is due to the near-complete elution (removal) of solutes from the column sample and significantly reduced dilution rates.

The review referred to in the submission is provided in Section 3, Annexure A of WRM (2020). This section presents the results of analyses conducted on NAF waste rock leachate collected at the end of the kinetic testing program (refer Table 20). This report also presents the results of leachate testing undertaken on stream sediments collected in the vicinity of surface water monitoring locations from Hawkins Creek and Lawsons Creek (Section 2.5.3, Table 19). These results are considered more comparable with the analyses being conducted on samples subjected

to reduced rates of dilution. As noted in Section 3.3.2, Annexure A of WRM (2020), the results of stream sediments and NAF waste rock leachate analyses are generally within a similar range. This suggests that any runoff from NAF waste rock utilised for progressive development/construction would be of similar quality to that of runoff presently entering Hawkins and Lawsons Creeks.

Notwithstanding this, geochemical testing remains ongoing to inform detailed design of infrastructure for the management of runoff from areas where NAF waste rock is placed, either for construction or stockpiled. Should this testing program determine that NAF waste rock runoff must be retained to ensure downstream water quality is not impaired, sufficient storage capacity would be provided to minimise the likelihood of discharge.

As noted in EIS Section 4.7.5.4, should retention be required, the proposed design criteria would be the 5% AEP 72 hour design storm using a volumetric runoff coefficient of 0.75 (equivalent to 1.2 ML/ha). Sediment storage zones, equivalent to 50% of the water storage capacity would also be provided within each dam. Pumping infrastructure would be provided to enable the water to be transferred into the containment system within 5 days.

5.24.5 Water Balance

Representative Comment(s)

We recommend the low runoff value be clarified given recent drought conditions. This is a critical element for the site water balance as rainfall runoff is the most significant water source in terms of volume for the three climate scenarios modelled. A significant reduction is likely to have implications to the projects water supply which may result in increased reliance on external water supplies.

DPIE – Water and NRAR

Response

The low runoff scenario water balance model was revised to test the sensitivity of the site water balance to further reductions in the rate of surface water runoff. The revised runoff parameters, results and discussion are provided in Section 3.4. In summary, the revised modelling further reduced runoff from the modelled catchment by between 9% and 24% when compared with modelled average annual runoff.

Whilst low rainfall would reduce water availability, the proposed external water supply would be more than sufficient to supply demands of this magnitude. Subsequently, the impact of reduced runoff on maximum water supply requirements (which are largely independent of the contribution of site runoff) is minor.

Representative Comment(s)

Stating that the majority of 'outflow' is stored in tailings in the average mine water balance should be clarified.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Section 5.2.1 of WRM (2020) describes the inflows and outflows associated with the processing plant. The tailings slurry stream sent from the processing plant for deposition within the TSF would be approximately 56% solids by weight. Accordingly, based on the 2Mt per annum throughput, the largest 'outflow' of water from the processing plant would be the tailings slurry stream (i.e. 4.23 ML/day).

WRM (2020) also identifies that approximately 25% of the moisture entrained within the tailings slurry stream would be released soon after deposition within the TSF (initial bleed), as the deposited tailings consolidate from a 56% w/w solids slurry to a settled solids content of 62.8% w/w. This means that approximately 1.05ML/day would report to the TSF decant pond whilst the remaining 3.18 ML/day would be "stored" as retained tailings moisture within interstitial pores with some lost to evaporation.

Representative Comment(s)

Figure 5.2 shows no established rehabilitation throughout the project life. Contrary to project aims of releasing water to downstream when of suitable water quality.

It is unclear if this the same approach as for the modelled water balance calculations.

Does this mean there are longer period of impacts?

Does this mean there will be higher external water demands if rehabilitated and discharged offsite (if suitable water quality is achieved)?

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Figure 5.2 of WRM (2020) notes the assumption that the capped layer would be revegetated and runoff suitable for release after 5 years. However, the water balance conservatively assumed all runoff from the capped layer would be captured on site, thus ensuring any nominated dam would be suitably sized.

Once runoff is suitable for release, the Project's impact on runoff interception would reduce as these contributing catchments are re-instated.

Any reduction in runoff interception would not create a water supply shortfall, as the Project proposes to obtain water from other sources (e.g. water contained within containment zone dams, groundwater inflows or externally via the water supply pipeline).

Representative Comment(s)

Why is average annual increase in stored volume 40 ML/yr for low runoff and 41 ML/yr for baseline runoff.

Data predicts that the site is unable to maintain neutral balance over the life of the mine water balance scenario for the average conditions. How is the surplus water storage proposed to be managed? (Section 5.7)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The average increase in stored volume is the retained water in storage once outflows and inflows (including external supply) have been accounted for in the preceding period whether wet or dry. This retained volume is carried forward in the water balance to maintain water supply through subsequent periods.

Under all scenarios, there is an accumulation of stored volume predicted during later years that remains on site at the end of operations. The volumes stored at the end of operations under the base case and low runoff scenarios are similar, resulting in similar average annual increases in stored volume. The numbers stated (i.e. 40 ML/year and 41 ML/year) represent the overall increase in stored volume over the Project Life, and the difference is insignificant compared to the other changes to the water balance.

5.24.6 Climate Data

Representative Comment(s)

I am concerned that the risks of local flooding at the mine site are not adequately considered. I am concerned that this may lead to a breach of the tailings dam into Lawsons Creek.

The highest daily rainfall event I have seen was 225 mm in 12 hours in February 2003. This caused record high water levels in Lawson Creek.

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

It is recognised that high intensity rainfall events may occur during the life of the Project. Consequently, Bowdens Silver would require that all Mine Site infrastructure requiring engineering design (i.e. the TSF) adopt design criteria and methods (e.g. rainfall estimation) that reflect contemporary industry and engineering best practice. This means that all design criteria and their resultant requirements, including storm storage would be subject to further detailed assessment during the final design phase of the TSF.

All dams such as the TSF must be designed and operated with sufficient freeboard to retain the nominated design rainfall (flood) event (storm storage allowance). In the unlikely event that the storm storage allowance is exceeded via rare high rainfall events, the dam design must provide for a means to safely pass any discharge (i.e. a spillway), without causing damage to the dam (i.e. embankment failure). The storm storage allowance is effectively the volume between the maximum operating pond level and the spillway invert level that is maintained for the storage of an extreme rainfall event. By keeping this volume available, the risk of discharge from the TSF via the spillway is reduced.

Section 12.2 of ATC Williams (2020) presents the adopted storm storage allowance design criteria for the Bowdens Silver TSF. It is noted that the adopted design storm is the most stringent for a TSF with a ‘High C’ consequence category. The preliminary design levels of the TSF embankment crest and spillway invert (refer Table 16 of ATC Williams (2020)) and the timing of embankment raises were then established using the results of the site water balance model prepared by WRM (refer Section 5 of WRM (2020)) and the required storm storage allowance.

It is noted that TSF embankment raises are timed to ensure the storm storage allowance is always maintained. This means that for much of the TSF's operational life, the volume available for storm storage is greater than required.

An assessment of the Mine Site water management system capacity to retain all water in the containment zone (including the TSF) was undertaken by WRM using the GoldSIM model. The results of this assessment are provided in Section 5.5 and Table 5.7 of WRM (2020) and identify that all water in the containment zone can be contained without release under the modelled historic climate conditions.

Representative Comment(s)

Also it is concerning that the EIS despite being lodged in May 2020 doesn't record last year's 'record' drought year where our Lue property annual rainfall for 2019 was a total of 260mm, (we recorded 383.5mm in 2018 and 462.25 mm in 2017)

ACN 059 643 533 Pty Limited of Lue, NSW (Submission SE-8654532)

Response

Bowdens Silver acknowledges that the EIS was lodged in May 2020. However, the assessments commissioned by Bowdens Silver for the EIS, required significant lead time (i.e. >2 years) and effort to fully consider potential impacts according to current best practice. Therefore, they were substantially completed in 2019. For the AWBM, WRM (2020) utilised daily rainfall data from 1889 to 2018 that was sourced from the Scientific Information for Landowners (SILO) database (refer Section 3.2 of WRM (2020)). Whilst it is noted that 2019 was a year of very low rainfall, the period between 1938 and 1940 (total rainfall of only 1 291mm) which was included in the AWBM, was drier than that between 2017 and 2019 (1 340mm). WRM (2020) considered the 130-year SILO rainfall dataset appropriate to capture any historical variation in regional rainfall and thus suitable for assessing potential surface water impacts. WRM's position was also supported by the independent peer review of WRM's assessment (HEC, 2020).

Representative Comment

Meteorology analysis does not consider how the Mudgee rainfall over the period of analysis compares to same period of Lue Mine site data. Is there a more local station with long term records closer to Lue? Can the same gauge be used as used for the Cudgegong streamflow data? Should the long-term data for Rylstone (Ilford Street, Station 062026) be considered?

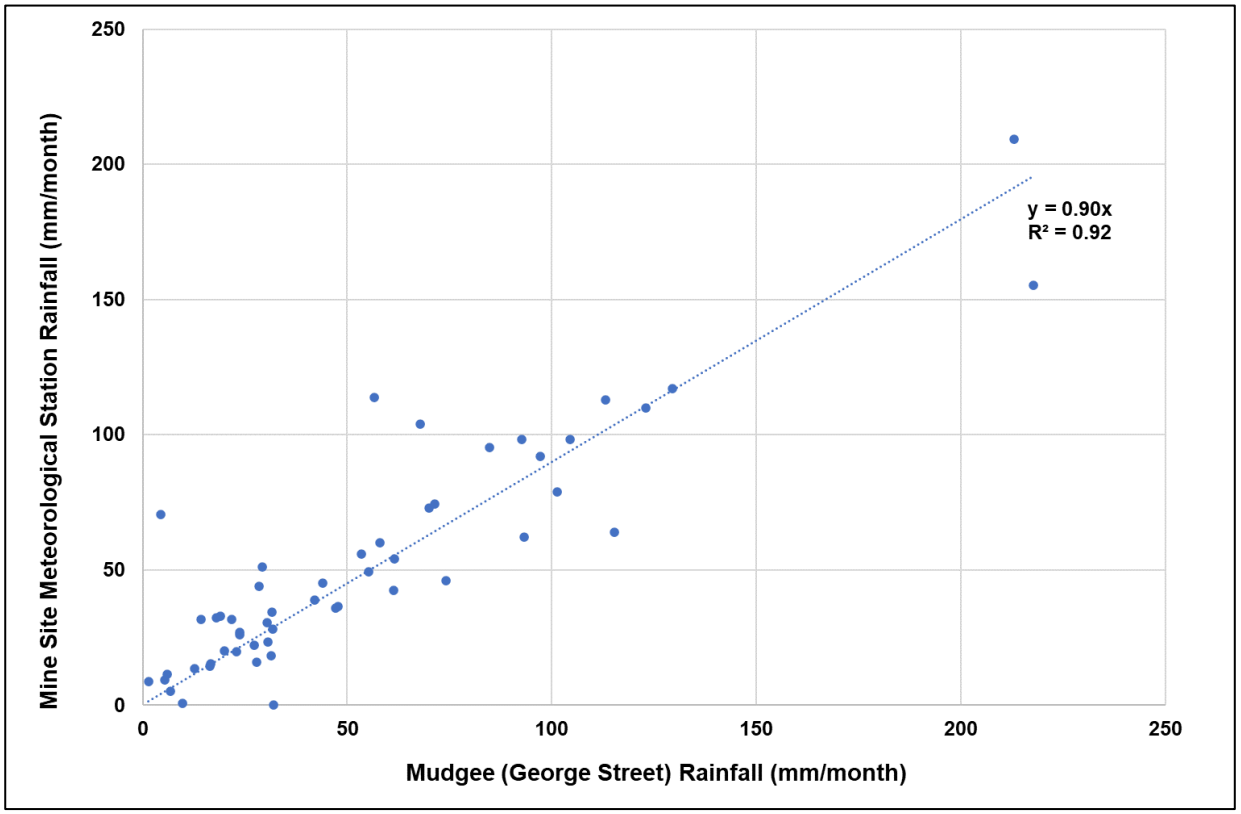
Similarly, how does the SILO evaporation data compare to the long-term data recorded at Mudgee?

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Monthly rainfall data from Mudgee (George Street) compares well with that collected at the Mine Site. A graphical comparison of monthly totals is provided in **Figure 5.10**. Of note is the R^2 value that is used to assess the strength of data correlation (0 = weak, 1 = strong). As shown on **Figure 5.10**, Mudgee (George St) and Mine Site rainfall data show a strong correlation with an R^2 value of 0.92. However, the correlation between the Mine Site rainfall data and SILO Data Drill ($R^2 = 0.95$) presented in Figure 3.3 of WRM (2020) is stronger.

Figure 5.10 Monthly Mudgee (George St) and Mine Site Rainfall Comparison



The only one other long term rainfall datasets close to Lue village ceased collection in either 2007 (Bayly St, Lue) or 1920 (Lue Station). As this does not represent a contemporary dataset, it was not suitable for use in a similar manner to that used for Cudgegong streamflow.

Whilst Rylstone (Ilford St) rainfall data was considered, as shown **Figure 5.11**, monthly rainfall at Rylstone (Ilford St) are similar to Cudgegong PPD rainfalls over the same period, with some outliers.

Evaporation data is not recorded at either the Mudgee (George St) or Mudgee Airport AWS stations.

5.24.7 Climate Change

Representative Comment(s)

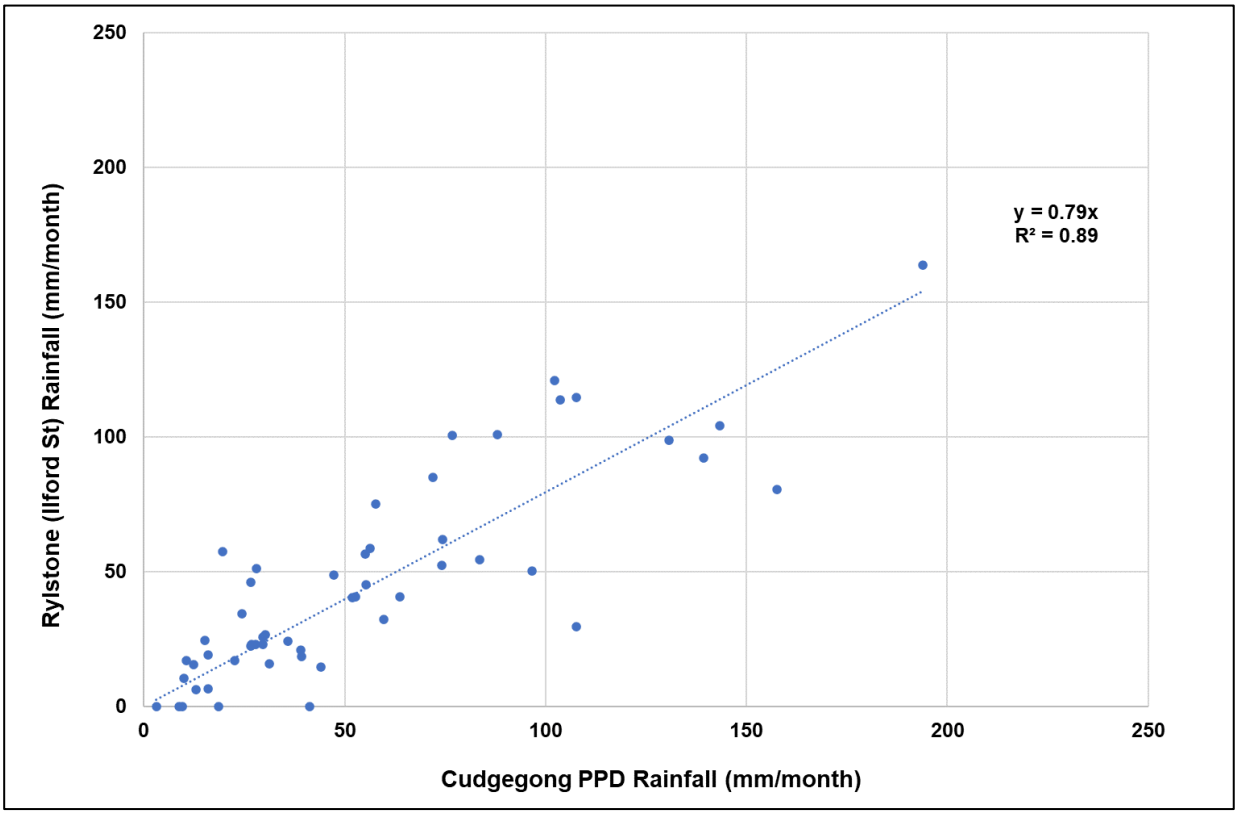
There seems to be no consideration of changing weather patterns and climate change.

Luciana Smink of Breakfast Creek, NSW (Submission SE-8627359)

Response

This statement is incorrect as modelling the potential effects of climate change on long-term pit lake behaviour is presented in Section 7 of WRM (2020) with Section 7.9 detailing the approach and Section 7.10 presenting the results of this modelling.

Figure 5.11 Monthly Rylstone (Ilford St) and Cudgegong PPD Rainfall Comparison



Representative Comment(s)

…this mine would use the equivalent of an Olympic swimming pool a day. How could this happen when we know that due to climate change water will become ever-more scarce.

Elisabeth Brasseur of Mudgee, NSW (Submission SE-8640882)

Response

The Project would not increase demand on the respective water sources (e.g. Lawsons Creek) greater than what is currently available to all authorised and licensed users. Bowdens Silver also notes that its proposed approach to accessing water resources for the Project is permissible and open to all prospective users of water resources under the current NSW regulatory arrangements with respect to water.

Representative Comment(s)

Have the implications of Climate Change been integrated into SVL planning? Internationally, Climate Change experts advise that "As our climate changes, floods will become larger and more frequent."

Chris Pavich of Mudgee, NSW (Submission SE-8655189)

Response

Section 6 and Annexure B of WRM (2020) details the approach taken to assessing potential flood impacts associated with the Project. The adopted approach to assessing flood impacts was undertaken in accordance with the SEARs and consistent with the NSW Floodplain Development Manual and includes consideration of the Probable Maximum Flood (PMF).

Bowdens Silver considered potential long-term interaction with regional floods as part of Project planning and notes that most mine infrastructure potentially impacting flood behaviour would be removed during rehabilitation and closure activities and would not be retained in the final landform. Mine related infrastructure remaining within the final landform includes the:

- TSF;
- WRE; and
- final void.

Post-closure, both the TSF and WRE would become free draining landforms. As the PMF is the upper limit of flood magnitude, with negligible chance of being exceeded (Geoscience Australia, 2019), it is sufficient to inform planning for the final landform. A summary of the TSF and WRE as they relate to the PMF is provided as follows.

- The TSF is situated well beyond the extent of the PMF envelope for Lawsons Creek (see Appendix C of WRM (2020)). Runoff from the upstream catchment of the TSF embankment would be directed to a closure spillway designed to convey the PMF (refer Section 2.6 of ATC Williams (2020)).
- The WRE is situated beyond the extent of the PMF envelope for Hawkins Creek (see Appendix E of WRM (2020)). However, long-term measures for mitigating erosion risk from localised flooding in Prices Creek would be incorporated into the WRE rehabilitation design (see Section 7.2.2).

As noted above, the long-term behaviour of the pit lake in the final void was modelled using multiple climate change scenarios (refer Section 7.9 and Section 7.10 of WRM (2020)). This modelling identified that the maximum pit lake level would be approximately 20m below the 597mAHD overflow point from the final void. All climate change scenarios resulted in long term reduction in equilibrium water level compared to the base case conditions.

In summary, long-term impacts, as they relate to the final landform, have been considered to the greatest practicable extent under current, best practice assessment methodologies.

Representative Comment(s)

…the predictions for the stability of the void and potential overflow of this highly toxic water body are not based on climate change modelling over a 200 year period.

Central West Environmental Council of Summer Hill Creek, NSW (Submission SE-8598199)

Response

As noted above, the potential effects of climate change on long-term pit lake behaviour are presented in Section 7 of WRM (2020). WRM (2020) utilised the most conservative (worst case) climate change predictions (RCP8.5) to inform modelled pit lake levels. The RCP8.5 is effectively the future climate case whereby greenhouse gas emissions continue unabated until atmospheric concentrations reach 650ppm by 2070. Figure 7.8 of WRM (2020) presents the results of modelled pit lake levels for all climate change models utilising the RCP8.5 pathway over a 400-year period and which shows that the pit lake does not discharge during any model iteration. Furthermore, modelled pit lake water levels are lower for all climate change scenarios than when existing conditions are modelled.

Representative Comment(s)

Recent rainfall records need to be considered as well as climate change predictions. Averages are useless for predicting environmental harm caused by extreme weather events.

Inland Rivers Network of Pyrmont, NSW (Submission SE-8645546)

Response

Potential impacts on water resources (i.e. catchment and baseflow loss) are presented as averages as they would vary over time, as the Project is developed (refer WRM (2020) and Jacobs (2021)). WRM (2020) utilised 130 years of daily rainfall data (1889 – 2018) sourced from the SILO database to develop its peer-reviewed AWBM model (refer Section 3.2 of WRM (2020)). This AWBM model then relied upon daily SILO rainfall data, not averaged rainfall data, to simulate system conditions and responses on a daily time-step. It is noted that the SILO dataset includes periods in the late 1930s that were drier than the recent dry years.

This peer-reviewed AWBM model also considered high and low rainfall scenarios and established that site water management infrastructure, including the TSF, could be operated without any overflow to the receiving environment (refer Section 5.7 of WRM (2020)).

Due to the relatively short life of the Project, the use of climate change projections for modelling of operational conditions is not appropriate.

Representative Comment(s)

I am concerned that the Tailings Storage Facility will be used as a water storage and given Climate Change and the increased likelihood of longer more severe droughts interspersed with heavier rain periods and more flooding than has occurred in the past the Tailings Storage Facility will not be designed to store the required amounts of water.

B. Wannan of Lue, NSW (Submission SE-8654059)

Response

Bowdens Silver does not propose operating the TSF as a water storage facility as operating the TSF in this manner would be:

- contrary to its design intent;
- potentially limiting to its functionality as a TSF; and
- potentially reducing the efficacy of design elements that reduce the potential for discharge.

The Project's water supply strategy is provided in Section 5.24.3.

5.24.8 Surface Water Runoff Rate

Representative Comment(s)

WaterNSW states average regional runoff for the region is 0.7ML/ha/year. In the EIS Bowdens uses a figure of 0.3/ha/year for natural/undisturbed lands. Bowdens is incorrect and doesn't justify the difference.

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

The runoff rate used to consider water take for licensing is considerably lower than the average regional runoff rate published by NSWWater. (sic).

Using modelled versus published average annual runoff rates (WaterNSW), that is, 0.41 ML/ha/yr versus 0.7 ML/ha/yr reduces the volume of WALs required from 211 ML to 123 ML. (Section 8.1.34).

Average regional runoff plotted for the region by WaterNSW is 0.7 ML/ha/year. This is considerably higher than the table analysis which presents 0.30 ML/ha/yr for natural / undisturbed lands. (Table 5.4)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

WaterNSW's Maximum Harvestable Right calculator estimates the harvestable right dam capacity at the Mine Site as 0.07ML/ha. This capacity represents 10% of the mean regional runoff rate of 0.7ML/ha/year or 70mm. Percentages of annual regional runoff rates have been used in the design of farm water supply dams for many years (HARC 2020). However, the methodology applied to derive this runoff rate, in particular over what historical period it was calculated, is unclear. In some areas the published values are not supported by recent rainfall and runoff measurements. For example, the measured runoff rate at a nearby mine site was as low as 0.18ML/ha or 18mm (refer Section 3.5.3 of WRM (2020)).

The adopted average annual runoff rates were derived using the calibrated AWBM model (refer Section 3.5 of WRM (2020)). This AWBM model was then subjected to peer review and is considered the most appropriate method to estimate runoff from the Mine Site catchment areas. The most reliable means of determining local (catchment scale) mean annual runoff rates is via the comparison between actual streamflow volumes obtained from long term gauge records with corresponding catchment rainfalls, which is the method adopted by WRM. This approach identifies that runoff rates within the Mine Site and broader region vary considerably from year to year. Consequently, it is not possible to compare the two rates without further details relating to the basis of the runoff estimates used by the WaterNSW Maximum Harvestable Right Calculator.

Bowdens Silver notes that for sensitivity testing of the AWBM, the highest rate adopted by WRM was 0.6ML/ha, which resulted in unreasonably high flow rates when compared to observations. Subsequently no higher rate was tested.

5.24.9 Ephemeral Watercourses

Representative Comment(s)

Based on the watercourse assessment the ephemeral drainage lines have limited aquatic habitat and their disturbance is predicted to result in minor to negligible impacts. Based on a site assessment this is supported. The main watercourse areas with ephemeral habitat value are in the mid to upper reaches of Price Creek which is not to be disturbed and in the lower reaches of Walkers Creek near the TSF dam wall and further downstream.

DPIE – Water and NRAR Request:

The relocation of watercourses will need to ensure adequate design and rehabilitation measures are implemented to ensure channel stability and long term ecological functioning are achieved.

DPIE – Water and NRAR

Response

Bowdens Silver acknowledge the submission and proposes to consult with DPIE – Water and NRAR as it develops rehabilitation and post-closure strategies as they relate to water management.

Representative Comment(s)

The expectation of minimal impacts on baseflows needs to be quantified for all the mapped 3rd order watercourses.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

It is unclear as to the basis of this statement. As noted in Section 3.5.2 of WRM (2020), baseflow derived from groundwater discharge and bank storage is considered likely to contribute to flows in Hawkins Creek and Lawsons Creek. Subsequently, predicted baseflow losses are quantified for these watercourses.

However, based on site observations, all other drainage features within the Mine Site (i.e. Walkers and Prices Creek) are considered ephemeral with negligible aquatic habitat and baseflow. This view is supported by the Aquatic Ecology Assessment (Cardno, 2020) and NRAR (refer above).

5.24.10 Lawsons Creek Crossing Design

Representative Comment(s)

An alternate bridge design is recommended for the proposed crossing of Lawsons Creek by the relocated Maloneys Road due to significant impacts to the hydrology of Lawsons Creek. This is due to the crossing design which includes culverts that accommodate little more than half of the channel capacity below the proposed crossing height of 5m above the creek bed level.

DPIE – Water and NRAR Request:

Provide a bridge design for the proposed crossing of Lawsons Creek to meet the requirements of the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018).

DPIE – Water and NRAR

Response

Bowdens Silver proposes to relocate Maloneys Road to reduce traffic-related impacts on the amenity of Lue village as the result of the Project. As part of the proposed relocation, Bowdens Silver would construct a new crossing of Lawsons Creek for existing users of Maloneys Road and Bara-Lue Road and provide access to the Mine Site. The proposed crossing represents

increased hydrologic function when compared to the existing Pyangle/Maloneys Road crossing, as the proposed crossing would have a greater capacity to convey flow (10/2.7m x 2.4m concrete box culverts) compared to the existing 5/1.5m x 2.4m concrete box culverts. In addition, the proposed crossing would provide greater flood immunity than the current Lawsons Creek crossings for either Pyangle/Maloneys Road or Bara-Lue Road, thus improving access arrangements for all existing and future road users.

Whilst Bowdens Silver recognises that the proposed crossing does not meet the guidance provided in *"Guidelines for Controlled Activities on Waterfront Land"* (NRAR, 2018), it is noted that the proposed crossing provides a greater level of conveyance than existing arrangements upstream and downstream of this location. In addition, any difference in flooding outcomes between the proposed design and a larger structure would only result in impacts to land owned by Bowdens Silver. It is considered that the proposed design would not significantly impact the vegetated riparian zone compared to similar structures in the region and considering the scale and cost associated with a larger structure. Furthermore, during detailed design Bowdens Silver would consider additional measures to reduce floodplain engagement and upstream water levels to maintain Lawsons Creek flow and reduce impacts of the proposed crossing.

In light of the above, Bowdens Silver considers the proposed design would provide for an acceptable level of flood impact risk.

Representative Comment(s)

Why designing to existing 10% AEP level, why not the new 10% AEP level?

No comparison to existing crossing accessibility and safety during flood events. Is the same flood immunity (flood hazard and duration) provided for the new crossing compared to the old crossing?

Modelling predicts 1 to 2 m increases in depth upstream of proposed crossing during 10% AEP event (Figure 6.10). Should the design include a high flow conveyance path as well as the low flow culverts, this may assist in reducing the breakout and predicted impacts. (Section 6.3.1)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

It is noted that the proposed Lawsons Creek crossing as presented in the EIS is conceptual only with all predicted flood level increases occurring on land owned by Bowdens Silver. Therefore, refinement of the proposed crossing would occur during detailed design. These refinements would include an assessment of road crest levels and flood immunity as well as measures to convey flows resulting from breakout and floodplain engagement.

The proposed crossing would provide greater flood immunity than the current Lawsons Creek crossings for either Pyangle/Maloneys Road or Bara-Lue Road, thus improving access arrangements for all existing and future road users.

5.24.11 Clean Water Diversion Design

Representative Comment(s)

The temporary Southern Barrier will be constructed over Blackmans Gully which is a third order watercourse. The discharge capacity of the proposed pipe/culvert under the barrier has not been quantified, hence it is not clear of its adequacy to convey the catchment runoff volumes downstream and any potential impacts to flow.

DPIE – Water and NRAR Request:

Clarify the discharge capacity of the proposed pipe/culvert under the Southern Barrier and any potential impacts to the flow regime.

DPIE – Water and NRAR

Response

Bowdens Silver proposes to convey diverted flows from undisturbed sections of the Blackmans Gully catchment through the southern barrier via 7 x 1 500mm (nominal diameter) pipe culverts. This configuration would be sufficient to convey the 1 in 100 AEP design flood at a maximum outlet velocity of approximately 2.3m/s (similar to the existing channel velocity). Full details of the culvert sizing would be finalised during detailed design of the southern barrier, i.e. in the event the Project is approved.

Representative Comment(s)

There are no stated design criteria for the clean water diversions, either during operations or in the final landform. These need to be clearly defined.

What is conveyance capacity of clean water drain (i.e. diversion channel)? It is considered that this should be 1% AEP as a minimum. (Section 4.6.3)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The design criteria for clean water diversions would be developed during detailed design in consultation with regulators and documented in the Water Management Plan.

Notwithstanding, the open cut pit clean water diversions would be designed with a sufficient capacity to convey a 0.1% Annual Exceedance Probability (AEP) event without overtopping.

5.24.12 Erosion and Sediment Control

Representative Comment(s)

Approximately 5.2km of Maloney's Road would be relocated, including construction of new intersections, a railway crossing, Lawsons Creek crossing and numerous ephemeral waterways. No erosion and sediment control measures have been provided.

NSW Environment Protection Authority

Response

Section 2.3 of the EIS details the site establishment and construction activities whilst Section 2.3.2 identifies that a program of initial earthworks would be undertaken. This program would initially establish the relevant surface water management system (erosion and sediment control). No substantial earthworks would commence until all required erosion and sediment controls, constructed in accordance with relevant design guidance (e.g. Managing Urban Stormwater: Soils and Construction, Volume 1, 4th eds. (Landcom, 2004)) are in place.

All required erosion and sediment controls would be documented with the Water Management Plan, which would be prepared in consultation with DPIE Water, the EPA and DPIE. .

5.24.13 Sediment and/or Water Quality Dams

Representative Comment(s)

The proposal includes stockpiles of Non-Acid Forming (NAF) rock, low grade ore and oxide ore. It is unclear which sediment dams will contain contaminated runoff from these stockpiles and/or NAF earthworks and whether they will be lined and sized appropriately.

Any sediment dam which receives NAF runoff/leachate should be considered to contain contaminated water unless demonstrated otherwise.

Any sediment dam which receives low grade ore or oxide ore runoff/leachate should be considered to contain contaminated water unless demonstrated otherwise.

The overflow frequency, duration and volumes of water discharged under a range of operating scenarios has not been provided.

EPA Request: *It is recommended the proponent:*

a). confirms all locations that receive NAF rock for either stockpiling or construction (such as haul roads and embankments) will drain to a dam

b). clarifies design specifications of dams collecting contaminated water, including sizing, frequency of overflow, and lining (including liner type, permeability, thickness).

c). demonstrates that the proposed design storm sizing for the sediment dams collecting uncontaminated water are equivalent to or larger than the 90$_{th}$ percentile, 5 day rainfall event;

d). if discharges are to occur from any dam the potential impact of those discharges must be considered consistent with the relevant matters under s45 POEO Act, including:

- *estimate the expected frequency and volume of discharges.*
- *characterise the expected quality of each discharge in terms of the typical and maximum concentrations of all pollutants likely to be present at non-trivial levels (including coagulants/flocculants).*
- *assess the potential impact of each discharge on the environmental values of the receiving waterway consistent with the national Water Quality Guidelines (ANZG, 2018).*

- *where relevant, identify appropriate measures to mitigate any identified impacts, including but not limited to, for example, increased reuse, flocculants and grassed swales.*

e). considers using enlarged basins/dams to minimise or avoid discharges and maximise reuse.

NSW Environment Protection Authority

Response

Bowdens Silver is continuing to conduct geochemical testing to characterise water quality of runoff and from NAF, low grade ore and oxide ore stockpiles to confirm whether any captured runoff can be considered as suitable for release. Bowdens Silver intends to establish the indicative water quality prior to the commencement of detailed design.

a) Bowden Silver confirms that all locations that would receive NAF rock for either stockpiling or construction (such as haul roads and embankments) would drain to a dam.

b) Should runoff and seepage from a NAF, low grade ore or oxide ore stockpile be deemed unsuitable for release, the dams containing this water would have the following specifications.

   – Dam sizing: containment zone equivalent to 1 in 20 AEP 72hour design storm (approximately 157mm) (with volumetric runoff coefficient of 0.75) (1.2ML/ha) plus 50% sediment allowance.

   – Pump system: capacity to pump out in 5 days to the closed water management system (containment zone).

c) Should runoff and seepage from a NAF, low grade ore or oxide ore stockpile be deemed suitable for release, the dam containing this water would have the following specifications.

   – Dam sizing: in accordance with "the Blue Book" (DECC, 2008) requirements for Type F sediment basins – i.e. settling zone equivalent to or larger than the 90th percentile, 5 day rainfall event (approximately 38mm).

   – Pump/release system: capacity to pump out/release in 5 days.

d) Discharges would only be considered if the water quality satisfies the requirements of an Environment Protection Licence (EPL) that would be granted by the NSW EPA prior to operations commencing. The EPL application would be based on the results of runoff characterisation of runoff quality and with regards to expected constituent concentrations (including coagulants/flocculants), and consideration of the potential impact on the environmental values of the receiving waterway.

e) Based on the results of the site water balance model, if the dams are sized and operated as containment dams, off-site discharges would be avoided under historical climate conditions. This notwithstanding, during detailed design, Bowdens Silver would consider using enlarged dams to further reduce the risk of discharges and maximise reuse. However, as Bowdens Silver's intention is, to the greatest extent practicable, limit impacts to the downstream flow regime this would only be implemented if there was a material risk of discharge impacting the environmental values of the receiving waters.

Representative Comment(s)

There is no clearly defined trigger to use containment dams rather than sediment dams for Waste Rock Emplacement (WRE). The assessment should commit to initially use containment dams for the WRE and only use sediment dams if it can be demonstrated to the regulators that the water is of suitable quality.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The WRE has been designed to ensure that all surface water runoff within active cells of the WRE is contained within the leachate management system (refer EIS Section A5.10.5.4). Active WRE cells would be separated from undisturbed areas within the WRE footprint and rehabilitated areas by a series of intercell embankments (refer Figure 12 of Advisian (2020a)). Direct rainfall and runoff within active WRE cells and those undergoing rehabilitation drain to the leachate collection system.

However, it is Bowdens Silver's objective that runoff from the final vegetated WRE landform is of suitable quality to allow discharge to the receiving environment. During operations, monitoring and adaptive management of progressive WRE rehabilitation would be undertaken to continually improve rehabilitation and vegetation establishment methods.

Therefore, Bowdens Silver does not consider it necessary to define or commit to any triggers relating to water storages other than the rehabilitation measures presented in the EIS. However, Bowdens Silver is committed to continue to assess the geochemical characteristics of NAF runoff to ensure that appropriate containment measures are put in place if contaminant concentrations would lead to unacceptable risk of harm to the environmental values of the receiving waters.

Representative Comment(s)

If water is considered not suitable for discharged (sic) *the SWA states that the design will be 20% AEP 72 hrs containment (with 0.75 volumetric runoff coefficient, 50% sediment storage zone and pump out in 5 days).*

It is considered that stronger controls should be in place for determining containment criteria (sediment or containment) for sediment water. Initial dams should be built for containment volumes and if the water quality testing then is considered by the EPA to be suitable for release sediment dams could be used.

The proposed capacity for sediment dams in Year 0 of operation (and max) do not appear to be consistent with the methods stated in the text. (Section 4.6.2)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Discharges would not be allowed to occur unless it was confirmed that water quality is suitable for release, i.e. in accordance with the Project's EPL. As a precaution, Bowdens Silver has planned that dams would be sized in accordance with the higher containment standard (20% AEP 72 hrs).

The dam capacities in Section 4.6.2 of WRM (2020) are consistent with the above criteria, and the currently proposed program of staged development and rehabilitation of the WRE. These storage requirements would be reviewed during detailed design of the WRE to ensure that the appropriate level of containment is achieved throughout the Project life.

Representative Comment(s)

There is no consideration of the water quality within the water management system. There is a potential for build-up of both salts and metals which is not considered in the assessment.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

It is acknowledged that salts and metals may build up within the water management system as water is recycled and reused in processing operations to minimise external water demands. Water quality within the Mine Site (including the containment zone) would be a component of the proposed water monitoring program so that this is tracked and understood.

As previously noted, assessment of the Mine Site water management systems identified that all water in the containment zone can be contained on the Mine Site without release to the receiving environment.

The adopted containment approach means that any water containing potentially elevated metal and salt concentration would not be allowed to occur and does not warrant further consideration as to its constituent concentrations. Regardless, the EPL for the Project would provide concentration limits for any discharges from the Mine Site.

Representative Comment(s)

Table 4.5 lists 0 ML/a dam overflows. Does this include sediment dams? Type F (Blue Book, Landcom 2004) sediment dams typically have a forecast spill of 1 to 2 times per year (5-day 95th percentile design capacity). Is this included in the data presented? (Section 5.4)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The 0 ML/year results for simulated dam overflows presented in Table 5.5 and discussed in Section 5.4 of WRM (2020) do not include discharge from sediment dams. This is because water balance modelling (Section 5.7 of WRM (2020)), identified that, even under a high rainfall and runoff scenario, the system would retain all water in the containment zone without discharge. Therefore, reference to the Blue Book (Landcom, 2004) allowances for spill frequency is not relevant.

Any discharge from sediment dams within the Mine Site would only occur through a controlled release managed by site personnel.

5.24.14 Contaminated Water Storages

Representative Comment(s)

The EPA notes that the proposed sizing of the Leachate Management Dam varies between specialist reports (65ML) and the EIS (80ML).

The applicant proposes to delay the capping of cells 1 to 3 of the WRE to facilitate stockpiling of low-grade ore on the surface (EIS Section 4.7.7). Consideration should be given to capping the cells as soon as possible to minimise leachate…

The internal embankment of the WRE and Leachate Management Dam would be lined by a 1.5mm HDPE liner with an undefined permeability. It is unclear whether the floors of the WRE and Leachate Management Dam will also be lined to prevent infiltration to groundwater.

EPA Request: *It is recommended the proponent:*

a). clarifies the storage capacity and overflow frequency of the TSF, WRE, Leachate Management Dam and any other contaminated water storages.

b). confirms lining of the TSF, WRE, Leachate Management Dam, and any other contaminated water storages will be consistent with EPA's Tailings Dam Liner Policy (including but not limited to liner type, permeability and thickness). Where an alternative liner system (or natural geology) is proposed, a robust hydrogeological investigation and impact assessment must be undertaken to demonstrate the proposed system will prevent the pollution of waters.

c). clarifies the operational management of the TSF, including how the design sizing and a minimum freeboard will be maintained throughout the project, including the probability of the TSF being overtopped if the design sizing is not maintained during the whole project.

d). clarifies the proposed sizing of the Leachate Management Dam.

e). considers capping active cells within the WRE as soon as completed to minimise the volume of leachate generated at any given time.

NSW Environment Protection Authority

Response

a) The leachate management dam, WRE and TSF form part of the containment zone of the proposed integrated water management system (refer Section 4.6.1 of WRM (2020)). The Project would maximise recovery and prioritise re-use of runoff collected in the containment zone to reduce reliance on clean water and limit volumes of potentially contaminated water held on site, thus reducing the risk of discharge.

As noted in Section 5.7 of WRM (2020), water balance modelling undertaken to assess the effectiveness of the water management system identified that, even under a high rainfall and runoff scenario, the system would retain all water in the containment zone without discharge.

The storage capacity of the TSF would vary throughout the life of the Project depending on the stage of development of the embankment. The TSF embankment would be developed via an initial construction stage and two subsequent raises. Each raise would be undertaken to provide capacity for further tailings deposition, decant storage, storm storage allowance and other design contingency (e.g. freeboard and wave run-up). The nominal maximum storage capacities for each stage would be as follows.

– Stage 1: 1 407ML
– Stage 2: 1 643ML
– Stage 3: 1 674ML

The water storage capacity of the TSF would be greatest immediately following an embankment raise. Conversely, the lowest TSF water storage capacity would be immediately prior to an embankment raise (when the distance between the tailings beach and embankment crest is at a minimum).

With respect to the WRE, there would be temporary leachate storage capacity in the cell immediately downstream of the active cell. This cell would be underlain with the HDPE liner anchored to the intercell embankment. The objective of the temporary storage is to provide hydraulic head for gravity flow to the leachate management dam (refer Section 3.5 and Table 7 of Advisian (2020a)). The risk of discharge from the temporary storage area entering the receiving environment would be low as:

– it would remain hydraulically connected to the leachate management dam at all times;

– the lower embankment would intercept any discharge overtopping the intercell embankment; and

– The storage capacity of the leachate management dam would be 80ML (see Section 5.5 and Table 5.6 of WRM (2020)).

b) The WRE and leachate management dam would be underlain by a low permeability HDPE basal liner that would satisfy the EPA Tailings Dam Liner Policy. Similar measures would be adopted for additional water storages within the containment zone. This design information would be finalised in detailed design and be included as an appendix to the Water Management Plan that would be prepared in consultation with DPIE Water and the EPA prior to the commencement of the Project.

With regards to the TSF liner, ATC Williams (2020) describes how the proposed TSF liner would satisfy the EPA Tailings Dam Liner Policy objectives. The proposed approach was provided as a letter report to the EPA and NRAR on 21 March 2019. A copy of this letter is reproduced as **Appendix 8**. Email correspondence received from the EPA dated 9 October 2020 has since confirmed that this information was satisfactory in addressing seepage and conceptually, the design should meet the EPA criteria subject to appropriate conditions of consent. It is anticipated that the EPA would confirm this position formally upon review of this document.

c) Water accumulating within the TSF (either runoff or decant) would be prioritised as a source of processing plant make-up water. This would reduce stored water volumes and the subsequent risk of overtopping. Capacity to contain runoff and decant would also be facilitated by the adoption of the TSF transfer level (refer Section 4.7.9 of WRM (2020)) as part of integrated site water management. This transfer level would be independent of TSF design considerations relating to water levels (e.g. storm storage allowance, freeboard and wave run-up) but designed to limit potential discharge by automatically transferring water to the open cut pit once the level has been reached. Bowdens Silver notes that, based on the High C consequence category presented in the preliminary design (ATC Williams, 2020),

the TSF would be a declared dam under the *Dams Safety Act, 2015*. In accordance with the *Dams Safety Regulation 2019*, Bowdens Silver would then be required to prepare an operations and maintenance plan that details the dam safety management system. This plan would be reviewed annually (at a minimum) and is required to document the procedures for dam operation in normal, abnormal and extreme conditions including flood events whereby water levels rise higher than the crest. However, as the Project is yet to receive approval, Bowdens Silver has not commissioned detailed design of the TSF that would subsequently form the basis of any such plan and management system.

d) It is acknowledged that inconsistent leachate management dam volumes were presented in the WRE preliminary design document (Advisian, 2020a) and WRM (2020). Bowdens Silver confirms that the volume for the leachate management dam would be 80ML, sufficient to contain the peak stored WRE runoff volumes, with freeboard as derived by the peer-reviewed AWBM water balance. This volume would be reviewed and re-assessed during detailed design for the Project.

e) Bowdens Silver notes that full rehabilitation of WRE Cells 1 to 3 would not occur following their completion due to low-grade ore stockpiling above these cells. However, the store and release cover detailed in Advisian (2020b) would be installed on the slopes of these cells whilst the top would be covered with a geosynthetic clay liner (GCL). The purpose of the GCL would be to encapsulate the underlying PAF material, reduce rainfall infiltration and subsequent leachate generation. Whilst it is Bowdens Silver's intention to process all low grade ore, should processing prove uneconomic any stockpiled material would be capped, covered and incorporated into the final landform. During operations, closure and rehabilitation of all WRE cells would remain connected to the leachate management dam that would not be decommissioned until such time that leachate is no longer being generated in the WRE. All other WRE cells (4 to 7) would be progressively rehabilitated.

5.24.15 Processing Plant Area Dams

Representative Comment(s)

It is unclear which of these processing plant area dams receive contaminated water, and if so whether they are appropriately lined in consideration of EPA's Tailing Dam Liner Policy. It is also unclear whether the ROM pad is lined.

The EIS has not demonstrated that the Processing Plant Area Dams water quality will be suitable for dust suppression/wheel wash.

EPA Request: *Processing Plant Area Dams*

It is recommended that the proponent:

a). clarifies which Processing Plant Area Dams are contaminated water storages, including their storage capacity and overflow frequency.

b). confirms the liners (including liner type, permeability, and thickness) of any contaminated water storages will be consistent with the EPA's Tailings Dam Liner Policy.

c). undertakes a water quality characterisation and risk assessment to ensure any reused/recycled water is fit-for purpose.

d). details how brine from the RO plant will be managed.

NSW Environment Protection Authority

Response

a) All water storages within the Processing Plant Area would be treated as mine affected water storages (i.e. managed within a closed water management system and re-used for processing). As described in Section 5.5 and Table 5.6 of WRM (2020), these dams would have a total storage capacity no greater than 100ML. The processing plant dams would be hydraulically connected via pumps and pipes and would be actively managed to reduce risks of overflow. In addition, water stored in these dams would be the first priority water source for use in processing. The precise locations and sizing of these dams would be confirmed in detailed design, however it is noted that minor changes to size and location would not be expected to influence environmental outcomes of their construction and use.

b) The following liners would be used for contaminated storages for the Project.

- A 1.5mm low permeability HDPE liner underlying the waste rock emplacement and leachate management dam as described in Advisian (2020a). Details of the liner permeability would be confirmed during detailed design.
- A 1.5mm low permeability HDPE liner underlying all processing plant area dams. Details of the liner permeability would be confirmed during detailed design.

c) A low permeability geomembrane/clay zone and a low permeability (1×10^{-13}m/s) bituminous geomembrane (BGM) liner beneath the TSF, as described in ATC Williams (2020) and Annexure 10 of Jacobs (2021). Details of the liner design and extent would be confirmed during detailed design. Bowdens Silver would monitor water quality in the processing plant dams. It is possible that water stored in these dams would be unsuitable for use in the wheel wash or haul road dust suppression. If this is the case, water for these purposes would instead be drawn directly from water supplies outside the containment zone such as that imported to the turkey nest dam. The quantity of water derived from Processing Plant catchment yield is minimal, and the impact on the overall site balance would be negligible.

d) As described in Section 2.14.6 of the EIS, all brine generated by the on-site potable water reverse osmosis plant would be pumped to the process water tank for entry into the process water circuit.

5.24.16 Flooding Impacts

Representative Comment(s)

Flood velocities are predicted to increase along the Price Creek floodplain by up to 1.8m/s for the 1 in 10yr flow event. This is due to the Waste Rock Emplacement (WRE) encroaching on the floodplain and restricting the available floodplain to dissipate the flows. A velocity increase of 3.1% for the 1 in 10 yr flow event is predicted at the northeastern corner of the WRE embankment haul road flood bund. Increases in flood velocities of a lesser extent are predicted along Hawkins creek with a maximum increase of 0.14m/s for the 1 in 10 yr flow event.

DPIE – Water and NRAR Request:

Mitigating measures or alternate design options will be required to address potential erosion impact due to increased channel and floodplain velocities both within the site and any impacts extending downstream.

DPIE – Water and NRAR

Response

It is recognised that development of the WRE would result in increased velocities in Price Creek. However, in the vicinity of the WRE, substantial historic modifications to facilitate agricultural activity have effectively removed the watercourse with the former channel overprinted by pasture and only visible from aerial imagery. This notwithstanding, during detailed design of the WRE, Bowdens Silver would consider measures to re-instate a channel within Price Creek and limit potential impacts arising from the WRE. It is noted that potential impacts from WRE development would be constrained to the Mine Site within land owned by Bowdens Silver.

Representative Comment(s)

The assessment does not consider or discuss any crown or public lands and does not detail potential impacts on the creek crossings that are listed in the report. In addition, there is no landownership mapping associated with the flood modelling outcomes to confirm the landownership/options that might be present.

The creek systems flood protection works appear to be relatively mobile and erodible. No specific details of scour protection measures and their required maintenance are described in the assessment.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Who owns the land impacted by flooding? It is not clear in the EIS.

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

Response

WRM (2020) conducted hydraulic modelling to assess the changes to flood water levels that would occur from Project development. Section 6 and Annexure B of WRM (2020) present the results of this assessment and includes figures showing peak water levels and cadastral (property) boundaries. This assessment identified that flood impacts would occur within land owned by

Bowdens Silver and not on any public or Crown land. For simplicity, these figures did not identify individual landholders. Landowner information was however, provided in EIS Figures 4.1.10 and 4.1.11 but was redacted by DPIE.

As noted in Section 6.2.5 of Annexure B (WRM, 2020), Lawsons Creek is crossed by public and private roads. Most of these are low level crossings (i.e. limited flood immunity) that would have no perceptible impact on flood conditions. The existing Maloneys Road (to be closed) would be inundated once flood levels exceeded the road crest level. Emergency management protocols for the Mine Site would be used to inform responses in the event of this occurring.

It is acknowledged that scour protection measures are not provided in the EIS. However, the detailed design of infrastructure would consider (where required), measures to ensure stability and flood protection. During operations, Bowdens Silver would regularly assess the condition of infrastructure and associated landforms and perform remedial works, as required.

With respect to flood levels, the following is noted.

- The WRE would result in localised minor flood level increases constrained within the Mine Site but not cause significant impacts to other properties, assets or infrastructure (refer Section 6.2.3 of WRM (2020)).
- All increases in flood levels, as the result of the relocated Maloneys Road crossing of Lawsons Creek would occur on land owned by Bowdens Silver (refer Section 6.3.3 of WRM (2020)).

Representative Comment(s)

The assessment of flood risk for existing Maloneys Road (Lawsons Creek – Pyangle Road Crossing) crossing is not included in the assessment

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

WRM (2020) presents an assessment of flood risk at the proposed Lawsons Creek Crossing as it is Project-related infrastructure with the potential to create impacts. This crossing would replace the existing Maloneys Road (to be closed) as part of the broader relocation of Maloneys Road to the west of Lue village.

The Project does not propose any changes to the existing Maloneys Road (Lawsons Creek - Pyangle Road) crossing. Therefore, an assessment of flood impacts at this crossing is not warranted. However, this crossing is represented in the hydraulic model used to assess flood impacts arising from the Project.

Representative Comment(s)

The Lawson Creek valley is subject to severe flooding. These impacts will be more severe when land is cleared for mining. We experienced localised rainfall measuring 225ml overnight in February 2002 after a prolonged drought. This caused a massive loss of top soil and erosion. This will happen again.

(Name Withheld) of Havilah, NSW (Submissions SE – 8529249)

Response

Section 6.2.1 of WRM (2020) presents the flood impact assessment for the Mine Site and surrounding area when Project-related disturbance is at its greatest extent. The more significant flood level impacts are constrained to the Mine Site and the Project would not result in significant flooding impacts to other properties, assets or infrastructure.

Sections 4.6 and 4.7 of WRM (2020) describe the management of surface water runoff within the Mine Site that includes provision for capturing, storing, treating and releasing (sediment-laden water) from disturbed areas within the Mine Site. However, Bowdens Silver recognises the importance of retaining soils for rehabilitation and would implement best practice measures to stabilise disturbance areas and soil stockpiles as part of source (erosion) control. Furthermore, an approved water management plan would be developed following the detailed design of the Mine Site to ensure best practice measures are adopted to capture and treat sediment-laden runoff.

Representative Comment(s)

Changes in flood depth upstream of new crossing (sic) *and associated new downstream breakout zone have no clear comparison to the existing crossing accessibility and floodplain capability.*

Increase in velocities predicted in some locations requiring permanent stabilisation. Insufficient detail on where these are and the required stabilisation methods. Uncertain if the stabilisation can be established, considering the mobile creek systems described in Annexure A.

These aspects need to be considered in more detailed in both the operational and post closure scenarios.

No afflux mapping or analysis for smaller events. (Section 6)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Section 6.3.3 of WRM (2020) describes that the predicted increases in peak flood levels, extents and velocities associated with the proposed Lawsons Creek crossing do not appear to affect any existing dwellings for all events up to and including 0.2% (1 in 500) AEP. It is noted that all increases in flood levels, as the result of the relocated Maloneys Road crossing of Lawsons Creek, would occur on land owned by Bowdens Silver.

Where necessary, mitigation measures for managing the risk of erosion where velocities are increased, such as the appropriate size of rock armouring on the floodplains of Hawkins and Lawsons Creeks would be developed during detailed design to ensure minimal scour in the 10% AEP flood.

Additional afflux mapping is provided in Annexure B of WRM (2020). In particular, afflux mapping at the Lawsons Creek crossing is provided in Appendix F of Annexure B of WRM (2020).

Representative Comment(s)

The report states that the model was run for three scenarios – maximum disturbance, final landform, and Lawsons Creek crossing. Main SWIA states 2 scenarios.

Which landform is the Lawsons Creek crossing scenario using? This should consider analysis for both landform scenarios listed above (i.e. maximum disturbance and final landform) (Section 6.4.1 – Annexure B Flooding Assessment).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

WRM (2020) presents three scenarios that were used to assess flood impacts. These scenarios are as follows:

- Two landform scenarios (maximum disturbance and post-closure) used to assess flood impacts adjacent to the Mine Site are presented in Section 6.2 of WRM (2020).
- One scenario, based on the maximum disturbance scenario, used to assess impacts at the relocated Maloneys Road crossing of Lawsons Creek is presented in Section 6.3 of WRM (2020).

As closure and rehabilitation activities would result in a materially different landform to that during operations (i.e. maximum disturbance), the assessment of flood impacts from two separate landform scenarios is warranted. However, running separate landform scenarios for the Lawsons Creek crossing was unnecessary as both would result in similar flood impacts due to the distance of the crossing from the modelled landforms.

Irrespective of the scenario, all flood level increases would occur on land owned by Bowdens Silver.

Representative Comment(s)

Existing conditions only mapped for 1% AEP.

Developed – with Lawsons Road crossing only mapped for 10% AEP.

Break out zone downstream of new crossing increases flood extent for 10% and 2%. Increases in velocities. What are the likely impacts to the floodplain of the increased frequency of inundation?

No discussion on impacts to other crossings (see above).

No mapping of the land parcels impacted – unclear of what is owned by Bowdens Silver, or that Bowdens Silver has options on. (Annexure B – Flooding Assessment)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

What impacts are predicted at the four crossings of Lawsons Creek? These are not discussed in the SWIA. (Section 6.2.5 – Annexure B Flooding Assessment).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Flood mapping for a range of conditions is presented in Annexure B of WRM (2020). In particular, existing conditions are presented in Appendix C of Annexure B, and developed conditions at Lawsons Crossing are presented in Appendix F of Annexure B.

The predicted increased frequency of inundation is unlikely to result in any significant adverse environmental outcomes. No downstream infrastructure is likely to be affected, and cropping land would only be inundated at a slightly higher frequency, with no significant increases to velocities.

Additional afflux mapping is provided in Annexure B of WRM (2020). In particular, afflux mapping at the Lawsons Creek crossing is provided in Appendix F of Annexure B of WRM (2020). Responses regarding land ownership are provided above.

The flooding impacts at the Bara-Lue Road crossing are shown on various figures in Section 7.3.3 of Appendix B (WRM, 2020).

As noted in Section 6.2.5 of Annexure B (WRM, 2020), Lawsons Creek is crossed by public and private roads. Most of these are low level crossings (i.e. limited flood immunity) that would have no perceptible impact on flood conditions. The existing Maloneys Road (Lawsons Creek – Pyangle Road) would be inundated once flood levels exceeded the road crest level. Emergency management protocols for the Mine Site would be used to inform responses in the event of this occurring.

Representative Comment(s)

Figure 6.9 shows depths not velocities for the Lawsons Creek extent 1% AEP event. (Annexure B – Flooding Assessment)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Bowdens Silver acknowledges that depths and not velocities for the 1% AEP event were presented in Figure 6.9 of Annexure B (WRM, 2020). The correct figure is provided as **Figure 5.12**.

5.24.17 Final Void

Representative Comment(s)

In the final landform, what are clean water diversion channels? What about potential seepage form (sic) *the final void and the satellite pits.*

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

Response

A clean water diversion channel would be constructed to direct (divert) runoff from the upstream Blackmans Gully catchment around the final void. This channel would:

- manage water levels in the final void by limiting inflows; and
- re-instate streamflows to receiving watercourses from rehabilitated Mine Site catchments.

Figure 5.12 Predicted Flood Velocity (Existing Condition), 1% AEP

Whilst the main open cut pit would be retained as a final void, Section A5.10.3 of Appendix 5 of the EIS describes the rehabilitation of the satellite open cut pits which would be backfilled to restore the existing ground surface elevation. As noted in Section 6.4.2 of Jacobs (2021), the final void is predicted to remain a groundwater sink, with predicted final equilibrium levels below the pre-mining groundwater level. This reduced level, coupled with ongoing evaporative loss from the pit lake means that the direction of net groundwater flow would be towards, not away from, the final mine void.

Representative Comment(s)

What are the metal concentrations in the final void?

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

The water quality analysis for the final void is limited to salinity with no discussion of the potential long-term build-up of metals in the void lake.

Is it suitable to use the leachate salinity of 130 µS/cm in the early years of the recovery/seepage?(Section 7.10)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The final void would effectively act as a groundwater sink that draws groundwater to the pit lake (as a result of evaporative losses from the lake surface) and therefore salinisation of the water would intensify over time. Similarly, the concentration of metals in the pit lake would increase over time. Bowdens Silver acknowledges that salts and metals would accumulate within the water management system as containment zone water is recycled and reused in processing operations (to minimise external water demands).

However, as described in EIS Section 4.7.5.4, this water would be retained within the Mine Site and prevented from entering the downstream environment and causing impacts on water quality.

Section 7.6 of WRM (2020) identifies that a salinity of 130µS/cm was adopted for catchment runoff entering the final void rather than leachate. The final void numerical modelling does not assume any significant volumes of leachate reporting to the final void due to the management measures described in Section 8.6.1 of WRM (2020). For estimating the contribution of groundwater to void lake salinity, a groundwater inflow salinity (EC) of 1 420µS/cm (which is the median of site bore samples) was adopted.

Representative Comment(s)

The analysis of the final void does not appear to consider a seepage catchment area which could have the potential to increase inflows into the void.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The groundwater inflow rates provided by Jacobs were derived from peer-reviewed regional groundwater modelling that simulated post-mining recovery of the regional groundwater system, including all potential areas where a seepage catchment may exist. As noted in Section 7.3 of

WRM (2020), water is expected to accumulate in the final void until evaporative losses balance the combined influence of catchment runoff, rainfall and groundwater inflow. Groundwater inflows to the final void were based on the results of groundwater modelling undertaken by Jacobs (2021). Figure 7.4 of WRM (2020) show the pit lake water level versus groundwater inflow rates provided by Jacobs and used in the analysis. In summary, over a sufficiently long time-scale, water levels are expected to reach a nominal steady state, with some variation about the steady state level during prolonged periods of wet or dry climate bias. However, it is expected that the use of low permeability liners for the WRE and TSF would further reduce potential seepage fluxes from either of these landforms.

Representative Comment(s)

Section 4.7.5.5 (R. W. Corkery & Co. Pty. Limited, 2020, pp. 4-161) quotes long term evaporation from the pit lake of 309 ML/a and groundwater inflow of 102 ML/year, yet the Aquifer Interference Assessment submission (Q11 of Jacobs (2020) p 5-197) anticipates a long term take of 200 ML/a.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Review of this comment has identified that the long-term groundwater take provided in the Aquifer Interference Policy Checklist (Annexure 1 of the groundwater assessment presented with the EIS) was incorrectly identified as 200ML/year. The correct value is 133ML/year which is identified in Table 28 of Jacobs (2021) as the predicted long-term equilibrium take at 200 years post mining.

Irrespective of the value (i.e. 102ML/year, 133ML/year or 200ML/year), Bowdens Silver holds sufficient WALs to cover predicted inflows. These inflow volumes would undergo further refinement from the regular review and updates to the numerical groundwater model throughout the Project Life.

The groundwater inflow rates provided in Section 4.7.5.5 of the EIS are average annual rates over the entire simulation period modelled under climate change scenarios and presented in WRM (2020). The numbers referenced by each report relied upon different modelling processes and outcomes with the modelling completed by WRM more refined than the numerical groundwater model in this regards. Therefore, the WRM model was the principal assessment method for predicting the final void water level. The numerical groundwater model used to assess regional post mining impacts to the groundwater setting included inflow volumes. This is considered to be conservative as the higher inflow volume was used to identify Bowdens Silver's post mining WAL obligations.

5.24.18 Post Closure Water Volumes

Representative Comment(s)

Council requests confirmation as to the long term impacts to the Region's water supply, and impacts downstream resulting from the open cut pit lake, which will require 133ML/year to fill over 200 years, post mining.

Mid-Western Regional Council

Response

All inflow volumes to the open cut pit lake post closure would be licensed in accordance with the NSW Aquifer Interference Policy and therefore, would not impact the availability of water (water supply) to the region.

Table 28 of Jacobs, 2021 identifies that following closure, the predicted maximum and ongoing (equilibrium) take for the open cut pit lake would be as follows.

- A maximum 386ML/year decreasing to 59ML/year from the Lachlan Fold Belt Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources.
- A maximum 223ML/year decreasing to 52ML/year from the Sydney Basin Groundwater Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources.
- A maximum 22ML/year from the Lawsons Creek Water Source of the Macquarie Bogan Unregulated and Alluvial Water Source (2012).

With regards to groundwater supply, the potential drawdown of the water table due to dewatering was predicted using a peer-reviewed numerical groundwater modelling that was developed using information from detailed site investigations. At the end of mining, the maximum extent of the cone of drawdown would have a radius of up to 2km from the open cut pit and would not propagate significantly further post mining. Modelling has predicted that minor drawdown would occur for a period of 16 years post-mining and then at negligible levels until 50 years post-mining after which changes would not be detectable from seasonal fluctuations in water levels. At a radius of nearly 2km, the drawdown cone would reach a state of near-equilibrium (i.e. it ceases to expand), meaning that the horizontal flow of groundwater from all points along the circumference of the drawdown cone, plus any rainfall recharge occurring within the area of drawdown, would be equal to the net take of water from the open cut pit lake. This means there would be no lowering of the water table outside of the predicted extent of drawdown due to mining and underground water supply outside of the predicted maximum extent of drawdown propagation would not be impacted.

In the proposed final landform, the bulk of surface water runoff in Blackmans Gully would be diverted around the main open cut pit to reduce capture in the open cut pit lake and to maximise flows in Hawkins Creek and Lawsons Creek.

In summary, it is recognised that groundwater and some surface water would flow to the open cut pit lake post closure. However, once equilibrium is established in the lake, the change in flows would be negligible and not noticeable at any private water supply.

Representative Comment(s)

Post closure licensing needs to consider final void take as well as baseflows.

Final void surface catchment of 51.3 ha at 0.7 ML/ha/yr is equivalent to 37 ML – i.e. total of 59 ML required when considering predicted baseflow losses as well.

Is the TSF fully rehabilitated in the final landform, i.e. is there any future potential water take that needs to be considered? (Section 8.1.3.6)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Bowdens Silver holds sufficient WALs to cover the requirements identified above and notes that during operations, pit inflow volumes would be used to inform ongoing validation of the groundwater model and refinement of licensing obligations.

Whilst incident rainfall would fall onto the pit lake, all upstream runoff would be directed around the final void via the diversion channels shown on EIS Figure A5.9. This runoff from rehabilitated or undisturbed catchment areas would discharge to Hawkins Creek and flow onto Lawsons Creek.

With respect to the TSF, closure and rehabilitation activities would be undertaken to render it a free-draining landform that would direct all runoff from the vegetated store and release cover system to the closure spillway (refer Advisian, 2020b). Details of this strategy are provided in Advisian (2020b), EIS Section 2.16.5 and shown on EIS Figure A5.16.

5.24.19 Satellite Pits Post Closure

Representative Comment(s)

…post closure status of the satellite pits in regard to water recovery levels and potential to interact with other surface water and groundwater systems.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

Section 5.10.3 of Appendix 5 of the EIS describes the rehabilitation of the two satellite open cut pits (eastern and western). In summary, these pits would be backfilled with NAF waste rock to restore the existing ground surface elevations. Once backfilling is completed, the landform along the western margin of the eastern satellite pit would be shaped to create a rock-lined channel for the re-establishment of upslope flows from Blackmans Gully to Hawkins Creek. These flows would be conveyed around the final void by the clean water diversion channel (refer EIS Figure A5.9).

5.24.20 Best Practice Management Measures

Representative Comment(s)

Whilst both estimated surface water and groundwater impacts are dealt with, the remedial actions should consider a contingency should the impacts on ground or surface water be greater than those modelled. Both ground and surface water are identified as being high and medium agricultural risks in the assessment (Section 1.8 Page 14-33, AIS).

NSW DPI - Agriculture

Response

A Water Management Plan would be prepared by Bowdens Silver post-approval and in consultation with DPIE, DPIE Water and the NSW EPA. The Water Management Plan would include monitoring programs to collect data on groundwater levels, surface water and groundwater quality and to measure water volumes (e.g. pit inflow). The results of this monitoring would be published in an Annual Review for the Mine that would also present an

assessment of these results against predictions presented in the EIS and SCSC. Should this assessment identify a substantial deviation from predicted results, Bowdens Silver would investigate and, if required, undertake model revisions.

The Water Management Plan would also outline a process to identify the source of any water quality or quantity impacts should they exceed nominated triggers at a specified frequency (i.e. multiple exceedances of a water quality parameter would require an investigation to identify the source or cause). The investigation would inform the adaptive management measures to be undertaken by Bowdens Silver to mitigate any further exceedances.

Representative Comment(s)

Best practice and full range of methods not discussed – examples from Cloudbreak and other mine's treatment of contaminants should be followed.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver confirms that the management measures considered and presented in the EIS and various assessments are based on current industry best practice. It must be noted that designs for the WRE and TSF are preliminary only and suitable for the current stage of mine planning. These designs would be further advanced during detailed design for the Project.

Bowdens Silver notes that the Cloudbreak Mine is an unsuitable analogue for this Project. The Cloudbreak Mine is an iron ore operation located in the Pilbara region of Western Australia which requires substantially different environmental management measures due to its geology, terrain, climate and groundwater regime.

Representative Comment(s)

More definitive and robust key performance indicators would instil confidence in the planned management.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Key performance indicators (or objectives) relating to surface water would be included in a Water Management Plan that would be prepared in consultation with DPIE, DPIE Water and the NSW EPA.

5.24.21 Monitoring

Representative Comment(s)

It is recommended the proponent:

a) develops a surface water quality monitoring program including but not limited to:

i. water quality monitoring locations;

ii. analyte list and sampling frequency for each monitoring location;

iii. the sampling method for each location;

iv. the method of analysis for each analyte (as per Approved Methods for the Sampling and Analysis of Water Pollutants in NSW, 2004) and practical quantitation limit;

v. a site-specific relationship between TSS and turbidity if triggers are provided in TSS concentrations; and

vi. timing and frequency information for each sampling regime. Sampling should be carried out with a frequency commensurate with risk and stage of operation (including ongoing monitoring for post closure stages).

b) develops a Trigger Action Response Plan (TARP) (that includes decommissioning and rehabilitation monitoring). The TARP should include contingencies to identify and manage any unpredicted impacts and their consequences to ensure corrective actions are implemented;

c) applies ANZECC (2000) Interim working levels or ANZG (2018) draft DGVs for toxicants where no moderate or high reliability guideline value is available; and

d) if site-specific guideline values are developed, they are to be consistent ANZG 2018. The reference sites should be representative of a slightly disturbed condition.

NSW Environment Protection Authority

The monitoring network should be improved and detailed. Triggers for action should be agreed with the community now and approved.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

A Water Management Plan would be prepared in consultation with DPIE, DPIE Water and the NSW EPA. Such a plan would require approval prior to mining commencing. The plan would identify the appropriate monitoring locations and monitoring parameters. Site specific trigger criteria would also be established based on the monitoring data record and in consultation with NSW regulatory agencies.

Developing such a plan prior to mining commencing, as opposed to the environmental approvals stage, allows for further collection of monitoring data. As Bowdens Silver's surface water monitoring program continues, this monitoring data may then be used to derive more representative trigger values.

Representative Comment(s)

Will I need to be constantly testing the health of the water to ensure I am not causing any long-term health concerns for my children and husband?

How can the mine owners ensure that there will be no leaching into the Lawson Creek?

Catherine McNeill of Mount Knowles, NSW (Submission SE-8482164)

Response

As noted in Section 5.24.3, the assessment of human health risks (enRiskS, 2021) concluded there was negligible potential for adverse, Project-related health impacts associated with surface water and groundwater resources.

Bowdens Silver would continue to monitor water quality in Lawsons Creek and groundwater quality in its immediate vicinity as well as other locations within its proposed monitoring network. The results of this monitoring would assist Bowdens Silver in assessing the effectiveness of management and mitigation measures and informing additional actions, should they be required.

Representative Comment(s)

Will the mine be providing regular water test result to the Lue Action Group and general public within the greater Mudgee basin who will potentially be affected by water quality?

(Name Withheld) of Mount Frome, NSW (Submission SE-8571413)

Response

Bowdens Silver would include a meaningful summary of the results of its environmental monitoring program, including surface water and groundwater, as part its reporting obligations to DPIE (Annual Review) and the EPA (monthly). In accordance with current regulatory requirements, Bowdens Silver expects to publish the Annual Review on its website for the information of all interested parties, including the Lue Action Group and members of the general public, irrespective of their location. Any monitoring required under the Environment Protection Licence for the Mine would be summarised and reported monthly with the data accessible to the public from the Bowdens Silver website.

5.25 TAILINGS STORAGE FACILITY

5.25.1 Overview

Clarification regarding the design, operation, management and closure of the tailings storage facility (TSF) was requested in various Government agency submissions and concerns regarding the facility were the subject of many community submissions, across a range of associated environmental matters.

This subsection provides responses to submissions that either:

- specifically referenced information provided in ATC Williams (2020); or
- were associated with perceived general risks arising from the construction and operation of the TSF and deposited materials.

It is noted that submissions relating to potential impacts of the TSF on groundwater resources, including seepage are addressed in Section 5.11 of this document.

Bowdens Silver commissioned ATC Williams Pty Ltd (ATC Williams), a globally recognised engineering consultancy specialising in dam design and tailings management, to undertake preliminary design of the Project's TSF. The preliminary design of the TSF is presented in "*Bowdens Silver Project Lue, N.S.W. – Tailings Storage Facility Preliminary Design"* (ATC Williams, 2020). Specifically, ATC Williams was engaged to establish the TSF construction and operational methodologies and preliminary consequence categorisation to inform commensurate design criteria including:

- minimum storm storage allowance and contingency freeboard to reduce the risk of overtopping in an infrequent/rare rainfall event (1% Annual Exceedance Probability (AEP));

- emergency spillway capacity to safely convey peak flows of extremely rare rainfall events (0.001% AEP or 1 in 10 000 years);
- maximum ground acceleration to ensure embankment stability in 0.01% AEP or 1 in 1 000 years earthquake; and
- liner permeability and treatment to limit seepage.

These design criteria were identified using Dams Safety NSW, Australian National Council on Large Dams (ANCOLD) and NSW EPA guidelines for dam design. It is noted that ATC Williams (2020) identifies the most stringent design criteria were adopted for preliminary design of the TSF.

Whilst the following responses provide further clarification and information where necessary, there has been no change to the preliminary design or reporting prepared by ATC Williams (2020) with the following general conclusions retained.

- The preliminary design adopted minimum criteria in accordance with industry best practice.
- The preliminary design incorporates mitigation measures commensurate with identified risks.
- The engineering guidance utilised to inform preliminary design remains current and industry best practice.
- Seepage mitigation measures presented in ATC Williams (2020) would result in seepage rates lower than the maximum allowable rates of the EPA.
- The proposed water management of the TSF, including design storm storage allowance, freeboard and the additional mitigation measures of WRM (2020) reduce the risk of spillway discharge.
- Deposited tailings would be safely contained.

Notwithstanding the above, and as described in Section 3.3 of this document, Bowdens Silver has proposed to add further design elements that provide additional seepage mitigation to the measures presented in ATC Williams (2020).

It is acknowledged that the TSF structure is a particular source of concern for some community members, as reflected in the submissions discussed in this subsection. It is considered that sufficient information has been provided regarding the preliminary design of the TSF to support approval of the Project and to inform the next stage in development of this structure, i.e. detailed engineering design supported by further sampling and technical assessment. It is re-iterated that the use of tailings storage facilities is common practice in metalliferous mining across Australia and globally. The few cases of failure are the exception for this practice and not consistent with the many successful facilities that are designed, constructed, used and rehabilitated for mining purposes.

As has been described for other practices applied for the Project, the management of the TSF would be subject to a strict compliance and reporting regime that would ensure that performance is checked, trends in monitored outcomes are identified and analysed and that management may be adaptive.

5.25.2 TSF Design

Representative Comment(s)

It is recommended the proponent refer to the following during the detailed design of the TSF:

- *Australian Government Tailings Management: Leading Practice Sustainable Development Program for the Mining Industry (2016) risk-based approach*
- *NSW Dams Safety Committee (DSC) declarations and guidelines*
- *ANCOLD Guidelines on Tailings Dams, ANCOLD (2012)*
- *NSW EPA Solid Waste and Landfill Guidelines (2015, 2016)*
- *AS/NZ ISO 31000:2018 Risk Management – Principles and Guidelines (Standards Australia, 2009)*

NSW Environment Protection Authority

A detailed risk assessment for the construction of the tailings dam should also be undertaken.

Mid-Western Regional Council

I'm concerned about the tailing's dam not being up to world standard.

Rebecca Guilfoyle of Rylstone, NSW (Submission SE-8637865

Bowdens does not plan to have a second tailings dam should the first one fail. I recommend they have a second tailings dam for safety.

James White of Tyagarah, NSW (Submission SE-8640341

Response

Section 9 of ATC Williams (2020) identifies the ANCOLD and NSW DSC (now Dams Safety NSW) guidance documents recommended in the EPA submission were adopted as TSF preliminary design standards. It is noted that ANCOLD (2012) was developed to support Commonwealth guidance on tailings management and recommends applying the risk-based management principles presented in AS/NZS ISO 31000 throughout the entire TSF life cycle (e.g. design, operation and closure). Furthermore, Section 17 of ATC Williams (2020) considers the NSW EPA guidance identified above. Bowdens Silver would engage an engineering consultancy with similar capabilities to those of ATC Williams for the detailed design and construction supervision of the TSF.

The process of TSF design is principally guided by the assessment of risks to human life, property and the environment. This process identifies the minimum design criteria that are commensurate with the risk. These criteria then establish the nature, extent and management of TSF design elements that would be constructed to reduce or eliminate risks.

This notwithstanding, Bowdens Silver must prepare and implement a dam safety management system during all aspects of the TSF lifecycle, including design, construction and operation in accordance with the NSW *Dams Safety Regulation 2019*. The dam safety management system must be provided to Dams Safety NSW, an independent regulatory agency with enforcement powers under the NSW *Dams Safety Act 2015*.

Dams Safety NSW guidance identifies that the dam safety management system should:

- describe the processes and procedures associated with the risk framework for the dam;
- include procedures identifying Bowdens Silver's responsibilities and accountabilities for hazard identification, risk analysis, risk evaluation and risk treatment processes; and
- include a description of the risk management framework and how often hazard identification, risk analysis, risk evaluation and risk treatment processes are carried out.

Bowdens Silver notes that neither current State nor national tailings dam design guidance requires construction of a second tailings dam embankment to manage the risk of an upstream TSF embankment failure.

5.25.3 Liner Design and Reliability

Representative Comment(s)

Preliminary investigations reveal that the in-situ clays across the site are heterogenous, having variable low to medium-high plasticities across the TSF site. Details regarding the clay distribution across the TSF layout have not been provided as a means to interpolate the spatial spread of clay variability within the impoundment area.

…the proposal of compacting impermeable clays, where available in-situ, to thicknesses that are lesser than 1,000mm is not considered suitable for the preferred TSF site…The EPA believes a full depth storage blanket liner, of at least 1,000mm is most suitable across this identified TSF site.

EPA Request: *Proposed TSF design and potential impacts on groundwater*

a). In line with the concerns raised above, the proponent should provide further information regarding the TSF design, liner options and the prevention of seepage to the underlying strata.

NSW Environment Protection Authority

Response

Detailed TSF seepage management and mitigation measures are presented in the EIS and ATC Williams (2020) and summarised in Section 3.3 of this document. Further refinement of TSF seepage controls would occur, where necessary, following further on-site investigations undertaken to support detailed design of the TSF.

The preliminary design for the TSF presents discussion on the liner design (refer Section 17 of ATC Williams (2020)). This discussion identifies that the assessment of the proposed 0.45m thick compacted clay liner was undertaken using laboratory (consolidation) testing of tailings samples and permeability testing of clay samples obtained from the TSF impoundment area. As noted in Section 17.4 of ATC Williams (2020), based on these assessments, even at the maximum tailings thickness (20m), the expected seepage rate ($6.0 \times 10^{-9} m^3/sec/m^2$) is lower than the EPA's maximum allowable seepage rates for a 1m thick liner ($2.0 \times 10^{-8} m^3/sec/m^2$). Bowdens Silver notes that further consultation with the EPA (email dated 9 October 2020) has confirmed that the proposed liner configuration and permeability presented in the EIS and ATC Williams (2020), met the EPA's criteria, provided any approval was supported by appropriate conditions of consent.

Furthermore, it is anticipated that the detailed design process would include thorough additional assessment not required at the preliminary design stage such as processes to assess how variability in natural permeability may be assessed and improved during construction and further consideration of the risks associated with secondary seepage (that is, seepage from the broader impoundment area).

Notwithstanding the above, additional TSF design elements have been assessed at the request of Bowdens Silver to further reduce potential groundwater impacts in recognition of advice from Government agencies and submissions received from the community. A summary of this assessment is provided in Section 3.3 whilst full details are provided in Section 6.5 and Annexure 10 of the Groundwater Assessment (Jacobs, 2021). Bowdens Silver would ensure that the final TSF design would achieve seepage rates and impacts no greater than those predicted by the conservative assessment undertaken Jacobs (2021).

Representative Comment(s)

Construction to achieve the design over an uneven natural surface will be difficult. How will quality control ensure the minimum 0.45m thickness is achieved?

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

As noted in Section 22.3 of ATC Williams (2020), where a 0.45m clay liner is proposed, the surface would not be uneven, rather the area would undergo:

- topsoil removal (including clay and unsuitable materials);
- ripping;
- moisture conditioning;
- compaction; and
- placement, moisture conditioning and compaction of clay in 150mm thick layers.

However, Bowdens Silver has been assessing alternative design elements to further reduce seepage rates beyond that achieved by the 0.45m compacted clay liner, potentially rendering the above approach redundant. Notwithstanding this, construction specifications would be developed during detailed design and issued with construction plans. A key selection criterion for the construction contract would be the proposed approach to quality assurance and quality control. This would include a program with sufficient testing frequency and standards to support construction certification (e.g. AS 1289 Soil compaction and density tests, International Association of Geosynthetics Installers). The results of this program would be overseen by the construction contractor and supervising engineer.

5.25.4 Prevention of Overflows

Representative Comment(s)

…it is unclear how the TSF will be operated to ensure overflows will be prevented throughout the entire project. There has been no indication as to whether clean water diversions are proposed for the TSF.

NSW Environment Protection Authority

Response

Clean water diversions are not proposed for the TSF as the surrounding catchment limits opportunity for their construction. Subsequently, the minimum design criteria for storm storage allowance and freeboard provided in ATC Williams (2020) were derived using the maximum extent of the TSF contributing catchment.

Section 4.7.9 of WRM (2020) identifies the operational arrangements that would be implemented to manage water volumes in the TSF. In summary, TSF water levels would be managed via pumped transfers to the processing plant and, during very wet periods, transfers to the main open cut pit (if required). It is noted that the potential water storage capacity of the TSF is lowest prior to an embankment raise (when the distance between the tailings beach and spillway invert is at a minimum) and greatest immediately following embankment construction/raises.

The operational arrangements presented in WRM (2020) would not replace the minimum TSF operational criteria nominated in the TSF design (e.g. operational freeboard, storm storage allowance). Rather, they would be implemented concurrently to provide additional contingency and reduce the risk of spillway discharge during operations.

Section 5.5 of WRM (2020) presents modelling results identifying the proposed containment (mine affected) zone water system, of which the TSF is a component, can retain all water without release under the modelled conditions.

Representative Comment(s)

Unclear of *the source of the proposed 0.75 m freeboard for the TSF Transfer Level.*

Expectation is that required freeboard = Max Extreme Storage: 1:100 AEP 72hr + 0.5 m contingency + 1:10 AEP wave run-up = ~2.9 m (Section 4.7.9)

Lue Action Group, NSW (Submission SE-8654995) – Attachment 5

Response

The TSF would be operated in accordance with either the ANCOLD (2012) requirements as set out in ATC Williams (2020) or as specified by Dams Safety NSW. However, as a minimum, the TSF decant pump station would have the capability to re-instate the 1 in 100 72-hr storm capacity within 7 days of a design storm. For modelling purposes, it was assumed that under normal operating conditions, water pumped from the TSF would be limited by process plant demand. However, modelling identified that, under some rainfall conditions, additional pumping (i.e. exceeding plant demand) would be required to re-instate the freeboard. The abovementioned TSF transfer level refers to the modelled trigger level at which this additional pumping would be instigated to the main open cut pit, to re-instate the required freeboard. Operationally, if the design freeboard could not be reinstated within seven days, additional pumping would be instigated at lower levels.

5.25.5 Surface Water

Representative Comment(s)

In the WRM Water and Environment mine mass balance, the majority of 'outflow' from the site is actually storage in the voids of tailings (1,151 ML/a of 1,857 ML/a in Table 5.5 (page 6--83). There is no discussion on how long the contamination will remain in the voids post mining.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Section 5.2.1 of WRM (2020) describes the inflows and outflows associated with the processing plant. WRM (2020) also identifies that approximately 25% of the moisture entrained within the tailings stream would be released soon after deposition within the TSF. This means that approximately 1.05ML/day would report to the TSF decant pond whilst the remaining 3.18ML/day would be retained within interstitial pores although some would be subsequently lost to evaporation.

Furthermore, as noted in Section 16 of the TSF preliminary design (ATC Williams, 2020), the progression of tailings deposition would increase the dry density of deposited tailings with depth. This consolidation would reduce the tailings void ratio (permeability) and thus the capacity of tailings to retain interstitial water.

Bowdens Silver recognises that some interstitial (pore) water would remain within the TSF and some may migrate downward to enter the groundwater system as seepage. However, the design of the TSF would incorporate measures to reduce seepage to acceptable levels.

Bowdens Silver commissioned assessment of additional seepage mitigation measures which are summarised in Section 3.3 (full details in Section 6.5 and Annexure 10 of Jacobs (2021)). This assessment was inherently conservative and identified that water quality would not reduce the range of beneficial uses currently applied to local groundwater and surface resources. Bowdens Silver would ensure the final TSF design would result in impacts no greater than those predicted by Jacobs (2021).

5.25.6 TSF Failure

Representative Comment(s)

The *catastrophic failure of the tailings dam would have a devasting effect on the above uses of the Lawsons creek, the catchment of which, also supplies water to the Macquarie catchment.*

(Name Withheld) of Totnes Valley, NSW (Submission SE-127486)

Response

Catastrophic failure of tailings storage facilities, the likes of which have been presented in the media when occurring in other countries, have not occurred in Australia. This is likely to be because of the regulatory regime that applies to these structures in Australia and NSW. The consequence of TSF failure is explicitly recognised in ATC Williams (2020) with the assignation of a High C consequence category made in accordance with Dams Safety NSW criteria. As noted above, the consequence category determines the design criteria and ongoing management requirements of the TSF.

The detailed design process would include a comprehensive analysis of the tailings run-out envelope and implications in the event of a dam break.

Representative Comment(s)

Tailings dams regularly fail around the world (23 in the past five years), one of which was not far away at Newcrest Mining's Cadia Gold Mine near Orange NSW.

Ben Nagel of Mayfield, NSW (Submissions SE-8654963)

The embankment at Newcastle's Cadia Gold Mine at Orange failed in March 2018 resulting in breakthrough of tailings material. The breakthrough was contained within a second tailings dam. Bowdens does not propose to have such a back up.

(Name Withheld) of Havilah, NSW (Submissions SE-8529249)

Response

Bowdens Silver notes that detailed investigations of tailings dam failures are conducted to identify the cause. The results of these investigations are invariably used to inform refinement or extension of the processes (i.e. field investigation) associated with subsequent TSF designs or operational arrangements to reduce or eliminate the risk of the failure mechanism re-occurring.

Detailed technical review of the failure at the Newcrest Cadia Valley Operations was undertaken by Ashurst Australia in April 2019. The review identified a number of geological and foundation construction matters that led to the failure. It was noted that an earthquake was not the likely cause of the failure. The report was used to inform restoration of operations at the Cadia Mine which have since occurred. That is, the failure was managed safely and operations are continuing. As noted above, catastrophic TSF failures have not occurred in Australia and this is considered to be a result of the detailed requirements of planning and design as well as the strict regulatory regime for management of these structures.

As noted in Section 5.25.1, no current State or national tailings dam design guidance requires the construction of a second tailings dam embankment to manage the risk of an upstream failure. The failure of the Northern TSF at Cadia resulted in tailings entering the impoundment area of the Southern TSF. This latter TSF was not constructed as a contingency (back-up) measure to mitigate failure risk of the Northern TSF with both facilities operational at the time of the failure.

Representative Comment(s)

There is a significant risk of dam failure under a rainfall event greater than 100 ARI. Rainfall events of greater magnitude have already occurred in the Mudgee Region.

Central West Environmental Council of Summer Hill Creek, NSW (Submission SE-8598199)

Response

Section 12.2 of ATC Williams (2020) identifies that at a minimum, the TSF would be operated with a storm storage allowance (freeboard) equal to the volume of runoff generated in the 1% AEP 72 hour rainfall event (1 in 100 year). In addition, Section 4.7.9 of WRM (2020) identifies the additional operational arrangements (pumping) that would be implemented to ensure freeboard levels are maintained.

Subsequently, the risk of a "failure to contain" rainfall event would be significantly reduced.

As ATC Williams (2020) identifies, the spillway of the TSF would have the capacity to convey the 0.001% AEP rainfall event (i.e. 1 in 100,000 year), the risk of catastrophic embankment failure as the result of overtopping in a 1% AEP (1 in 100 year) rainfall event is negligible.

5.25.7 Chemicals Retained

Representative Comment(s)

I think it is vital that the following points be reconsidered… The lack of research on pollutants that will be left behind on the site.

Jenny Kerr of Mudgee, NSW (Submission SE-8647321)

The tailings will contact 17-20% of the lead, zinc and silver mined due to losses during ore processing. Other metals present include arsenic, antimony, fluorine and manganese.

Andrew Fuller of Moree, NSW (Submission SE-8648698)

Response

The geochemical characteristics of the tailings are summarised in EIS Section A5.7.2.2 with full details provided in Annexure 2 of GCA (2020).

Irrespective of the chemical constituents and as noted in EIS Section A5.10.7.1, the key objective of TSF rehabilitation is to contain all tailings and limit significant dispersal of tailings solids or liquids to the surrounding environment via groundwater, surface water or air. The retention of tailings solids and liquid would be facilitated by the engineered liner design (see Section 3.3 and ATC Williams (2020)). Following the cessation of operations, the TSF would be rehabilitated via the installation of a vegetated store-and-release cover to limit percolation of rainfall into the tailings, details of the design concept and proposed configuration of this system is provided in Advisian (2020b). This cover would result in a free draining landform that encapsulates the stored tailings in a stable landform.

Whilst it is recognised that minor rates of seepage would occur, additional assessments undertaken by Jacobs (2021) identified that the implications from seepage would be negligible (see Section 3.3).

It is noted that Jacobs (2021) adopted a conservative approach that likely over-predicts potential impacts to surface water and groundwater resources.

Representative Comment(s)

The EIS states: "…the bulk of the chemical reagents required for processing would report to the produced silver/lead and zinc concentrates and would not be deposited as part of the tailings stream."

This stated fate of reagents appears to be in direct contradiction to EIS Table 2.4 which shows that on a tonnage basis most of the chemicals end up in the tailings.

The risk to wildlife like water birds who are exposed to this leachate in the TSF decant pond or the WEA leachate management dam is not known.

Table 2.4
Processing Plant Reagents

Reagent	Chemistry	Function	Form / Container	Annual Usage (tpa)	Maximum Quantity on Site	Fate of Reagents
Hydrated lime/ soda ash	$CaOH/Na_2CO_3$	pH Adjustment	Powder / 60t silo	1 236	60t	Tailings
Zinc sulphate	$ZnSO_4.7H_2O$	Zinc Depressant	Powder / 1t bulk bag	610	50t	Tailings
Copper sulphate	$CuSO_4.5H_2O$	Activator	Powder / 1t bulk bag	450	40t	Tailings
MIBC	Methyl Isobutyl Carbinol	Frother	Liquid / 800kg IBC	222	20t	Tailings / Decomposed
Sodium cyanide#	NaCN	Zinc Depressant	Pellets / Isotainer	190	20t	Tailings / Decomposed
Flocculant	Anionic polyacrylamide	Flocculation	Powder / 0.8t bulk bag	139	12t	Tailings
Lead collector	Na - diisobutyl dithiophosphinate	Lead Collector	Liquid / 1000L IBC	24	4t	Most to Concentrate / Balance to Tailings
Zinc collector	Na isobutyl dithophosphate	Zinc Collector	Liquid / 1000L IBC	22	4t	Most to Concentrate / Balance to Tailings
Caustic Soda	NaOH	pH Adjustment	Flake / 25kg bag	2.5	1t	Tailings
Antiscalant	Polycarboxylic acid or similar	Antiscalant	1000L IBC	20	4t	Tailings

* IBC = Intermediate Bulk Container # NaCN would be added with a concentration of 66mg/L

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Bowdens Silver acknowledges the discrepancy in EIS information. However, it is noted that the total annual tonnage of reagents in EIS Table 2.4 represents 0.1% of the 2 million tonnes of material deposited in the TSF each year.

Furthermore, of the reagents identified in EIS Table 2.4, representing over 90% of total reagents (i.e. 0.09% annual TSF deposition) the following can be summarised.

- Hydrated lime / soda ash (42% total reagents) are two readily dissociable compounds commonly used in water treatment for pH adjustment.
- Zinc sulphate hexahydrate (21% total reagents) is a common fertiliser that dissolves in water to form zinc ions (NPIC, 2012a).
- Copper sulphate pentahydrate (15% total reagents) is a common herbicide that also dissolves in water, forming copper ions (NPIC, 2012b).
- Methyl isobutyl carbinol (7.6% total reagents) is a readily biodegradable aliphatic alcohol (Price, 1974).
- Sodium cyanide (6.4% total reagents) which is a readily volatilised compound (NICNAS, 2010).

With regards to wildlife risks, the TSF would be hydraulically disconnected from receiving watercourses and the Mine Site would be fenced. It is also noted that many of the reagents identified above readily degrade to form non-toxic compounds (e.g. sulphate or calcium carbonate) or ions (e.g. zinc or copper). Whilst degradation products such as calcium carbonate reduce the bioavailability of dissolved metals via complexation, it is noted that the US EPA considers zinc non-toxic to bird populations and copper moderately toxic.

5.25.8 EPA's Cyanide Limit

Representative Comment(s)

The projects feasibility study found free cyanide (3mg/L) and weak acid dissociable cyanide (7mg/L) within the tailings would be "substantially lower than the EPA's limit for NSW mines of 30mg/L" (Aquatic Ecology Section 1.2.3.4). The EPA is not aware of this limit.

NSW Environment Protection Authority

Response

Bowdens Silver acknowledges the NSW EPA does not have a published, standard 30mg/L limit for weak acid dissociable cyanide at mining operations in NSW.

However, as noted in EIS Section A5.6.6, the 30mg/L concentration is a published limit condition of Environmental Protection Licence EPL 20169 (refer Condition L2.4). This licence was issued by the NSW EPA for the Tomingley Gold Mine which utilises cyanide for ore processing.

5.25.9 TSF Seepage

Representative Comment(s)

I'm concerned about potential leaks or worse from the tailings dam. How will this risk be minimised and what undertakings have the project made if the unimaginable happens?

(Name Withheld) of Mudgee, NSW (Submission SE-8619224

There are no contingencies for leakage from the Tailings Storage Facility.

Clare Hamilton of Rylstone, NSW (Submission SE-8628154)

Leaks would only be detected when acid mine drainage has escaped the containments. The location of a leak would not be easy to find and repairs do not appear possible.

Michael White of Manobalai, NSW (Submission SE-8570166)

There is no contingency to remediate leakage.

(Name Withheld) of Havilah, NSW (Submission SE-8655450)

Mitigations for potential problems such as TSF or leachate dam leakage are not provided.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The US Army Corps of Engineers notes that all earth and rock-fill dams are subject to seepage, through either the embankment, foundation and / or abutments (USACE, 2004). The expected seepage rate from the TSF ($6.0 \times 10^{-9} m^3/sec/m^2$) presented in Section 17.4 of ATC Williams (2020) is lower than the EPA's maximum allowable seepage rates for a 1.0m thick liner ($2.0 \times 10^{-8} m^3/sec/m^2$). However, additional TSF design elements for seepage mitigation have been assessed at the request of Bowdens Silver. Results of these assessments are summarised in Section 3.3 with further detail provided in Section 6.5 and Annexure 10 of the updated Groundwater Report (Jacobs, 2021). Additional seepage mitigation measures would supplement those already proposed in ATC Williams (2020).

The principal design objective for the TSF is development of a safe and stable landform that retains deposited materials. A suite of management and seepage mitigation measures would be incorporated into TSF detailed design, construction and operation to meet design objectives. The effectiveness of these measures would be routinely assessed, using data collected from the monitoring program described in Section 25 of ATC Williams (2020). Should this monitoring identify seepage rates exceeding those predicted during detailed design, a range of measures are available to trace the seepage pathway (e.g. geophysical investigations) and allow targeted mitigation such as the installation of pumping bores to intercept seepage and return it to the TSF. Groundwater monitoring in the vicinity of the WRE leachate management dam would also occur to measure the effectiveness of that structure's lining. Details of all groundwater monitoring would be provided in an approved Water Management Plan.

Representative Comment(s)

It is proposed that the tailings impoundment area outside the maximum water level area does not have any impermeable layer beneath it. There must be some risk of leachate leaking into the water table when the overlying tailings are saturated in this area outside the maximum water level area.

The EIS does contain the following section

- *The TSF impoundment foundation preparation in the area of tailings impoundment (i.e. remote from the decant pond area), including compaction also to achieve the equivalent permeability of $1mx10^{-9}m/s$.*

There is no detail provided as to how this reduced permeability target is achieved in the impoundment area remote from the decant pond.

There is no information provided as to how long this will prevent acid water containing heavy metals from seeping into the surrounding environment. There is no information provided as to where this design has been successfully used for an AMD tailings dam in the short term and long term.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The down valley method of tailings deposition promotes accumulation of tailings bleed water (decant) within a pond at the TSF embankment. Subsequently, the greatest extent of saturated tailings and thus seepage potential would occur beneath the operational decant pond (refer Figure 6 of ATC Williams (2020)). In order to reduce seepage potential, ATC Williams (2020)

included a 0.45m compacted clay liner (referred to as "foundation treatment B") beneath the operational decant pond. For contingency and to manage potential seepage from areas subjected to short term saturation, the extent of foundation treatment B included the maximum decant pond level. As shown on Figure 16 of ATC Williams (2020), the area of the impoundment not underlain by a foundation treatment B is very minor. Furthermore, these areas are situated in elevated, steep, upper reaches of the TSF and highly unlikely to be subjected to saturation.

As noted in Section 5.25.2, Section 22.3 of ATC Williams (2020) details how the proposed 0.45m clay liner would be developed.

Furthermore, as noted in Section 5.3.1, whilst there are many historical instances of environmental issues arising from AMD, many arose due to limited (or in some cases no) understanding of AMD processes. Bowdens Silver recognises the implications of AMD and commissioned a Materials Characterisation Assessment (GCA, 2020) to understand the geochemical behaviour over time. This was undertaken, in part, to inform preliminary design of the TSF and its capping and closure strategy. This strategy includes a store-and-release cover system to limit percolation and ingress of water into the tailings which would increase seepage potential. The proposed TSF closure strategy is not new and has been used for decades with success. Long-term assessment programs testing the efficacy of various cover systems installed over a range of materials and in a variety of site conditions include the Australian Alternative Covers Assessment Program (A-ACAP), the Contaminated Site Clean Up Database and the Alternative Cover Assessment Program (ACAP) from the U.S. Environmental Protection Agency (USEPA) and others.

Whilst the liner measures proposed in ATC Williams (2020) meet EPA permeability requirements, Bowdens Silver has elected to increase seepage mitigation measures in the TSF. These measures are documented in Section 3.3.

5.25.10 ANCOLD Guidelines

Representative Comment(s)

The 2019 ANCOLD dam management guidelines, as well as groundwater management around dams should be implemented.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

Bowdens Silver is committed to implementing best engineering practice as provided by contemporary guidance for the design, construction and operation of the TSF. As noted in ATC Williams (2020), ANCOLD guidelines on tailings dams was adopted for the preliminary design for the TSF.

5.25.11 Monitoring

Representative Comment(s)

As the consequence of failure of the proposed TSF has been determined as High C (from EIS), the monitoring of the TSF embankment needs to take account of the location of the TSF within an active mine site. It is therefore recommended that:

- *Daily inspections of the embankment take place;*

- *The Company shall ensure that peak particle velocities generated as a result of mining will not exceed 50 mm/s at any point on the TSF Dam embankment. A minimum requirement is that monitoring of blast vibration occurs at the closest point to the blast on the embankment crest;*
- *If peak particle velocities exceed 50mm/s, then an inspection of the dam by a suitable dams engineer is required;*
- *The Company shall develop a program of seepage monitoring, and report any occurrence of changes in seepage from the dam which are considered significant;*
- *The Company shall implement a program of subsidence monitoring, and report any occurrence of unexplained movement of the dam embankment;*
- *The Company shall develop a program of piezometer monitoring of geotechnical drillholes within the dam embankment and its surrounds and report on any unexplained movement of groundwater levels.*

Dams Safety NSW

Response

Bowdens Silver recognises the critical role of Dams Safety NSW in ensuring the safe operation of dams in NSW. ATC Williams (2020) classifies the TSF as a High C consequence category dam. In accordance with Clause 4 of the *Dam Safety Regulation 2019*, the TSF would be a "declared dam". Subsequently, plans detailing the operation, maintenance and emergency management of the TSF must be prepared and supplied to Dams Safety NSW. These plans would incorporate all current and future requirements of Dams Safety NSW, *Dams Safety Regulation 2019* and *Dams Safety Act 2015*, including those listed above.

As noted in the above comments from Dams Safety NSW, the monitoring network for the Project, including groundwater monitoring in the vicinity of the TSF, would be expanded to ensure that performance in satisfying the containment objective of the TSF has been satisfied.

5.26 TERRESTRIAL BIODIVERSITY

5.26.1 Overview

The following subsections provide a response to matters raised in relation to terrestrial biodiversity including the assessment of impacts to vegetation communities and threatened species. Submissions relating to aquatic ecology and biodiversity offsetting are addressed in Sections 5.6 and 5.7 respectively.

An updated version of the Biodiversity Assessment Report (BAR) is included as **Appendix 4** which clarifies and expands on matters presented in the assessment presented in the EIS. It should be noted that reference to the BAR throughout this document is to the updated report prepared by EnviroKey (2021). The updated BAR includes further details and survey information relating to *Swainsona* species after Bowdens Silver personnel identified individuals of *Swainsona recta* (a threatened species) within the Mine Site and proposed biodiversity offset area (see Section 3.5). Additional ecological field surveys[18] were undertaken within the Mine Site by

[18] Surveys for *Swainsona recta*, *Swainsona sericea*, *Euphrasia arguta*, *Prasophyllum* sp. Wybong and *Prasophyllum petilum* Tarengo Leek Orchid (AREA, 2021).

AREA during the spring flowering season and identified four *Swainsona recta* individuals and approximately 64 *Swainsona Sericea* individuals. Updated biodiversity credit calculations have been included in the BAR and summarised in Section 3.5 to provide for the *Swainsona* species. At the request of BCD, the credit summary now separates the credit calculations for the water supply pipeline and applies the linear-based assessment calculation tool.

The BAR, which incorporates additional ecological field survey and refinement of assessment outcomes, presents the comprehensive assessment that has been undertaken by EnviroKey and others and represents a thorough understanding of the potential risks to biodiversity values.

An assessment of the impacts of the 2019/2020 bush fires on MNES (Niche, 2021) has also been prepared (see **Appendix 5**). Niche Environment and Heritage Pty Ltd (2021) concludes that the loss of regional habitat for MNES listed species may in some cases result in increased reliance upon habitat within the Mine Site and Biodiversity Offset Area. However, it is also noted that impacts associated with the Project are unlikely to commence until at least 2022 and a significant degree of vegetative recovery is expected in areas impacted by the bush fires. As such, the increased significance of the habitat within the Project and Offset areas would reduce over time and the assessment outcomes of the BAR would not be significantly affected by the 2019/20 bush fires.

Whilst these updates assist in clarifying the biodiversity offset requirements and provide additional information on *Swainsona recta*, the outcomes of the BAR remain consistent with those originally presented in the EIS. That is, that while the Project would result in residual impacts to native flora and fauna, it is not expected to result in significant impacts upon migratory or threatened species, assuming the implementation of the range of on-site mitigation measures and the proposed biodiversity offsetting strategy.

5.26.2 General

Representative Comment(s)

The EIS has provided details of the Biodiversity Assessment Report (BAR) footprint of the pipeline, however given the uncertainty of the location of the pipeline corridor, these figures will likely be inaccurate. The BAR should be amended once the pipeline corridor has been finalised.

Mid-Western Regional Council

Response

Bowdens Silver acknowledges that, if any amendments to the pipeline corridor are required, these would need to consider the likely ecological and other environmental impacts of the realignment. The BAR provides separate calculations of disturbance and biodiversity offset credit requirements for the Mine Site and pipeline corridor. Therefore, should an amendment be required, the change in potential impacts can readily be compared and assessed. Notably, vegetation clearing associated with the pipeline corridor represents <4% of the total vegetation clearing associated with the Project. As such, it is not likely that any changes to the alignment of the pipeline would result is significant changes to environmental outcomes such that the merits of the Project should be questioned. Notwithstanding, in the event any amendments occur prior to approval of the Project these would be presented in an Amendment Report. Should any amendments to the Project be required post-approval a Modification Report would be prepared and accompany a modification application.

Representative Comment(s)

The wildlife will be scared away by blasting, vehicles, noise and mine activity.

(Name Withheld) of Kandos, NSW (Submission SE-8704052)

Response

Section 7.4.9 of the BAR addresses the potential for indirect impacts on biodiversity arising from noise, vibration and lighting. Whilst there is some potential for negative effects, there are many examples of fauna (including threatened fauna) co-existing with active mining projects. In fact, some aspects such as 'light pollution' can also have positive effects by attracting insects and moths which in turn attract microchiropteran bat activity. The BAR assesses both direct and indirect impacts.

Representative Comment(s)

The combined effects of drought, high temperatures and bush fires have massively further reduced populations of the local flora and fauna and have exacerbated the impacts of habitat loss and degradation.

Blue Mountains Conservation Society Inc of Springwood, NSW (Submission SE-8422283)

Response

It is acknowledged that recent climate variation and events such as prolonged drought and extensive bush fire have created a sense of helplessness in some community members in relation to Australia's biodiversity. It is important that climatic conditions are factored into assessment, however there is currently no mechanism to directly assess the potential effects of climate change patterns. It therefore remains important that assessment and determination of State Significant Projects relies upon thorough technical assessment of potential biodiversity impacts. This is provided through the NSW Biodiversity Offsetting Scheme and application of the Biodiversity Assessment Methodology which have been applied by EnviroKey (2021) in preparation of the BAR.

The Commonwealth Department of Agriculture, Water and the Environment has developed an approach to assessment of bush fire impacts and in particular the impacts of the Summer 2019/2020 bush fires. Niche was commissioned to undertake an assessment of the impacts of the Summer 2019/2020 bush fires on the assessment outcomes of the Project in relation to Matters of National Environmental Significance (MNES) defined under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This assessment (Niche, 2021) includes an assessment of potential impacts to the following five species and one threatened ecological community.

- Koala (EPBC-Vulnerable)
- Large-eared Pied Bat *Chalinolobus dwyeri* (EPBC Act -Vulnerable)
- Regent Honeyeater *Anthochaera phrygia* (EPBC Act - Critically Endangered)
- Swift Parrot *Lathamus discolor* (EPBC Act - Critically Endangered)
- Small purple-pea *Swainsona recta* (EPBC Act - Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community (Box gum woodland) – (EPBC Act - Critically Endangered).

The 2019/2020 bush fires did not impact either the Mine Site or nominated Biodiversity Offset Area. As such, no areas of habitat within these areas suitable for any of the six MNES listed entities were directly impacted by the fires. The closest large fire occurred approximately 15km to the southeast of the Mine Site and 12.8km to the southeast of the Biodiversity Offset Area.

Section 3.6 of this document presents a summary of the regional habitat impacted by the 2019/2020 bush fires. Niche (2021) concludes that the loss of regional habitat for MNES listed species may in some cases result in increased reliance upon habitat within the Mine Site and Biodiversity Offset Area. However, it is also noted that impacts associated with the Project are unlikely to commence until at least 2022 and a significant degree of vegetative recovery is expected in areas impacted by the bush fires, particularly in those areas impacted by low to moderate severity fire. As such, the increased significance of the habitat within the Project and Offset areas would reduce over time and the assessment outcomes of the BAR would not be significantly affected by the 2019/20 bush fires.

The *Bushfire Impact Assessment of Matters of National Environmental Significance* is presented as **Appendix 5**.

Representative Comment(s)

The proximity of the project site to three Key Biodiversity Areas (KBAs)…i.e. Greater Blue Mountains KBA (Wollemi National Park) 20km to the east, Capertee Valley KBA 30 km to the south, Mudgee-Wollar KBA 20 km to the north…is a strong indicator of the likely habitat significance of the project footprint.

BirdLife Australia of Annandale, NSW (Submission SE-8640362)

Response

Comprehensive field surveys identified a total of 11 Plant Community Types (PCTs) of variable condition within the Study Area. A summary of the extent of each PCT, by condition class, within the Study Area and the area that would be disturbed as a result of the Project is provided in Table 31 of the BAR (EnviroKey, 2021). It is considered that the BAR provides an accurate representation of the condition of vegetation and habitat significance of all areas to be disturbed within the Study Area. While there may be connectivity with the areas noted in the submission, actual habitat significance can only be determined by comprehensive survey. Notwithstanding, where applicable, the BAR has taken into account the proximity of surrounding habitat areas in determining the likelihood of species to occur within the Study Area. For example, whilst no Regent Honeyeaters were recorded within the Study Area, their presence has been assumed to occur.

5.26.3 Ausfeld's Wattle

Representative Comment(s)

Additional information be provided regarding the locations, size, circumstances and implications of applying buffers to Ausfeld's wattle populations.

DPIE Biodiversity Conservation Division

Response

The BAR provides a description of what buffer has been applied and the context for the buffer for the populations of Ausfeld's Wattle. Specifically, the species polygon created for Ausfeld's Wattle (*Acacia ausfeldii*) includes all individual plants that were recorded during the field surveys plus a 5m buffer to encompass any potential seed bank. However, in instances in the northern part of the water supply pipeline corridor, where the population extends well beyond the boundaries of the Study Area, no additional buffer has been applied to those boundaries. Given that the species was recorded in areas that were the subject of previous disturbance (suggesting that this species is a coloniser like other Acacia species), a further construction buffer is not considered appropriate but rather an exclusion zone that would keep machinery, persons or equipment clear of retained vegetation. Details for the implementation of these exclusion zones would be provided within the proposed Biodiversity Management Plan.

Representative Comment(s)

Removal of Ausfield's (sic) *Wattle habitat and likely plants. Ausfeld's Wattle is identified as a 'Red Flag' in the NSW BioBanking Credit Calculator i.e. it is a species that is considered unable to withstand any further loss if it is to survive in the future.*

Blue Mountains Conservation Society Inc of Springwood, NSW (Submission SE-8422283)

Response

The Ausfeld's Wattle (*Acacia ausfeldii*) was recorded within the northern part of the water supply pipeline corridor but was not recorded within the Mine Site or the area for the relocated Maloneys Road. An estimated population size of 239 individuals at eight locations was recorded, however, the population at some locations is likely to extend beyond the boundaries of the Study Area (with further survey restricted by access permissions to adjoining landholdings). The Ausfeld's Wattle was found to be common within areas of existing disturbance which suggests that the species is a coloniser like other Acacia species. Whilst impacts to Ausfeld's Wattle have been minimised as far as practicable, any residual impacts would be offset in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*. This policy has been developed in order to appropriately offset native vegetation impacts from development. It does not allow removal where that action would have a significant impact on a species such that it risks extinction, fragmentation or exacerbates declining trends.

5.26.4 BBAM Calculator

Representative Comment(s)

The case in the BioBanking Assessment Methodology calculator (proposal ID 0143/2019/4954MP) should be split so that the site-based tool is used for the mine site while the linear tool is used for the pipeline.

DPIE Biodiversity Conservation Division

All data for both the mine site and pipeline components should be clearly presented in the biodiversity assessment report.

DPIE Biodiversity Conservation Division

Response

In accordance with the BBAM, the BAR footprint was split into two developments and, therefore, two projects in the Biobanking Credit Calculator (BBCC). The pipeline was assigned as a Linear-based development (0143/2020/5083MP), while the Mine Site and associated infrastructure areas, including the relocated Maloneys Road, was assigned as a Site-based development (0143/2020/5088MP). The BAR provides copies of the updated calculations and updates the credit summaries, as appropriate.

Representative Comment(s)

Management site scores for development within the BioBanking Assessment Methodology calculator should be set to zero for the pipeline.

DPIE Biodiversity Conservation Division

Response

Whilst EnviroKey does not necessarily agree with this request, given that ground vegetation would regenerate after the pipeline has been laid, the BBCC has been set to zero for the pipeline. This is reflected in the updated calculations presented within the BAR.

Representative Comment(s)

Updates be made to ensure that the areas (hectares) and biodiversity credits in the calculator match those provided in tables in the biodiversity assessment report and biodiversity offset strategy.

DPIE Biodiversity Conservation Division

Response

All vegetation disturbance areas have been remeasured and the updated BAR includes the corrected values. Subject to approval of the Project, the biodiversity offset strategy will be updated in accordance with the conditions of the development consent and will reflect the updated areas as presented in the updated BAR and respective credit requirements.

5.26.5 Credit Calculation for CW 291

Representative Comment(s)

Check if the credit calculation for CW 291 has been duplicated, noting that this issue may be resolved if the project is split into site-based and linear cases in the BioBanking Assessment Methodology calculator.

DPIE Biodiversity Conservation Division

Response

The BAR now includes a Site-based and Linear-based Assessment with the duplication area for CW 291 now resolved. It is noted that the duplication resulted from a bug / error within the calculator itself which was resolved by commencing a new calculation file and re-entering the applicable data.

5.26.6 Significant Ecosystems

Representative Comment(s)

The locations of significant ecosystems should be identified to enable maximal and residual risk assessments and development of a monitoring plan along with triggers and planned remediations that will be effective.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

All plant communities and habitat are identified within the BAR. Those with a greater legal status in the *Biodiversity Conservation Act 2016* (i.e. critically endangered ecological communities) have also been identified throughout the BAR (see Section 4.3 and Maps 28-38). The location and status of both species and plant communities has been taken into consideration as part of the refinement of the Project design, the assessment of impacts, and for developing mitigation, management and rehabilitation measures. It is noted that vegetation clearing would be restricted to the proposed areas with no additional clearing of native vegetation undertaken irrespective of the 'significance' of the vegetation community.

5.26.7 Impact Avoidance

Representative Comment(s)

Measures that have been taken to avoid impacts on biodiversity should be clearly explained. Changes to mine layout or the pipeline route that have been made to avoid impacts should be described and mapped.

DPIE Biodiversity Conservation Division

Whilst a traffic light system has been shown in the Map 54 and Map 55, no explanation of how this mapping was used to redesign around ecological sensitive areas has been provided. Therefore, it is not understood if Bowdens have made a conscious effort to avoid impacts to threatened biodiversity.

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

It is claimed the applicant has made all reasonable efforts to avoid impacts to threatened species habitat where possible, through a substantial planning and design phase. This avoidance is not clearly demonstrated within the biodiversity assessment report and in the context of biodiversity protection. The mitigation measures proposed to minimise potential impacts are unclear and reliant on future work.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

During the design of the Project, Bowdens Silver examined a range of alternatives for a number of the components of the Project before deciding upon the location, scale and/or form of the proposed components of the Project as presented within the EIS. Table 1.2 of the EIS reviews the key feasible alternatives considered and provides the basis for the selected alternative that forms part of the overall Project.

As described in Table 1.2 of the EIS, the key adjustment to the Mine Site layout to minimise impacts to terrestrial ecology comprised changes to the subsoil and topsoil stockpile designs. It was originally proposed that subsoil stockpiles would be constructed to 3m in height with topsoil stockpiles constructed to 2m in height with an estimated footprint of approximately 91ha. In light of a traffic light model developed to identify areas of high biodiversity value, most soil stockpiles were confined to low and moderate impact areas and the footprint required for soil stockpiles was reduced to 62ha by increasing the thickness of subsoil stockpiled from 3m to 5m.

Another key adjustment made to the Mine Site design was the decision to proceed with reduced open cut pits (52ha) rather than the enlarged open cut pit (73ha) originally proposed by Kingsgate (as shown on Figure 1.5 of the EIS). Whilst this decision was principally informed by economic considerations, it is considered that the decision to proceed with reduced open cut pits would minimise impacts to biodiversity values.

5.26.8 Koalas

Representative Comment(s)

Further targeted surveys should be conducted for koalas in all plant community types of all condition classes that contain potential koala habitat, or koalas should be presumed present.

DPIE Biodiversity Conservation Division

Response

In addition to the two Koala transects, a total of 137 scat and sign searches (which include searches for Koala) and call playback (which included Koala as a target species) at 10 sites were completed to inform the BAR (survey locations shown on Map 13 of the BAR). Section 2.3.7 and Table 3 within the BAR has been updated to provide clarity on the survey effort for Koala. EnviroKey considers that the survey methodology and survey effort is appropriate and that, combined with the timing of other surveys completed on site, a good understanding of Koalas has been acquired. It is considered that no additional surveys are warranted.

Representative Comment(s)

Selection of PCTs and condition classes for koala species polygons should be fully explained and justified.

DPIE Biodiversity Conservation Division

Response

The extensive nature of the Koala scat searches undertaken ensures an excellent understanding of potential habitat occupancy within the BAR footprint. The results of these 137 scat and sign searches confirm that there is no sign of current or previous occupancy (in terms of the life of a scat). As such, only the BVT/PCT in the highest condition was found to provide habitat occupancy and was therefore assigned as a species polygon for Koala. This approach is notwithstanding Koala sightings over the period of BAR preparation and since that time (discussed below).

Representative Comment(s)

There is no assessment for koala populations.

Clare Hamilton of Rylstone, NSW (Submission SE-8628154)

Koalas are an endangered species and have been located in this area. This has not been presented accurately in the EIS.

Mali Boller of Pyangle, NSW (Submissions SE – 8514672)

The EIS does not explain what is intended for the Koala population of the Bowden property.

William Brown of Breakfast Creek, NSW (Submission SE-8630760)

Response

As discussed in Section 4.10.6.4 of the EIS, EnviroKey completed a significance assessment for the Koala in accordance with the EPBC Act. Following significant survey effort, two Koalas were recorded within the Study Area by the time the EIS was finalised. Since that time, several sightings have been recorded within or near the Mine Site and the local community has identified sightings either historical or new. These are consistent with the conclusions of the BAR and, as such, there is not an 'important population' (as defined by the Matters of National Environmental Significance guidelines) within the Study Area. Whilst the Project would result in the loss of approximately 140ha of habitat that could be used by Koala, this represents only a small proportion of the same habitat that occurs within the Study Area. Furthermore, within the wider locality, there is higher quality habitat to the north and east of the Study Area which is known to be used by Koala and would remain unaffected by the Project.

The significance assessment (Annexure 6 of the BAR) concluded that the Project would not result in a significant impact to Koala due to these factors.

Representative Comment(s)

Perhaps the dust contaminates falling on the gum leaves will affect the leaves so that the koalas can no longer consume them.

(Name Withheld) of Bara, NSW (Submissions SE –8619580)

Response

The deposition of dust within surrounding vegetation would be very low or negligible and is not expected to adversely impact upon the health of the vegetation or fauna that may consume them. This is consistent with the outcomes of the HHRA that considers potential health risk from ingestion of home-grown vegetables and other produce and concluded this exposure pathway would not present a health risk to the local community as a result of the mining operation.

Representative Comment(s)

two out of three key points of the Koala recovery plan are not addressed.

Sonia Christie of Monivae, NSW (Submission SE-8638252)

The effect of the mine and pipeline on Koalas may be greater than the immediate impact areas, cause fragmentation and not be in line with the overall objectives of the NSW Koala Recovery Plan including:

- *Reverse the decline of Koala in NSW; and*
- *Ensure adequate protection, management and restoration of Koala habitat*

The cumulative and indirect impacts to Koala habitat as a result of the action make a higher proportion on current viable habitat remaining in NSW.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

The BAR provides the methods and results of extensive field survey to determine habitat occupancy and use across the Mine Site, water supply pipeline corridor and the corridor for the relocated Maloneys Road. It also identifies where higher quality habitats exist (noting that Bowdens Silver has sought to avoid or minimise impacts to these areas wherever practicable), provides discussion as to the likely reason for the Koala records within and/or adjacent to the BAR footprint and provides an assessment of the likely impacts to Koala as a result of the Project.

As discussed in Annexure 6 of the BAR, the overall objectives of the NSW Koala Recovery Plan are to:

- reverse the decline of Koala in NSW;
- ensure adequate protection, management and restoration of Koala habitat; and
- maintain healthy breeding populations of Koala throughout their current range (DECC, 2008).

The Project would be in conflict with the second objective by removing approximately 140.36ha of habitat that is suitable for Koalas. However, it would also provide protection of the same vegetation types within and surrounding the Mine Site as part of the on-site biodiversity offset. Furthermore, higher quality habitats where clusters of Koala records occur to the north and east of the Mine Site would remain unaffected by the Project. As such, it is considered that the Project would not inhibit the achievement of the first and third objectives.

Representative Comment(s)

The statement in the EIS of just 2 sightings is under reporting Koala numbers in the vicinity of the project. – Four other sightings since 2013.

Michael Boller of Lue, NSW (Submission SE-8757975)

Response

At the time the EIS was finalised, a total of two Koala records had been confirmed within the Study Area, both of which are either within or directly adjacent to the Mine Site (see Map 42 of the BAR). It is acknowledged that there have been other sightings of Koalas within the broader region surrounding the Mine Site in the past and at the Mine Site since publication of the EIS. The BAR does not conclude that Koalas are not present or are not using the land, with

approximately 140.36ha of vegetation within the proposed disturbance areas identified as being suitable for Koalas. Notwithstanding, the land does not support a resident population of Koalas and records are relatively low.

Representative Comment(s)

We have a koala group living on the Property…but I am sure the noise emitted from the proposed BSP site will interfere with the koala group.

(Name Withheld) of Bara, NSW (Submissions SE –8619580)

Response

Section 7.4.9 of the BAR addresses the potential for indirect impacts arising from noise, vibration and lighting. Whilst noise can have a negative impact on fauna, causing them to move away from the noise, it is noted that the location of the submission is Bara which is at least 5km from the Mine Site. As can be seen from the operational noise contours presented in Annexure 18 of the Noise and Vibration Assessment, even under adverse meteorological conditions, the noise contribution from the Project would be less than 30dB(A) at the closest points within Bara. For context, the *Noise Guide for Local Government* (EPA, 2013) states that 30dB(A) is representative of a quiet countryside. Whilst this guide relates to human amenity, it is considered highly unlikely that the Koala group mentioned in the submission would experience any adverse noise impacts.

Notwithstanding the location, the overall impacts upon Koala have been assessed as part of the BAR and it has been determined that there would not be a significant impact upon Koalas.

Representative Comment(s)

a survey needs to be conducted to better understand the current local and regional distribution of Koala and remaining extent of habitat in the locality following the 2019/2020 bush fires.

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

Response

As discussed in Section 5.26.1, the 2019/2020 bush fires did not impact either the Mine Site or nominated Biodiversity Offset Area. As such, no areas of Koala habitat within these areas were directly impacted by the fires. The closest large fire occurred approximately 15km to the southeast of the Mine Site and 12.8km to the southeast of the Biodiversity Offset Area.

Niche (2021) includes an assessment of impacts to regional habitat for MNES listed species with "regional habitat" defined as an area with a radius of 100km surrounding the Mine Site and Biodiversity Offset Area. It is estimated that the 2019/2020 bush fires resulted in an overall loss of 21% of "likely" Koala habitat and 9.3% of habitat where Koala "may" occur within the region. Niche (2021) concludes that the loss of regional Koala habitat may result in increased reliance upon habitat within the Mine Site and Biodiversity Offset Area with some surviving individuals moving into the area leading to a small increase in interactions and/or competition between individuals. However, it is also noted that impacts associated with the Project are unlikely to commence until at least 2022 and a significant degree of vegetative recovery is expected in areas impacted by the bush fires, particularly in those areas impacted by low to moderate severity fire.

As such, the increased significance of the habitat within the Mine Site and Offset areas would reduce over time and the assessment outcomes of the BAR would not be significantly affected by the 2019/20 bush fires.

The full *Bushfire Impact Assessment of Matters of National Environmental Significance* is presented as **Appendix 5**.

5.26.9 Swift Parrot

Representative Comment(s)

Sadly, the EIS has inadequate surveys for Swift Parrots (wrong time of year for flowering of the species it feeds on).

Sonia Christie of Monivae, NSW (Submission SE-8638252)

There is insufficient survey effort to make the conclusion that Swift Parrot does not occur in the study area (particularly the mine site). Given the habitat values and potential for feeding (with flowering Eucalypts present), there is opportunity for this species to utilise the area and without evidence of its absence it should be assumed present. Therefore, this species hasn't been adequately considered.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Whilst not all survey periods were within the suitable season for Swift Parrots, approximately 20% of the field surveys were carried out at a suitable time (during April). Notwithstanding, in accordance with the Framework for Biodiversity Assessment (FBA), Swift Parrot is assessed as an Ecosystem Credit Species, meaning that it is a species that can be reliably predicted by habitat surrogates. Therefore, specific Swift Parrot surveys were not required. Rather, the presence of suitable habitat is sufficient to assume its presence and require offsetting utilising suitable vegetation communities credits (as opposed to specific species credits).

The BAR identifies a total of 381.71ha of potential foraging habitat within the disturbance footprint and provides an assessment of significance under the EPBC Act within Annexure 6. This assessment concluded that Swift Parrot are unlikely to be significantly impacted by the Project given the following.

- The species does not breed in NSW.
- The relatively localised nature of the potential habitat to be disturbed in comparison to the distribution of Swift Parrot in NSW.
- The species is highly mobile and migratory meaning that it would not rely solely on the habitats of the Study Area.

5.26.10 Regent Honeyeater

Representative Comment(s)

this species is known to now breed in only a handful of sites throughout its entire foraging range. Two of these are the Mudgee-Wollar area and the Capertee Valley… The proposed mine site is between these two areas, a short distance away.

BirdLife's Regent Honeyeater Project Manager is aware that in 2015 a Lue bird enthusiast, while guiding a local school group investigating birds in Lue, positively identified a Regent Honeyeater.

BirdLife Australia of Annandale, NSW (Submission SE-8640362)

Response

No Regent Honeyeater individuals were recorded within the Study Area despite completion of comprehensive surveys during appropriate sampling months. However, given the rarity of the species (critically endangered), the presence of suitable habitat, previous records in the locality and the location of the Study Area at the northern extent of the Capertee Important Bird Area (IBA) (a known Regent Honeyeater 'hotspot'), it is considered probable that the species is or may have been present in the past. As a result, the potential impact to this species has been offset accordingly.

Representative Comment(s)

Species credits have been calculated for the removal of habitat for the Regent Honeyeater, and mention of a suitable biodiversity offset strategy must be considered for Regent Honeyeater. However, the impact of mining activities on habitat within the mine area "retained vegetation" is not known. There is risk that the Regent Honeyeater will lose more than the BAR footprint for mine site and pipeline of available habitat.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

The BAR assessed the impact of the Project on Regent Honeyeater in accordance with the NSW Biodiversity offset Policy for major projects. This impact is defined within the Biobanking Credit Calculator based on direct impacts to vegetation communities as a surrogate for habitat. The BAR acknowledges the significance of the region to Regent Honeyeater and concludes in Annexure 6, that "*The Project has the potential to have a significant impact on Regent Honeyeater. The Applicant has made all reasonable attempts to avoid impacts to potential foraging and breeding habitat where possible, through a substantial planning and design phase. A series of detailed mitigation measures are proposed within this BAR to minimise potential impacts (see Section 6). A suitable biodiversity offset strategy must be considered for Regent Honeyeater*". EnviroKey is therefore of the opinion that the assessment for Regent Honeyeater has been appropriate.

It is not agreed that the Regent Honeyeater would lose more habitat than that assessed as any retained areas of vegetation either within or surrounding the Mine Site, and indeed within the wider locality (including the Important Bird Areas defined in both the BAR and the biodiversity offset strategy), would continue to provide habitat for Regent Honeyeater. The biodiversity offset strategy also identifies significant offsets for the Regent Honeyeater in accordance with the Major Projects Offset Policy.

5.26.11 Barking Owl

Representative Comment(s)

EnviroKey have not ruled out breeding habitat occurring in the development footprint, and there appears to be suitable nesting hollows despite their lack of habitat mapping. Therefore, the occurrence of Barking Owl breeding habitat cannot be ruled out and species credits should be generated for areas which contain suitable breeding hollows.

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

Response

As no evidence of nesting was recorded during comprehensive field surveys, Barking Owl has been assessed as an Ecosystem Credit Species. As such, impacts are assessed based on impacts on vegetation communities. Section 5.3 of the BAR confirms the presence of Barking Owl as an ecosystem credit species.

5.26.12 Echidna

Representative Comment(s)

There is also a most concerning paucity of information in the EIS relating to Echidnas in the mine area. 3 Echidnas were observed *in a rock crevice on Lankeys Mountain…within 1 km of the site of the eastern WRE on top of the escarpment.*

Michael Boller of Lue, NSW (Submission SE-8757975)

It is noted that within Biodiversity Assessment that echidna were not mentioned in this report. They are found within the project and wider area.

Gallanggabang Aboriginal Corporation of Orange, NSW (Submission SE-8384568)

Response

It is acknowledged that Echidna may be present within the Study Area although no individuals were recorded during surveys. Anecdotal evidence from Bowdens site personnel support this conclusion. It is noted that Echidna is not listed as threatened under the *Biodiversity Conservation Act 2016* or *Environment Protection and Biodiversity Conservation Act 1999* and, as such, is not required to be considered individually in the BAR.

5.26.13 Reptile and Frog Surveys

Representative Comment(s)

The EIS has inadequate surveys for … frogs (surveyed during dry times)

Sonia Christie of Monivae, NSW (Submission SE-8638252)

It appears that call playback for threatened frog species was not carried out and there is no evidence of suitable searches within aquatic vegetation and rocked areas.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Herpetofauna (frog and reptile) surveys were carried out at 85 sites within the Study Area. Based on the fauna survey effort maps provided (Maps 12 and 13 within the BAR) the survey effort for frogs and reptiles was widespread and covered the greatest range of habitats across the BAR footprint. Not all frog species are confined to riparian areas. The locations of surveys were chosen based on the quality of habitat present, and available access during the field surveys. It is acknowledged that not all streams were surveyed, however, the methodology implemented is consistent with guidelines for frog surveys which require that a representative sample is surveyed.

Representative Comment(s)

Although reptile surveys appear to be quite numerous, methods of survey are not suitable to detect all of the threatened species that may occur on the study area or that are listed as MNES on the EPBC search. Amphibian survey in aquatic areas is not well distributed and was carried out in an extended period of low rainfall. Therefore, not all threatened reptile and amphibian species can be considered absent based on the information supplied.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

EnviroKey completed comprehensive field surveys across several years throughout the Study Area and recorded opportunistic sightings of reptiles and frogs during other field surveys. For example, during diurnal bird surveys or nocturnal surveys, data on all fauna species is also collected. EnviroKey are of the opinion that both the survey methods and survey effort is commensurate to the quality of habitats present and the level of potential impact. It is also acknowledged that survey timing may not have been optimal given extended dry periods, however, survey timing is limited for any biodiversity assessment in Australia. As conditions may not always be suitable for detection, reliance is placed on vegetation as a surrogate for habitat combined with the condition of the vegetation to determine the presence or absence of a species. The BAR provides an extensive evaluation using existing location data from mapped records against the habitat quality present to justify inclusion into the BBCC. This approach is deemed suitable by the FBA.

5.26.14 Platypus

Representative Comment(s)

Lawson Creek is home to platypus. We have observed platypus in two different sections of the creek.

Catherine McNeill of Mount Knowles, NSW (Submission SE-8482164)

… the Creek, which will be the most significantly impacted by the Bowdens Silver Mine, is one such platypus habitat. Sadly, platypus populations are facing extinction as a direct result of man-made changes to the environment and consequently, habitat degradation…

The presence of the platypus in the Lawson Creek should not be taken for granted and should be treated with the utmost caution.

Aillie McNeill of Mount Knowles, NSW (Submission SE-8637953)

My wife and I regularly walk around our property which is located only 1.5klms from the proposed mine boundary and we have on numerous occasions observed native water rats and platypus in the water holes to the east of our windmill on Lawson creek.

Carl Tubnor of Lue, NSW (Submission SE-8645238)

Response

The BAR is prepared under the FBA (OEH, 2014) which has defined assessment requirements. Fauna that is not listed as a threatened species does not require specific consideration. Given that Platypus is not listed under the *Biodiversity Conservation Act 2016*, or *Environment Protection and Biodiversity Conservation Act 1999*, it is not specifically considered within the FBA. Notwithstanding, it is noted that the Surface Water Assessment (WRM, 2020) predicts that the effects to downstream water flows within both Lawson and Hawkins Creek would be minimal. The potential for impacts for surface water quality would also be managed over the life of the Project and monitored in accordance with an approved Water Management Plan.

5.26.15 Tree Hollows

Representative Comment(s)

The mine will destroy hollow bearing trees that are home to many native bird and mammal species. These hollows can take hundreds of years to develop. Many of our species may be extinct long before this.

Hastings Birdwatchers Inc of Camden Head, NSW (Submission SE-8577521)

Response

It is acknowledged that hollow-bearing trees would be cleared during the development of the Project. As such, the Applicant would ensure that pre-clearance surveys are undertaken within all areas to be cleared of vegetation including a two-stage clearing protocol for all hollow-bearing trees. In addition, all hollow-bearing trees to be removed would be marked and their species and approximate dimensions catalogued so that salvaged hollows or nest boxes can be re-strung in similar standing trees.

Representative Comment(s)

The report does little to discuss the density and size of hollows which may also be suitable for species that were not identified during field survey assessments. In addition, there is a lack of information on the presence of hollows along the linear pipeline area and areas elsewhere nearby that are proposed to be retained.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

Hollow-bearing tree data was collected during Biometric plot/transects, which is an extensive dataset that exceeds the minimum survey requirements for this Project as determined by the BBCC. The data entered into the BBCC determines the site value score for each vegetation zone.

It is acknowledged that, while it is common practice for every hollow-bearing tree to be mapped on significantly smaller sites, the practicality of carrying out this task on a much larger site is greatly reduced. The FBA requires the collection of site-specific attribute data as part of the plot/transect which has been entered into the BBBC.

Representative Comment(s)

Section 6.3.3 General Vegetation and Habitat Removal addresses protocol for hollow removal:

4. Implement a two-stage clearing protocol for all hollow-bearing trees.

5. Mark all hollow-bearing trees to be removed and catalogue their species and approximate dimensions so that hollows or nest boxes can be added to similar standing trees (i.e. 1 for 1).

However, the above does not take into account breeding time, reduced range and immediate or long-term impacts on the species present.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

As part of the overarching Biodiversity Management Plan, a Fauna Management sub-plan, as detailed in Section 6.2 of the BAR, would be prepared for approval by DPIE prior to commencement of vegetation clearing. While plans of management are generally not prepared until after the development application has been approved, the BAR does state that the plan "would be prepared with the objective of minimising potential impacts to fauna species". In general, fauna management plans consider the timing of proposed tree removal, including staged removal and reuse where possible, as well as any hollow-bearing trees to be removed.

Specifically, the management plan would include a Hollow-bearing Tree Pre-clearance Survey Protocol and a Vegetation Pre-clearance Protocol whereby a suitably qualified person holding an environmental science, or science (biology, zoology or ecology) qualification would supervise a team of suitably trained persons to search the area in front of and directly behind vegetation clearing machinery for any fauna species to relocate these fauna to areas of retained vegetation. Given the use of suitably qualified and trained persons, this would reduce the immediate impact to the extent feasible in relocating the fauna, having regard to suitable techniques for relocation. Long-term impacts from the proposed disturbance have been assessed as part of the BAR. The outcomes of the assessment do not rely upon the success or otherwise of relocation.

5.26.16 Terrestrial Groundwater Dependent Ecosystems

Representative Comment(s)

Threatening Processes for Terrestrial GDES that have not been appropriately considered in relation to the potential drawdown of groundwater across the site as well as upstream and downstream of the potential operations.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

As outlined in EIS Section 4.6.7.2, the terrestrial vegetation present within the Study Area is not likely to be obligate phreatophytes (i.e. groundwater dependent). Notwithstanding, terrestrial vegetation that does draw on subsurface groundwater is unlikely to draw water from the regional

groundwater table. Rather, it is more likely to draw on water that is in the capillary zone or at the soil-rock interface, from rainfall infiltration and storage in perched aquifers, or surficial groundwater within drainage lines. Therefore, the predicted drawdown in the regional aquifer is unlikely to impact upon groundwater dependent ecosystems.

5.26.17 Box Gum Woodland

Representative Comment(s)

I find it difficult to believe that there is 113.83 hectares (ha) of land within the development footprint which does not align to the Commonwealth definition of BGW. Table 21 of the Biodiversity Assessment shows the average cover of exotic species compared to native species as higher, however, it does not specify if this vegetation is perennial or annual vegetation.

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

Response

The determination of the extent of Box-Gum Woodland that meets the EPBC Act identification criteria is based on the thresholds provided in Section 4.4 and Table 24 of the BAR. It is acknowledged that the floristic summary for the biometric vegetation type (BVT) is very broad, however, determination is based on the overall BVT when considering the EPBC Act threshold. It is noted that the survey timing spans over a number of years and occurs during various months. As such, the surveys are considered adequate to determine these thresholds.

Representative Comment(s)

The disturbance of impact areas is likely to cause fragmentation of this Critically Endangered Ecological Community in addition to potential indirect impacts that have not been adequately accounted for as a result of major changes to groundwater. Mitigation measures do not suitably address this risk and it is not clear as to how the avoidance and minimisation of losses has been demonstrated through planning. There is no mention of edge effects nor the implementation of a buffer zone between the mine and the retained native vegetation. As Box Grassy Woodland provides habitat for threatened species (particularly flowering Eucalypts and presence of hollows) greater emphasis on its significance is warranted.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

The BAR acknowledges that some landscape connectivity would be lost and levels of habitat fragmentation would increase, therefore, increasing edge effects. The landscape assessment within the BioBanking Credit Calculator (BBCC) considers landscape change and includes an edge to area ratio for linear-based assessments and this is calculated into the biodiversity credits required for the Project. The biodiversity offset strategy then addresses biodiversity credit requirements through the creation of biodiversity stewardship sites.

In relation to groundwater, as discussed in Section 5.26.16 of this document, terrestrial vegetation present within the Study Area is not likely to be obligate phreatophytes (i.e. groundwater dependent). Any terrestrial vegetation that does draw on subsurface groundwater is unlikely to draw water from the regional groundwater table. Rather, it is more likely to draw on water that is

in the capillary zone or at the soil-rock interface, from rainfall infiltration and storage in perched aquifers, or surficial groundwater within drainage lines. Therefore, the predicted drawdown in the regional aquifer is unlikely to impact upon the Box-Gum Woodland.

In relation to how avoidance and minimisation of losses have been demonstrated through planning, Section 5.26.7 of this document provides further details on how impact avoidance has been achieved. In summary, during the design of the Project, Bowdens Silver examined a range of alternatives for a number of the components before deciding upon the location, scale and/or form of the proposed components of the Project as presented within the EIS. This was guided through the use of a traffic light model in which 'red' areas included Box-Gum Woodland, which were avoided to the extent possible.

5.26.18 Landscape Score Value

Representative Comment(s)

Clarification be provided regarding whether all native vegetation visible on aerial images has been used in calculation of landscape score value.

DPIE Biodiversity Conservation Division

Response

The landscape value score was determined through air photo interpretation and regional mapping as well as on ground knowledge from field surveys.

5.26.19 Lighting Impacts on Fauna

Representative Comment(s)

Further consideration of the impacts of artificial lighting are required to determine the impacts to Matters of National Environmental Significance (MNES) of several EPBC Listed species.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 7

Response

EnviroKey considers that the potential impacts of lighting have been addressed for MNES. In relation to MNES, a single species of relevance (Large-eared Pied Bat) was recorded within the Study Area. While the effects of artificial lighting can be both positive and negative, it is likely that microbats would be affected to some degree as they are nocturnal. Recent developments in lighting appear to have a greater effect on bats, as shown by Rowse et. al. (2015) who found that some genera of bats avoided modern lighting, such as LED, even when dimmed. However, EnviroKey (2012) found that the highest abundance of bat activity was recorded while proximate to the large carpark lights. These older style lights attracted large quantities of flying insects which the bats in turn hunted. Similarly, Rydell & Racey (1995) found bat densities were ten times higher in areas illuminated with Mercury Vapour Lamps (MVL) when compared to unlit areas.

The BAR notes that lighting at the Mine Site is unlikely to be directed toward vegetated areas, but rather at hardstand and active mining areas which would contain any negative impact to within the Mine Site whilst at the same time providing additional foraging opportunities depending on the final light design.

Representative Comment(s)

Light pollution is known to have an effect on the native wildlife disturbing migratory species, and upsetting the adjacent area with 24 hour light affecting night foraging species such as the endangered Squirrel Glider and Barking Owl which have been identified within the area and would be affected by this light pollution.

Bruce Christie of Monivae, NSW (Submission SE-8635417)

Best practice guidelines for light pollution impacts on nocturnal species are not considered.

Clare Hamilton of Rylstone, NSW (Submission SE-8628154)

Dark Sky Alliance has recently conducted a public awareness campaign on the affects (sic) *of light pollution and sky glow on native fauna.*

Sonia Christie of Monivae, NSW (Submission SE-8638252)

Response

Light pollution is likely to have both positive and negative effects. Some species of nocturnal birds and bats frequently hunt around light poles given that the light attracts insects including moths and other flying invertebrates. For example, at the CSA Mine at Cobar, EnviroKey (2012) found that the highest abundance of microchiropteran bat activity recorded by echolocation calls was in the proximity of the carpark lights at the CSA Mine. The lights were attracting copious quantities of flying insects and moths, which in turn attracted high microchiropteran bat activity (Scanlon and Petit, 2008, Grindal and Brigham, 1998).

Other nocturnal species may avoid well-lit areas given that these may increase vulnerability to predation. It is important to note that lighting at the mine is unlikely to be directed toward vegetated areas, but rather at hardstand and active mining areas.

5.26.20 Matters of National Environmental Significance

Representative Comment(s)

EnviroKey have not even provided a conclusion as to whether the project would have a significant impact on the Matters of National Environmental Significance (MNES), stating in their conclusion. The Project could have a significant impact on Box-Gum Woodland as listed by the EPBC Act and Regent Honeyeater.

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

Response

As discussed in the BAR and summarised in Section 4.10.6.5 of the EIS, a significance assessment was completed for MNES in accordance with the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DotE, 2013).

In summary, EnviroKey concluded that the Project would not impact on the Rainbow Bee-eater, White-throated Needletail, Latham's Snipe, Cattle Egret or any migratory species. It has also been concluded that the Project is unlikely to result in a significant impact upon the Koala, Large-eared Pied Bat, Spotted-tail Quoll or Swift Parrot. For both the Box Gum Woodland and Regent Honeyeater, despite all reasonable attempts to avoid impacts, the Project has the potential

to have a significant impact in the absence of suitable biodiversity offsets. Consequently, both Box-Gum Woodland and the Regent Honeyeater are key components in the proposed Biodiversity Offset Strategy (see Section 4.10.5.3 of the EIS).

5.26.21 Potential Bat Habitats

Representative Comment(s)

Any caves, overhangs, crevices, cliffs, escarpments, old mines, tunnels, culverts or building on or within two kilometres of the development footprint should be identified and mapped, and direct and indirect biodiversity impacts on these areas assessed.

DPIE Biodiversity Conservation Division

Response

An additional section (Section 3.4) has been added to the BAR with Map 17 providing the general location of identified features. In summary, the disturbance areas assessed in the BAR are largely devoid of caves, overhangs, crevices, cliffs or escarpments, however, a number of potential cliff lines have been identified which could contain small caves, crevices and overhangs suitable for microchiropteran bats.

5.26.22 Stream Orders and Riparian Buffers

Representative Comment(s)

Stream orders and riparian buffers be identified and mapped in the BAR.

DPIE Biodiversity Conservation Division

Response

Stream orders are provided for the Mine Site, however, this information is unavailable for the pipeline. As such, a desktop study was undertaken to identify the likely stream orders along the pipeline and the number of crossings involved.

No buffers are applied to any watercourses within the Mine Site BAR footprint (disturbance areas), as all would existing watercourses would be removed. An additional map (Map 16) has been included in the BAR.

5.26.23 Targeted Flora Surveys

Representative Comment(s)

Further information regarding timing and location of targeted flora surveys is required to verify the adequacy of the surveys.

DPIE Biodiversity Conservation Division

Response

Vegetation community surveys and threatened flora searches were completed whenever travelling between Biometric plot/transect surveys and during fauna surveys. In addition, a 15-minute search targeting threatened flora by random meander was also carried out at each of

the EnviroKey Biometric plot/transects which generally resulted in a search area of approximately 1ha. The random meander surveys have not been mapped (as they coincide with the BBAM plot/transects), however, they were carried out over the following survey periods.

- 4 to 9 December 2016 (6 days)
- 30 January to 3 February 2017 (5 days)
- 13 to 16 November 2017 (4 days)
- 29 January to 3 February 2019 (6 days)
- 3 to 7 April 2019 (5 days)

The BAR relied upon survey timing for threatened flora with Table 26 of the BAR confirming that the relevant threatened flora could be detected during the above survey timing with the exception of *Prasophyllum* sp. Wybong (which was included in later surveys of the Mine Site undertaken by AREA Environmental Consultants & Communication Pty Ltd (AREA) between 24 and 30 November 2020).

Representative Comment(s)

There has not been adequate survey for some threatened flora, in particular, Swainsona sericea…

EnviroKey has not mapped survey tracks and have not provided sufficient evidence that the site has been surveyed adequately for threatened flora.

(Name Withheld) of Lawson, NSW (Submission SE-8647990)

Response

EnviroKey has confirmed that the ecological field survey undertaken for the EIS was comprehensive and appropriate. However, following incidental identification of *Swainsona recta* by Bowdens site personnel within the Mine Site, further targeted threatened species searches were undertaken within the Mine Site for the following species.

- *Swainsona recta*
- *Swainsona sericea*
- *Euphrasia arguta*
- *Prasophyllum* sp. Wybong
- *Prasophyllum petilum* Tarengo Leek Orchid

Searches were undertaken between 24 and 30 November 2020 under favourable weather conditions and principally focussed on areas within the BAR footprint although several areas beyond the footprint were also surveyed.

The searches identified a total of four *Swainsona recta* individuals (occurring as one discrete population) and approximately 64 *Swainsona sericea* individuals (occurring as four discrete populations) within the proposed development footprint. No records of *Euphrasia arguta*,

Prasophyllum sp. Wybong or *Prasophyllum petilum* Tarengo Leek Orchid were detected. It is notable that climatic conditions during survey were very favourable for identification of these species.

The full AREA report is included as Annexure 9 of the BAR.

5.26.24 Final Void

Representative Comment(s)

Wildlife will not understand the toxic nature of the water (in the mine void) *and will attempt to use it as habitat.*

Bruce Christie of Monivae, NSW (Submission SE-8635417)

Response

Salts would gradually accumulate within the pit lake due to evaporative concentration with salinities predicted to develop up to 2 000µS/cm after 100 years and 5 375µS/cm after 500 years. As a point of reference, freshwater typically has an electrical conductivity of between 0 and 1 500µS/cm with sea water typically around 50 000µS/cm. Salinities more than 2 500µS/cm but less than 10 000µS/cm are not recommended for human consumption, however, most livestock can tolerate levels of up to 10 000µS/cm.

Notwithstanding the above, it is acknowledged that elevated salinity may adversely impact upon wildlife. As such, it is proposed that the final void would be fenced/bunded around the perimeter to minimise the potential for stock and wildlife to access the voids. Whilst it is not possible to completely restrict wildlife access to the final pit lake (e.g. avifauna, amphibians, etc.) it is considered that these measures would appropriately control access as far as practicable. This approach is implemented successfully across NSW at various mine sites.

5.27 TOURISM AND SMALL BUSINESSES

5.27.1 Introduction

It is recognised that tourism and the small businesses that it supports such as those involved in wine, local produce, accommodation and hospitality are important parts of the regional economy and rely upon the environmental, historical and rural setting to attract visitors. The prospect of a new mining development raises fears for some as perceived impacts are projected to result in a decline in visitors who would not wish to visit areas associated with mining. These fears were raised in some of the community submissions regarding the Project.

It is re-iterated that the mining operations would not be visible from Lue and only from short sections of Lue Road. Therefore, it is unlikely that tourists would be aware of the presence of the Project unless they are looking for it. Similarly, Bowdens Silver has committed to a number of environmental management and mitigation measures that would limit the community exposure to mining and therefore it is not considered likely that tourism would diminish as a result of construction and operation of the mine.

It is considered that many small businesses in the locality would in fact benefit from the Project through an increase in wages flowing through the local economy. This was reflected in some of the supporting submissions received on the Project. Statements such as the following contradict the concerns expressed by others in the community.

> *"It will also bring money back into Rylstone, Kandos and stop shops closing and will put money back into the local economy and help support local businesses and families."*

Furthermore, Bowdens Silver has committed to funding community projects through an expansion of the existing Community Investment Program. Community members have already suggested a range of local projects to Bowdens Silver, some of which may enhance tourism within Lue.

5.27.2 Tourism

Representative Comment(s)

This proposal is not a suitable fit with the existing industries in the region. Tourism, wedding, food, wine, agriculture and lifestyle enterprises are vibrant, successful and sustainable and as such should not be placed at risk.

Margot White of Wybong, NSW (Submissions SE-8571125)

Loss of income from my Air B&B cabins on my property, no one will want to holiday next to a lead mine.

(Name Withheld) of Lue, NSW (Submission SE-8571425)

I will not visit the Mudgee area if this mine goes ahead, there are plenty of beautiful places in NSW that I can visit without the risks from a lead mine.

(Name Withheld) of Cooma, NSW (Submission SE-8642763)

The tourism industry is likely to diminish if our water and air is polluted.

Sally Nagel of Lue, NSW (Submission SE-8639269)

Tourists want to see healthy landscapes teaming with biodiversity and native flora/fauna, not gaping holes with heavy metal contamination 2kms from historic hamlets. I believe that the proposed silver mine endangers a lot of these tourist attractions if contamination and environmental degradation occurs due to mining activity.

(Name Withheld) of Havilah, NSW (Submission SE-8642118)

The impact of the mine on current tourism has not been adequately assessed…

Lue Action Group, NSW (Submission SE-8654995) – Attachment 8

Response

These comments are consistent with the statements made in community engagement activities for the Project during which some participants raised concerns that the Project was not compatible with tourism activities in the area and that the presence of the Project could result in a loss of

tourist trade. Concerns with regards to conflicting land uses were largely associated with the view that mining was not a suitable or sustainable land use and was incompatible with the existing agricultural, tourism and rural residential land uses in the area.

The potential impacts of the Project on tourism have been considered and addressed in the EIS (Section 4.18.6.6 and 4.20.6.8) and supporting documents (Agricultural Impact Statement, Economic Assessment and Social Impact Assessment). In particular, Section 4.18.6.6 of the EIS notes the following.

> *Mining and tourism are not mutually exclusive activities. Areas such as Cessnock and Gunnedah in NSW, and Carnarvon Gorge and Arcadia Valley in Queensland, have recorded strong and sustained growth in visitor numbers in parallel with growth in mining and mining employment. This trend is reflected in the Mid-Western Regional LGA, where there has been a steady expansion of mining since 1986 in conjunction with tourism growth. This trend has continued in recent years with the Mudgee Region Visitor Information Centres recording a total of 28 202 visitors in 2015-16 (MRT, 2016), 28 079 visitors in 2016-17 (MRT, 2017) and 33 225 visitors in 2017-2018 (MRT, 2018).*
>
> *The fact that visitor numbers have not declined, despite the growth of mining, suggests that the major visitor attractions and their customer base would be reasonably secure from perception impacts. This is especially true as most cellar doors, the major regional attraction, are located to the northeast of Mudgee. Given the measures that would be taken to mitigate the impacts of the Project on visual amenity, and the fact that the majority of visitors travelling to Mudgee would utilise the Castlereagh Highway, it is not anticipated that the Project would result in any significant adverse impacts on tourism.*

It is acknowledged that the Mid-Western Regional LGA is a popular tourist destination due to the rich history of agriculture, viticulture and culinary experiences, combined with the natural amenity of regional NSW. In addition, tourism is an important and growing industry within the LGA. The MWRC's Land Use Strategy suggests that extensive and intensive agriculture, mining, tourism and rural living continue to be the key land uses across the LGA and that sufficient land, services and facilities need to be available to support these industries. Should tourists decide to travel towards or from Mudgee via Lue Road it is not likely that they would be aware of the Project as no mining operations would be visible from Lue and there would be only short glimpses possible from Lue Road.

In the context of the proposed mine being a suitable 'fit' with the existing industries in the region, it is noted that mining/extractive industry is currently a key industry within the LGA with a number of active mines (Ulan, Moolarben, Wilpinjong) and extractive industries (Kandos Quarry, Graymont, MDL). Within the LGA, mining is by far the largest contributor to economic output contributing approximately 46% to the region. Construction is second at 9% and agriculture 7%.

All of the mines and extractive industry operations contribute to the local economic prosperity of the LGA through a combination of direct employment, wages spent in the community, sponsorship, employment of suppliers and businesses, training and education, providing off-farm income/diversification for farmers. Therefore, the Project would provide an important component of a diversified local economy. The addition of local spending and activity may allow local businesses to invest in their businesses and improve attractiveness to tourist visitors.

Bowdens Silver has established a Community Investment Program that would be expanded in the event the Project is approved. The projects funded by this program would be determined by a committee that includes members of the local community. Potential projects identified through the Social Impact Assessment include investment in heritage and tourism through funding of events, programs and further development of the heritage trail through the region. The opening of a Lue shop has been a popular request from community members. Bowdens Silver Community Investment Program is considering such a sponsorship and in particular for presenting local produce such as wine, olive oil and local crafts.

5.27.3 Small Businesses

Representative Comment(s)

Local small business will be negatively impacted. The surrounding small business rely heavily on passing traffic and holidaymakers as a source of income.

(Name Withheld) of Rylstone, NSW (Submission SE-127397)

Response

As outlined in the response provided in Section 5.27.1 of this document, the Project is considered unlikely to have any significant impacts to local tourism or visitors. In particular, it is noted that the mine components would not be visible from Lue and most of Lue Road between Mudgee and Rylstone. Therefore, small businesses relying upon passing traffic and holidaymakers should not be adversely impacted.

Rather than being negatively impacted, such small businesses would almost certainly benefit from the Project through an increase in wages flowing through the local economy, as well as the Community Investment Fund which would invest in local projects. Such projects may include programs such as further development of the heritage trail through the region etc. which would act to increase passing traffic and holidaymakers within the region.

Representative Comment(s)

My future plans include opening a wellness Centre/yoga retreat here in Lue. I think the project would compromised (sic) *my business.*

Elodie Delwaide of Lue, NSW (Submission SE-8639474)

Response

As discussed in Section 5.9.3 of this document, it is acknowledged that a number of properties in close proximity to the Mine Site would be impacted by air, noise and/or vibration impacts to varying extents and periods. However, no exceedances of relevant criteria are predicted for any properties within Lue nor would any components of the Mine Site be visible from within Lue. Therefore, there are no Project-related reasons to impact the potential for a wellness centre/yoga retreat in Lue. Rather, the Project could provide additional potential patrons through its employees and their families for the new business.

5.27.4 Farm-stay Accommodation

Representative Comment(s)

…we currently operate a short stay accommodation facility "Tom's Cottage" with plans to open two more…

Thomas Gordon of Milroy, NSW (Submission SE-8622297)

Increased noise and traffic from mining equipment and trucks transporting ore from Bowdens Silver Mine along Lue Road will have a negative impact on our tourist business.(at 499 Lue Road, Milroy)

Stephanie Gordon of Milroy, NSW (Submission SE-8609819)

Response

Tom's Cottage is located more than 17km west of the proposed Mine Site and as such the key concern relates to increased traffic and associated traffic noise. Section 11 of the Noise and Vibration Assessment (SLR, 2020) presents the traffic noise and vibration assessment which includes assessment of representative roadside residences along a 7km section of Lue Road through Lue, including residences located within closer proximity to Lue Road than Tom's Cottage. During both construction and operational scenarios, the predicted traffic noise levels remained below the road noise criteria and vibration annoyance risk criteria.

It is also noted that the majority of additional traffic would be light vehicles rather than trucks. Unlike bulk commodity operations such as coal mines and quarries, the ore concentrate that would be produced represents a low volume of material. During operations, it is expected that the Project would generate approximately 10 heavy vehicle (truck) movements and 16 bus movements per day on Lue Road west of Lue. Based on traffic surveys in 2017, Lue Road west of Lue currently has a total daily traffic level of 877 vehicles of which 125 are heavy vehicles (trucks). Therefore, the Project would not substantively change the nature of the traffic environment on Lue Road.

Representative Comment(s)

Our guests come to Wyuna to enjoy peace, quiet, beauty, serenity and to enjoy sunsets, sunrises and night skies and generally have a country experience that they don't have in the city.

Margaret Cameron of Lue, NSW (Submission SE-8645423)

We could no longer offer Wyuna as a peaceful farm stay and will thereby lose our income from farm stays.

Phillip Cameron of Lue, NSW (Submission Received After Exhibition)

Response

The Cameron's property Wyuna (Property 87) has been identified as a noise affected property within the 'management zone' as defined by the VLAMP. Tables 35, 37 and 39 in SLR (2020) record that noise levels attributable to the Project would vary substantially from very low levels of approximately 10dB(A), i.e. inaudible, to levels of 1 dB(A) - 3dB(A) above the relevant daytime, evening or night-time criteria. It is noted that the higher noise levels would occur when gentle daytime/evening prevailing winds are blowing from the Mine Site towards the "Wyuna" property or under temperature inversion conditions at night-time. The noise experienced at other times would be well below the relevant criteria and at times indiscernible.

Based upon this assessment, it is acknowledged that the noise climate on the "Wyuna" property would change, and whilst Project-related noise would be audible from time to time, the actual levels would be sufficiently low for them to be discernible and contain a residual noise impact. The impacts when assessed under the NPfI are predicted to be 'negligible' in the case of 1 dB(A) to 2 dB(A) exceedances and 'marginal' in the case of a 3 dB(A) exceedance. An exceedance of up to 3 dB(A) is predicted only during the daytime period of the Scenario 1 Year 0 Site Establishment and Construction Stage under meteorological conditions that occur for up to 21% of the time. As such the majority of exceedances at the 'Wyuna' would be limited to 2 dB(A) and in accordance with the NPfI the residual noise impact would be considered 'negligible'.

This acknowledgement relating to noise has been taken into account during the discussions with Bowdens Silver and Mr and Mrs Cameron and subsequently through Bowdens Silver's proposed amenity agreement in line with (and actually above) the requirements set out in the VLAMP.

With regards the expected impact to the family business and use of their property as a farm stay, the extent and expected frequency of impacts considered intrusive indicate that may be experienced by visitors to the property would also be negligible to marginal. Therefore, it is not accepted that this would detract from the attractiveness of the property to the extent that they lose custom. In addition, there has been no indication in assessment outcomes that changes to the local setting would create a stigma associated with the Lue becoming a "mining town" and therefore no longer being a place that visitors seek out for their holidays.

Representative Comment(s)

People come to stay at our guest house for the tranquillity and peace (4km from the mines pit). Our business will be ruined as no one wants to come to visit when they get no peace and quite (sic).

(Name Withheld) of Pyangle, NSW (Submission SE-8602093)

Response

The exact location of the submitter's property is unknown, however, based on the air quality and noise modelling outcomes, no residences 4km from the Mine Site are predicted to experience any exceedances of relevant assessment criteria. It is acknowledged that there is a potential for the mine to be audible at times under certain meteorological conditions as noted in the response above.

Representative Comment(s)

Old Bara (located 8km from the Mine Site) *also runs a tourism business, made up of people wanting to escape to peace and quiet and fresh clean air. The noise level from a mine operating 24hrs a day, 7 days a week will destroy any peace and quiet*

Sally Nagel of Bara, NSW (Submission SE-8639269)

Response

Given the distance of 8km from Old Bara from the Mine Site, it is unlikely that any activities at the mine would be audible other than occasional distant noise and there would be no discernible impact upon air quality.

5.28 TRAFFIC AND TRANSPORT

5.28.1 Overview

Minor matters of clarification requested in comments and submissions have been addressed in the following subsections. A comprehensive assessment of the potential traffic-related impacts of the Project was prepared by TTPP (2020) and included with the EIS. There have been no significant changes to traffic levels or types and the outcomes of assessment undertaken by TTPP have not changed as a result of the comments raised in submissions.

The concern from residents in Lue relating to the potential for Mine-related traffic to pass through Lue and disrupt its peaceful and rural ambience have been acknowledged since the commencement of initial investigations by Bowdens Silver in 2016. The commitment of both the time and funds to relocate Maloneys Road was intended to demonstrate to the community Bowdens Silver's commitment to the sustainability of Lue. Regardless of this, when compared to existing traffic types and levels, the contribution of the Project to local traffic levels would be minor. This traffic generation and that required to pass through Mudgee would be subject to management through a Traffic Management Plan prepared in consultation with MWRC and TfNSW and ultimately approved by DPIE. It would be expected that should the Project be approved it will be a condition of the development consent that such a plan must be approved before site establishment and construction commences.

5.28.2 Construction Traffic

Representative Comment(s)

Construction haulage traffic calculations has also used assumed (sic) *a capacity of 50 tonnes per B-Double…*which *may result in traffic volume being underestimated and needs to be reconsidered given the road limitations.*

Transport for NSW

Response

The impacts of the construction haulage traffic referred to in this comment are restricted to that part of relocated Maloneys Road (once constructed) between the Mine Access Road and the entrance to the NAF Haul Road that provides access to the TSF. It is intended that this road would be constructed to a suitable standard to permit vehicles at Higher Mass Limits which under a Performance Based Standard (PBS) approval would easily permit payloads of 50t to be transported along this 1.4km section of road. Therefore, the proposed and assessed traffic levels are appropriate. Bowdens Silver would work with MWRC and the National Heavy Vehicle Register to ensure the necessary permits are in place for this to occur.

5.28.3 Traffic Through Lue

Representative Comment(s)

Trucks moving through our village at all hours every single day of the week. No thank you!

(Name Withheld) of Lue, NSW (Submission SE-8417310)

Response

Bowdens Silver would relocate Maloneys Road principally for the purpose of minimising traffic, particularly heavy vehicles, passing through Lue. Traffic that would travel through Lue may be separated into two categories, namely traffic required for the short-term site establishment and construction period (up to 18 months); and traffic generated throughout the operational life of the Project.

Heavy vehicles generated at the peak of construction activity, that would travel through the village of Lue include the following.

- Up to 4 movements per weekday and Saturday by shuttle buses (1 bus arrives and departs in the morning and 1 bus arrives and departs in the evening), likely to be a full size coach. The buses would operate based on shift change times, generating up to 2 movements through Lue village in the morning between 6:00am and 7:00am, and 2 movements between 5:00pm and 7:00pm.
- 32 movements per day (16 trucks inbound and 16 trucks outbound) before commissioning of the relocated Maloneys Road (first 6 months) and 10 movements per day (5 trucks inbound and 5 trucks outbound) after commissioning of the relocated Maloneys Road for miscellaneous deliveries, which typically occur during standard business hours 8:00am to 6:00pm.
- Occasional oversize or overmass vehicles, which would be managed on a case-by-case basis but would typically be limited to daylight hours.

Once the Project is operational, heavy vehicles generated by the Project and travelling through the village of Lue would include the following.

- Up to 12 movements per weekday by shuttle buses travelling to and from Rylstone/Kandos (6 buses inbound and 6 buses outbound, and fewer on weekends), which are likely to be 22-seater minibuses. The buses would operate based on shift change times, generating up to 2 movements through Lue village in any one hour between 5:00am and 8:00am, and between 3:00pm and 8:00pm.
- 2 movements per day for miscellaneous deliveries, which would typically occur during standard business hours.

All traffic generated by the Project or arriving at the Mine Site would be subject to strict operating hours and would not occur at "all hours".

5.28.4 Lue Road

Representative Comment(s)

The road is just not suitable for the proposed use and exceptionally narrow is some places so very dangerous for large vehicles.

Charlotte Buchanan of Mudgee, NSW (SE-8648003)

The already poorly maintained narrow road between Lue and Mudgee is now set to have 227,000 tonnes of ore trucked along it. This poses as a safety threat for locals and tourists in the area who use that road every day.

Ben Nagel of Mayfield, NSW (Submissions SE-8654963)

The EIS does not consider the width of the road in many places…This is a tourist drive. It won't be a very pleasant drive for tourists.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

The National Heavy Vehicle Regulator coordinates the national system of transport routes and the mass and size of vehicles approved to travel on them. This is done in coordination with State and Local authorities. Lue Road is an existing approved route for 26m B-Double vehicles indicating that the road is suitable for the use proposed for the Project. Regardless, all drivers associated with heavy vehicle traffic generated directly by the Project would need to sign and abide by a Driver's Code of Conduct that would direct driver behaviour and inform them of any constraints on the local road network. This includes limits to the use of Lue Road during school bus operating periods.

5.28.5 Concentrate Transport

Representative Comment(s)

The proposed total weight combined would exceed B-Double permissible weight on road network…This may result in traffic volume being underestimated in the TIA and may have an impact on proposed intersection treatments/modelling and road network traffic impact modelling.

Transport for NSW

Response

A review of planning for concentrate transport activities indicates that the contribution of shipping containers to the gross vehicle mass was omitted from the data presented in the EIS. It is proposed that half height bulk shipping containers would be used for this activity. These containers have an indicative capacity of 15.5m^3 and mass when empty of 3.15t. Two of these shipping containers would be transported on a 26m B-Double vehicle.

The following assumptions are therefore relevant to the planning of concentrate transport.

1. Transport of between 20 000t and 30 000t of concentrate each year.
2. Gross vehicle mass limit of 62.5t for a 26m B-Double vehicle at General Mass Limits (GML).
3. An assumed total payload of 38.84t for a 9-axle B-Double vehicle[19].
4. Mass contribution from two shipping containers of 6.3t.
5. Concentrates payload no greater than 32.54t (38.84t less 6.3t) to remain within the gross vehicle mass limit of Lue Road.

[19] Payload estimate sourced from the Australian Trucking Association *Truck Impact Chart* (March 2018)

At this concentrate payload, the expected concentrate production of 20 000t to 30 000t per year would require 615 to 922 loads per year, or between two to three loads per day (four to six movements with the return of empty trucks). In the EIS (Section 2.9.5), concentrate transport levels of between one and three loads per day were considered. Therefore, the maximum traffic generation per day would not change but the average traffic generation per day would need to increase.

The Traffic and Transport Assessment (TTPP, 2020) as well as the Noise and Vibration Assessment (SLR, 2020) and the Air Quality Assessment (Ramboll, 2021) conservatively assessed only the peak of three loads or six trips per day. Therefore, while the average number of loads would increase, the daily maximum would not change from that assessed for the Project with regard to impacts on the road network.

Representative Comment(s)

*The proponent is to explore a suitable B-Double route from the mine site to Parkes…*as the *current proposed route includes Renshaw McGirr Way which does not allow B-Double to travel on the entire length.*

Transport for NSW

Bowdens Silver should confirm the suitability of the entire transport route for B-double transport, as some roads may not be suitable.

Mid-Western Regional Council

Response

Bowdens Silver acknowledges this oversight in transport planning for concentrate delivery. An alternative route to Parkes via Wellington along the Mitchell Highway, through Molong to Escort Way via Peabody Road, before turning towards Parkes via Henry Parkes Way is presented in **Figure 5.13** and is an existing approved route for 26m B-Doubles. Given that concentrate transport is not predicted to exceed three loads per day, this additional distance of travel would not impact the feasibility of transportation activities to Parkes.

Representative Comment(s)

Currently B Double Trucks are restricted yet I believe that ore will be moved by B Double Trucks.

Camilla Graves of Beaconsfield Upper, Vic (Submission SE-8367329)

Response

B-Double vehicles are permitted on Lue Road, subject to restrictions which are described in detail in Section 3.1 of the Traffic and Transport Assessment. These restrictions include:

- general mass limits for 26m B-Double vehicles equivalent to 62.5t gross vehicle mass;
- speed limits of 80km/hr; and
- no heavy vehicles during school bus operating times (estimated to be between 7:50am until 8:50am, and between 3:00pm and 4:30pm on school days).

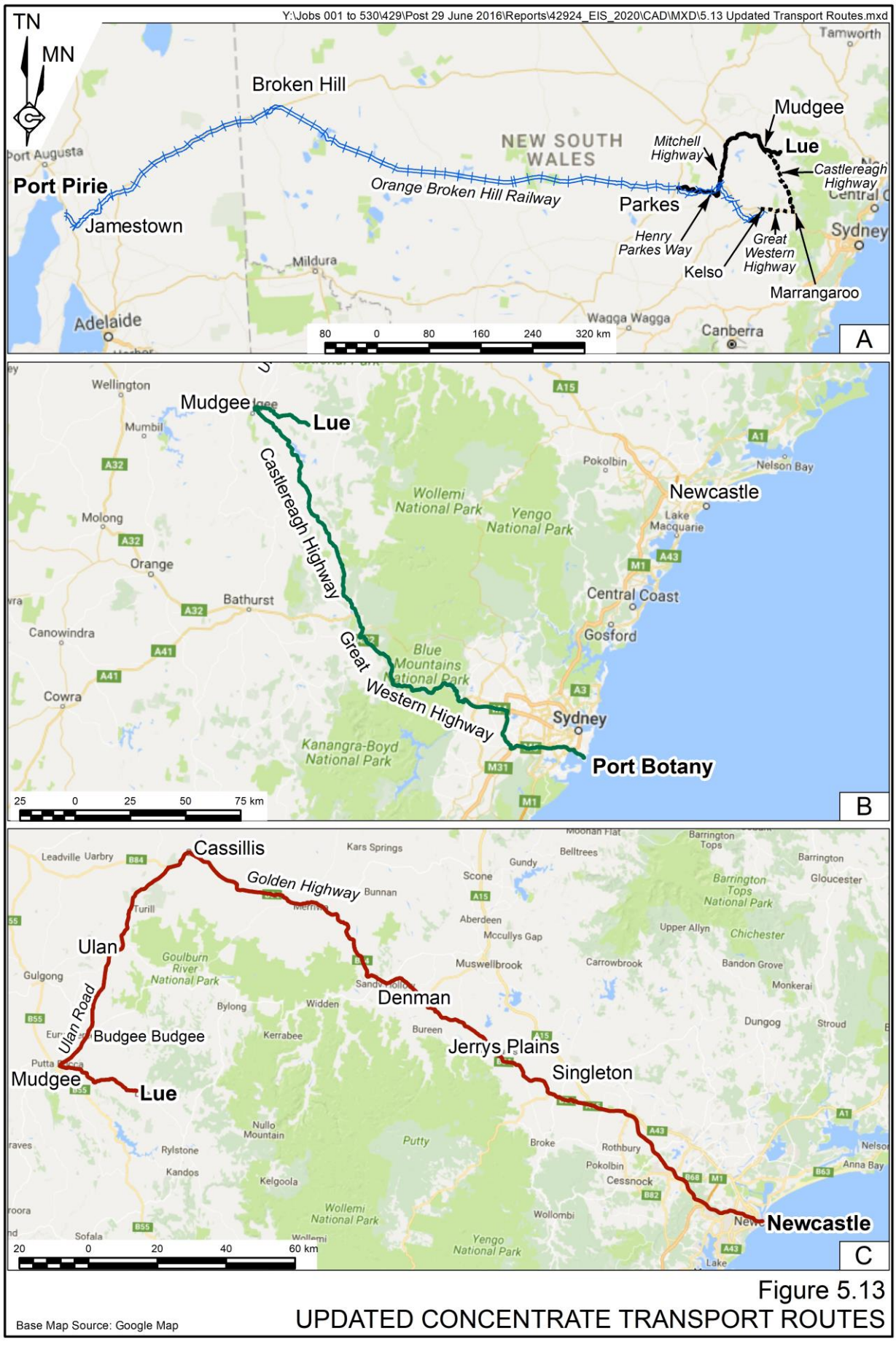


Figure 5.13
UPDATED CONCENTRATE TRANSPORT ROUTES

Base Map Source: Google Map

Project-generated B-Double vehicles would be subject to the same restrictions, which would be included in the Traffic Management Plan (as described in Section 6.15 of the Traffic and Transport Assessment) and a Driver's Code of Conduct.

5.28.6 Explosives Transport

Representative Comment(s)

The project proposes to bring 5-16 tonnes of both explosives and oxidising agents like AN (ammonium nitrate) to the mine site daily along the Mudgee –Lue road.

Risks associated with blasting and transport of explosives have not been adequately addressed.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

A Hazard Analysis of Dangerous Goods (Sherpa Consulting, 2020) was prepared for the Project and summarised in Section 4.16.1 of the EIS. This assessment included a SEPP 33 Screening Study prepared in accordance with *Hazardous & Offensive Development Application Guidelines – Applying SEPP 33* (DoP, 2011a). The proposed transportation of between 5t and 16t of ammonium nitrate-based blasting agents, such as ammonium nitrate fuel oil (ANFO) and/or ammonium nitrate emulsion (ANE) per day is below the screening level of SEPP 33 and therefore a transport route evaluation is not required (as was undertaken for the transport of sodium cyanide – see Section 4.16.1.4 of the EIS). Standard transport practices undertaken in accordance with *AS 2187.1 Explosives – Storage, transport and use – Storage* would be suitable to manage these activities.

Regardless, it was noted in Table 3 of Sherpa Consulting (2020) that a Mobile Manufacturing Unit (MMU) generally transports the raw materials to make ANFO or ANE in separate tanks (therefore reducing the Dangerous Good Class) and then mixes the materials on site with other agents to make the explosive in situ. This further demonstrates the low risk from transportation of these materials.

5.28.7 Traffic Levels

Representative Comment(s)

The traffic assessment be revised to omit the reduction in background traffic associated with projects outside of the control of the proponent.

Transport for NSW

Response

The assessment assumes changes in background traffic on Ulan Road (only) compared with surveyed conditions in 2017. The assumed changes are expected to result from changes in conditions at Wilpinjong Coal Mine, Moolarben Coal Complex and Ulan Coal Mine Complex, as follows.

- The operational workforces at the Wilpinjong and Moolarben Mines are expected to increase above those present at the time of the Project's traffic surveys, while that at the Ulan Mine is expected to decrease due to expiring of development consent for this mine. While this is beyond the control of Bowdens Silver, the information available indicates it will decrease.

- At the time of the traffic surveys in 2017, both Wilpinjong Coal Mine and Moolarben Coal Complex were undertaking short-term construction activity that involved additional traffic demands associated with the movement of the construction workforce and construction-related deliveries to and from those sites.

Furthermore, the assessment has applied non-specific growth to the volumes surveyed in 2017 in their entirety (see Section 5.1 of the Traffic and Transport Assessment), therefore it has been assumed that the mine-generated traffic surveyed in 2017 would continue to increase regardless of the actual expected changes to the operating conditions at each of the mines.

Nevertheless, a sensitivity analysis has been conducted to assess the midblock levels of service on Ulan Road for the longer term scenario under the assumption that the traffic generated by the Wilpinjong, Moolarben and Ulan Coal Mines, and captured in the 2017 surveys, would remain on the road network until 2031, and applying the background growth rate to total traffic captured in the 2017 surveyed (i.e. both mine-generated and non-mine generated traffic would increase over time). The results of the sensitivity assessment are summarised **Table 5.22** below, which includes comparison with the results of the original Traffic and Transport Assessment.

Table 5.22
Sensitivity Test of Traffic Level Assumptions

	Weekday AM Peak Hour 7:00am to 8:00am				Weekday PM Peak Hour 4:00pm to 5:00pm			
	Northbound		Southbound		Northbound		Southbound	
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Original Assessment (Table 41)								
Ulan Road north of Ulan	27	A	13	A	12	A	29	A
Ulan Road north of Lue Rd	48	B	58	C	63	C	67	C
Sensitivity Assessment								
Ulan Road north of Ulan	32	A	16	A	16	A	36	A
Ulan Road north of Lue Road	49	B	60	C	65	C	69	C
PTSF = Percent-Time-Spent-Following, LOS = Level of Service, refer to Table 9 of report for criteria								

The results of the sensitivity analysis demonstrate that the Levels of Service experienced during the Project peak hours on Ulan Road would remain the same as those of the original assessment.

5.28.8 Traffic Through Mudgee

Representative Comment(s)

this would be disastrous for the residents…of Mudgee who would have to endure extra trucks through the town.

Lesley Robertson of Mudgee, NSW (Submission SE-127742)

The direct route for these trucks comes through the heart of town passing the school and many of the accommodation types, cafes, pubs etc.

(Name Withheld) of Mudgee, NSW (Submission SE-8634609)

The potential threats of toxic chemicals being trucked through Mudgee and the potential for an incident to concern is a major concern.

(Name Withheld) of Mudgee, NSW (Submission SE-8638183)

…allowing B-doubles to pass through the town would destroy the amenity of our country town.

Elisabeth Brasseur of Mudgee, NSW (Submission SE-8640882)

Response

The despatch of mineral concentrates from the Project would use B-Double vehicles, some of which would travel through Mudgee enroute to Parkes, Kelso or Port Botany (Figure 5 of TTPP, 2020). The routes that would be used through Mudgee are all approved B-Double routes, and all currently carry heavy vehicles including articulated trucks.

The transportation of mineral concentrates would generate a maximum of three loads per day, (equivalent to six movements per day with the return of the empty vehicles) spread across all destinations. Project-generated haulage trucks on any one route through Mudgee would generate fewer than six movements per day. In the context of the background traffic and the existing use of the routes by heavy vehicles, the addition of up to six truck movements in a day would be imperceptible. The movement of trucks through Mudgee would be managed to avoid travel during school bus operating periods.

5.28.9 Relocated Maloneys Road

Representative Comment(s)

The relocation of Maloneys Road should occur prior to any on site construction commencing.

Mid-Western Regional Council

Response

It is appreciated that this restriction is intended as an additional mitigation to reduce the volume of traffic passing through Lue and noise from vehicles on Pyangle Road. As noted in the discussion on traffic through Lue in Section 5.28.2, prior to the commissioning of the relocated Maloneys Road, it has been estimated that 32 heavy vehicle movements per day would be required through Lue village as well as number of bus movements, and the occasional oversize load. While Bowdens Silver may delay commencement of on-site activities while construction of the relocated Maloneys Road is occurring, it is considered that the proposed schedule is appropriate for the following reasons.

- The expected traffic levels during the construction period are likely to be low relative to existing traffic passing through Lue (10% of existing traffic at a peak).
- Bowdens Silver has committed to upgrade the intersection of Pyangle Road and Lue Road. This upgrade would not be required should the relocation of Maloneys Road occur first and access via Pyangle Road not be required.

Therefore, it is considered that minor impacts associated with relatively low traffic levels for a limited period of time would be mitigated by permanent improvements to the road network (separate to the relocation of Maloneys Road). Therefore, the commencement of on-site activities during construction of the relocated Maloneys Road is considered acceptable.

5.28.10 District Roads

Representative Comment(s)

The Bowdens Silver mine will also increase traffic flow on all roads surrounding the mine. In the case of the Hayes Gap Road this will pose an increased safety risk as we move livestock and machinery.

(Name Withheld) of Stony Creek, NSW (Submission SE-8601366)

Response

It is noted that Hayes Gap Road is an unsealed road that would provide a potential access route between the Mine Site and Ulan Road. Predicted traffic between Ulan and the Mine Site is expected to be no greater than 8 movements per day during the peak construction period, and fewer once operational. The demand between Ulan and the Mine Site would be generated by workers travelling in private cars and would not include vehicles transporting concentrate or buses transporting personnel. Any use of Hayes Gap Road would therefore most likely be very occasional light vehicles only. Therefore, the risk to livestock or machinery would be minimal. In addition, it would also need to be the case that this route offers faster trips or is more convenient than the use of existing sealed roads at Lue Road and Ulan Road. This is unlikely unless there is an accident or congestion that is causing a delay. In summary, infrequent use of this route by a light vehicle seeking to avoid congestion on sealed arterial roads is unlikely and a minimal risk of inconvenience to livestock or machinery from agricultural land adjacent to Hayes Gap Road. Notwithstanding this, Bowdens Silver's community liaison officer would be available to discuss these issues should they arise, and address complaints made by relevant landowners.

Representative Comment(s)

…movements of other vehicles along the Bylong Valley Way to Newcastle do not seem to have been taken sufficiently into account.

Craig Shaw of Kandos, NSW (Submission SE-8655419)

Response

The majority of Project-generated traffic to and from the east would be light vehicles used by those workers travelling in private vehicles, and not using dedicated shuttle bus services. The Project's contribution to total traffic on Bylong Valley Way and the route to Newcastle is sufficiently small that it would have a negligible impact on the operation of the road network and intersections.

5.28.11 Rail Overbridge

Representative Comment(s)

…the proponent needs to contact JHR to discuss JHR's letter dated 16 April 2019 and provide evidence of JHR's in principle support of the proposal.

Transport for NSW

Response

John Holland Rail has been contacted to update the existing in principle support for the proposed rail overbridge. A response was not yet received at the time this document was published. Regardless, it is noted that the proposed rail overbridge has not changed since the initial in

principle support was provided and therefore this is considered a formality. Bowdens Silver recognises the need to work closely with John Holland Rail to finalise the design and agreed components of the rail overbridge. This process would commence in the event the Project is approved and moves to commence site establishment and construction.

5.28.12 Road Safety

Representative Comment(s)

…consideration needs to be given to how the following deficiencies will be addressed as part of the development.

- *insufficient centre line and edge line delineation particularly at night time;*
- *inconsistent treatments for guiding drivers through curves;*
- *unprotected roadside hazards within the clear zone, including substantive trees and slopes that are not traversable;*
- *pavement damage; and*
- *fretted seal edge.*

Transport for NSW

Council requires a road dilapidation report…particularly for *Lue Road and Ulan Road.*

Mid-Western Regional Council

A Transport for NSW Road Safety Audit should be conducted to identify particular areas of concern which require upgrade or treatment.

Mid-Western Regional Council

Response

A Road Safety Audit (RSA) of existing conditions was conducted in accordance with the relevant TfNSW (formerly RMS) guidelines, to examine and identify road safety concerns along Lue Road between Mudgee and Lue, as requested by TfNSW. The RSA report is presented as Annexure 4 to the Traffic and Transport Assessment, and its principal findings are also presented in Section 3.13 of the Traffic and Transport Assessment. Some upgrades to Lue Road have been completed since the RSA was conducted. It is noted that the RSA did not identify any safety issues that would make use of Lue Road unsafe for the intended use. It is expected that MWRC would direct some of the contributions to be paid to MWRC through a formal Planning Agreement towards these matters.

Representative Comment(s)

…the traffic created by the trucks will make an already slow trip even slower and increase the risk of accidents because there are few places where a car can pass a heavily laden B-double.

(Name Withheld) of Nullo Mountain, NSW (Submission SE-8630649)

Who is expected to foot the bill of the upkeep of the already narrow winding roads through the area when they disintegrate with the increase of heavy traffic?

Melanie Lattanzio of Nowra, NSW (Submission SE-8657903)

Response

Heavy vehicle movements associated with the Project would be minor compared to existing heavy vehicle traffic using the transport routes. While the potential for minor increases to heavy vehicle traffic levels may be perceived as a potential nuisance, in reality, the change would be difficult to be perceived in most locations. The number one priority for Bowdens Silver when it comes to transport would be safety, and all reasonable measures would be taken to ensure the safety of truck drivers and existing road users. The principal tool to manage safety on public roads would be the Driver's Code of Conduct, which would be developed in consultation with TfNSW, MWRC and DPIE.

5.28.13 Road Maintenance

Representative Comment(s)

Council expects that the proponent will make an annual contribution to roads maintenance for the project life based on projected traffic movements…

The proponent should approach Council to enter into a Road Maintenance Agreement and to determine an appropriate maintenance contribution for all ongoing maintenance requirements for the duration of mining operations, including Lue Road and Bara Lue Road.

Mid-Western Regional Council

Response

Preliminary terms for a Planning Agreement have been provided to MWRC that include contributions towards road upgrades and maintenance on those roads used for the Project as well as the transport infrastructure and road haulage matters conventionally covered in the Mid-Western Regional Contributions Plan.

Once the terms of the Planning Agreement have been agreed by all parties, they would be made publicly available in accordance with the requirements to publicly exhibit these agreements before they are finalised.

5.29 VISUAL IMPACTS

5.29.1 Overview

The responses in this subsection address comments received in community submissions relating to possible views of the Mine Site and associated infrastructure and the effects of lighting on the existing environment.

The visual impacts of the Project were comprehensively assessed by Richard Lamb and Associates in a Visibility Assessment (RLA, 2020) and the possible effects of night lighting on the surrounding environment and particularly the Dark Sky Region were assessed by Lighting, Art & Science Pty Limited in a Lighting and Sky Glow Assessment (LAS, 2020).

The review of the matters raised in the public submissions has not changed the outcomes of either of these assessments. Additional information and clarification has been provided for specific residences that would have views of the Project and to elaborate on views of the realigned 500kV transmission line. The outcomes of the Lighting and Sky Glow Assessment have also been clarified.

No components of the Mine Site would be visible from Lue village. Views of some components with the Mine Site from the public road network would be possible at some locations and it is acknowledged that the Project would result in changes in the visual landscape in the vicinity of the Mine Site with views from six private residences possible at certain stages of development (two of which are Project-related, having entered into agreements with Bowdens Silver). It is considered that the distance from the viewing locations and Mine Site as well as the proposed visual controls would achieve an acceptable level of impact. Lighting of the Project would result in only minimal and acceptable impacts to the built or natural environment and would have negligible impacts on astronomical observatories in the region.

5.29.2 Visual Impacts – Daytime

Representative Comment(s)

I have had no consultation from any Bowden representative up to this point but I would welcome a conversation.....perhaps on my back verandah, looking at the view I am about to lose if the mine goes ahead.

Dean Knott of Lue, NSW (Submission SE-8498566)

Response

The Visibility Assessment conducted for the EIS determined that the activities within the Mine Site would not be visible from Lue. Specifically looking at Mr Knott's property (R94), the intervening topography would obscure views of activities within the Mine Site and therefore the view from this property would not change. The assessment involved observations of the proposed Mine Site from 53 public and private viewing locations as well as other detailed analyses and development of cross-sections, a 3-D interactive model, creation of photomontages that show visual changes over time and a review of all project components. It was concluded that occupants of six privately-owned properties within approximately 5km of the Mine Site would be able to view components of the Project at different times during the Project life (two of which are Project-related, having entered into agreements with Bowdens Silver). **Figure 5.14** presents the locations of properties that would have views of the Mine Site.

Overall, the extent of visual impacts at private residences was considered to be low, given the low number affected and low overall visibility of components of the Project to most of the residences analysed.

Community consultation undertaken for the Project and Social Impact Assessment (SIA) (as outlined elsewhere) has been extensive. It should be noted that in terms of the stakeholder above, following communication from Bowdens Silver, an initial scheduled SIA interview was cancelled at their request. An attempt to "door-knock" the property was made and a note was left at the premises to get in touch to reschedule a meeting. No further correspondence or contact was received from the landholder. In October 2019, Mr Knott participated in a SIA interview with the Social Impact consultants, Umwelt. Stakeholders such as this have also been included in newsletter and information sheet mailouts with ample opportunity to contact Bowdens Silver to seek information. All local residents and neighbours have been invited to company open days and all newsletters and other information features Bowdens Silver's open-door policy for all to utilise.

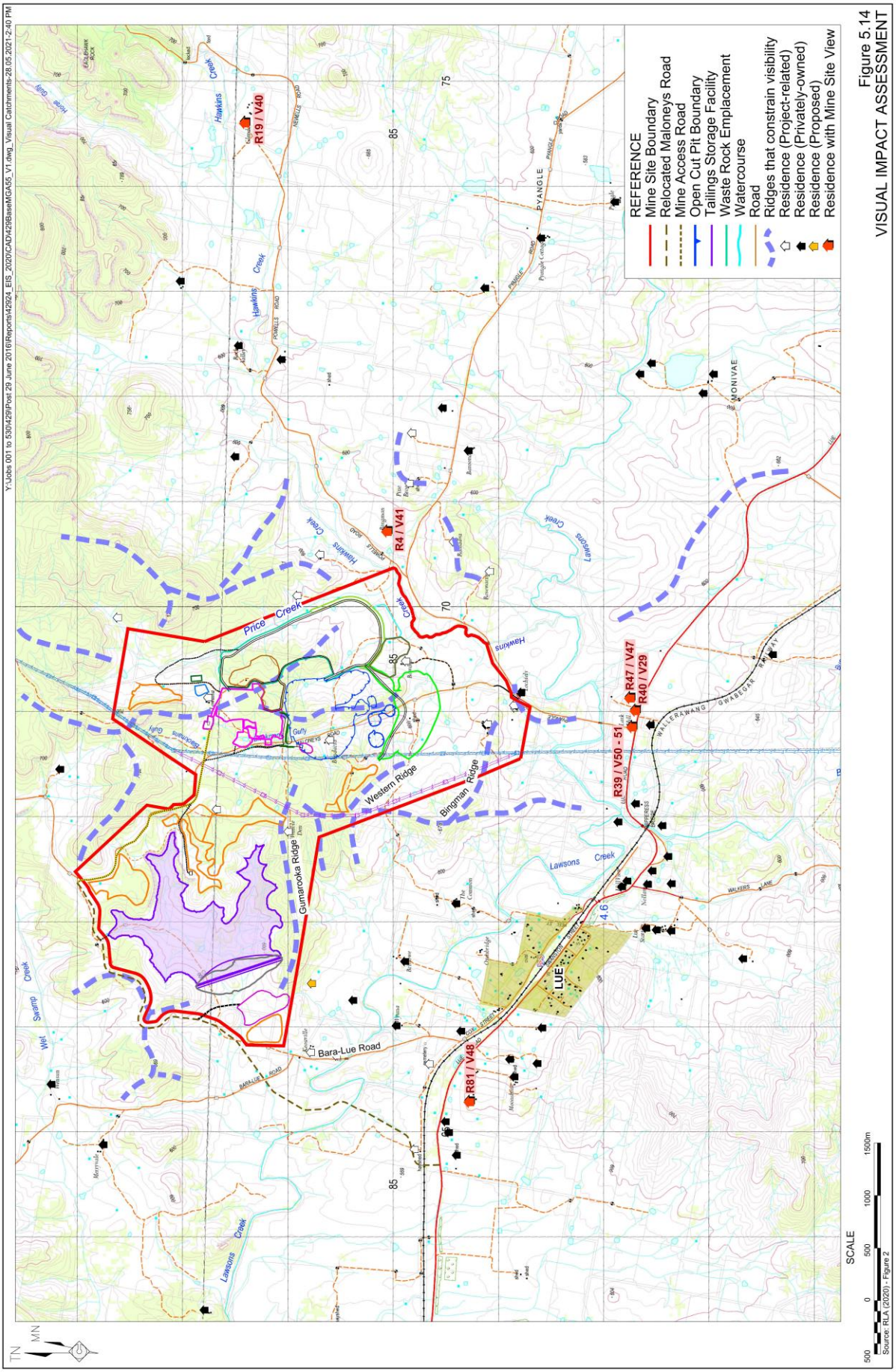


Figure 5.14
VISUAL IMPACT ASSESSMENT

Representative Comment(s)

I bought my property for the view and the country peace and the Bowden silver mine will ruin all of this. My property looks out over beautiful rural areas that are going to be the tailings dam and also the road into the mine.

Lucinda Jones of Lue, NSW (Submission SE-8500141)

Response

In recognition that sections of the relocated Maloneys Road and part of the TSF embankment would be within the viewshed from the Jones Residence, Bowdens Silver commissioned the preparation of a series of photomontages to present what would be visible from the residence, i.e. at a distance of approximately 2.24km. The photomontages are presented in Appendix B of Lamb (2020) as visibility location V48, with a copy of the image from Year 8 reproduced in **Plate 5.2** below. It is notable that this is the only residence on the western outskirts of Lue that would have a view of the Mine Site.

Plate 5.3 Photomontage R81 – Year 8

During the construction phases of the TSF embankment, earthmoving equipment would be visible and light-coloured waste rock would contrast with the surrounding vegetation. Beyond about Year 9, the outer face of the embankment would be fully revegetated and it is unlikely that the embankment would be clearly discernible.

The assessment undertaken by Richard Lamb and Associates considered the following factors.

- Viewing location
- View composition
- Scenic character and quality
- Viewing level and distance
- Viewing period
- Visual absorption capacity

- Visual compatibility
- An understanding of the subjective viewpoints and perceptions of those who would see components of the Project.

The view of the Mine Site from this property is classed as distant and does not cover a significant portion of the view. Once the TSF construction has commenced, the only change to this view over time would result from the progressive increase in the height of the TSF, but the overall character and quality of this view would not change substantially. That is, until completion of the final raise of the embankment when the surface would be revegetated.

Representative Comment(s)

Not only would the scar of the main pit be visible from the Lue Road but the rock pile alongside it is 100 metres high and shaped like a sand castle; there is no attempt proposed to make the rock pile integrate with local topography.

Claudia Dreverman of Crows Nest, NSW (Submission SE-8630630)

Response

The claim in this comment is not correct. Rather, the design of the "rockpile" (waste rock emplacement (WRE)) would achieve a landform resembling a north-south orientated ridge with local variation to remove straight sections – as displayed in EIS Figure 2.8. During the construction stage of the WRE, narrow berms would be constructed at the edge of each 10m lift, however, these berms would be effectively removed as the final landform (see EIS Figure A5.12) is progressively constructed on the surface of each cell.

Representative Comment(s)

People visiting do not want to see a mine sitting at the edge of the village!

(Name Withheld) of Buckaroo, NSW (Submission SE-8657328)

Response

The claim in this comment, i.e. "sitting at the edge of the village" is not correct – any visitor to Lue village would not be able to view mining, the processing facilities or any other of the mine's infrastructure at any point during the Mine life given the substantial topography between Lue and the Mine Site.

Representative Comment(s)

It appears that the transmission line will be relocated on top of the hills near the village in view of all homes.

(Name Withheld) of Lue, NSW (Submission SE-8758101)

Response

The existing 500kV transmission line east of Lue and the proposed re-aligned 500kV transmission line are displayed on **Figure 5.15** with references to the towers provided, i.e. existing (E1 to E8) and proposed (P1 to P7). **Plates 5.3** and **5.4** display views towards the powerline respectively from the eastern and western sides of Lue in which the existing towers are visible.

A review of the Project 3D model on Bowdens Silver's website for the existing powerline and proposed powerline (**Figure 5.16**) displays that four of the relocated 500kV transmission line towers (P4 to P7) would be topographically higher (to varying extents) and closer to Lue than the existing towers. As a consequence, the upper sections of the towers would be visible. Two towers (E2 and E7) would no longer be visible as they would be dismantled.

Plate 5.4 **View towards Powerline Tower E7 from the eastern side of Lue (Ref: E7 - IMG_0819)**

Plate 5.5 **View towards Powerline Tower E4 from the western side of Lue (Ref: E4-IMG_0837)**

The 500kV transmission line is a substantial item of infrastructure in the landscape east of Lue and its slight re-alignment and construction of four new towers and removal of two existing towers would not change the overall character of the powerline when viewed from Lue.

The re-alignment of this section of the power transmission line would enable the full quantity of defined ore to be recovered – for the benefit of NSW taxpayers who would benefit from the royalties paid by Bowdens Silver.

5.29.3 Visual Impacts – Night-time

Representative Comment(s)

The EIS has attempted to avoid the unsustainability of this project by ignoring *the residents of Lue by not assessing the impact of light pollution.*

B. Wannan of Lue, NSW (Submission SE-8654059)

Response

Contrary to the comment provided, Bowdens Silver acknowledged the need to fully understand the potential for light pollution generated by the Project as a result of a range of comments provided by Lue and district residents and consequently commissioned a Lighting and Sky Glow Assessment (LAS, 2020) to assess potential impacts associated with lighting at Lue and surrounding rural areas. These impacts could occur due to:

- direct impacts (i.e. where light is directed towards a viewer);

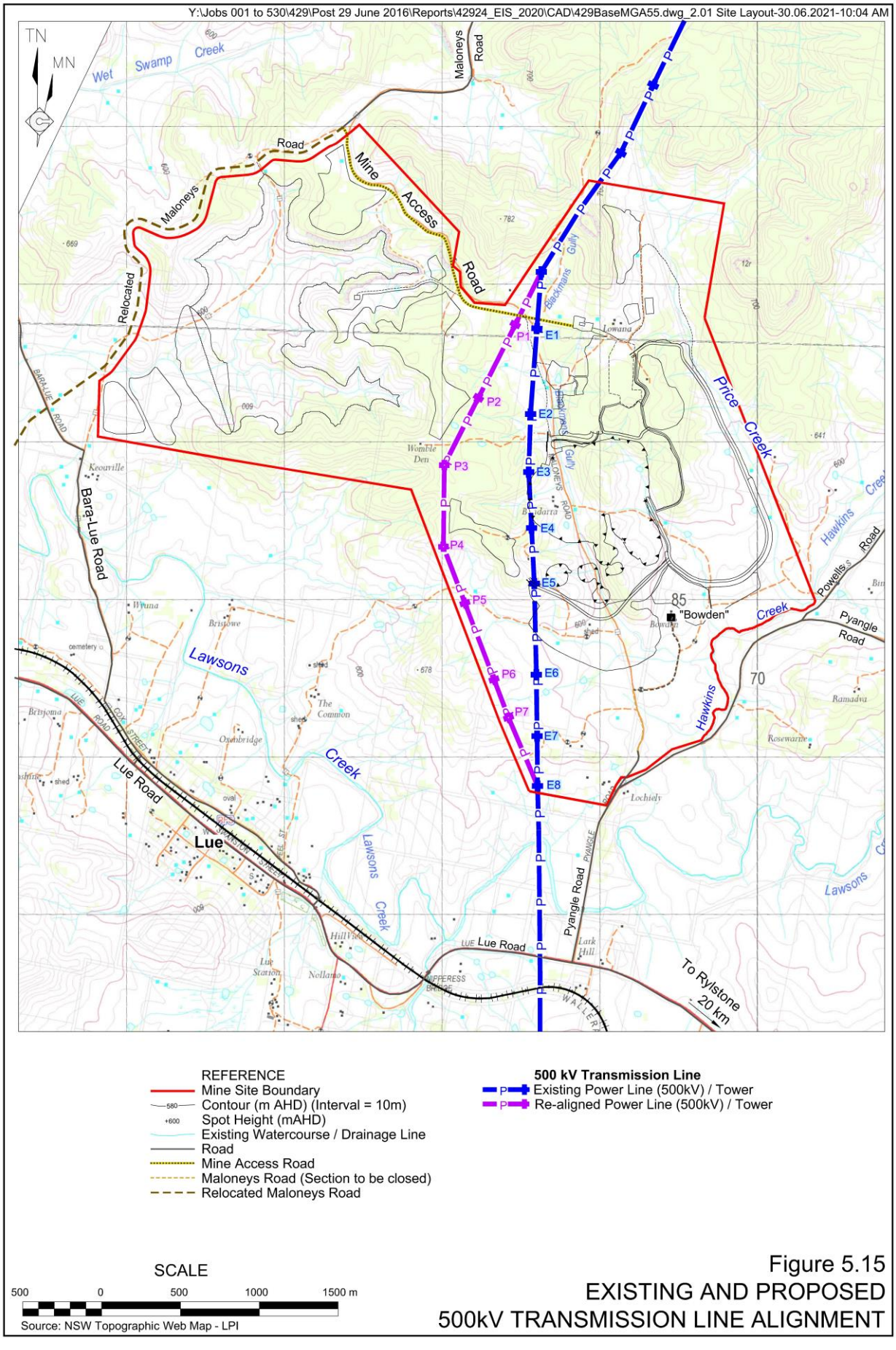


Figure 5.15
EXISTING AND PROPOSED
500kV TRANSMISSION LINE ALIGNMENT

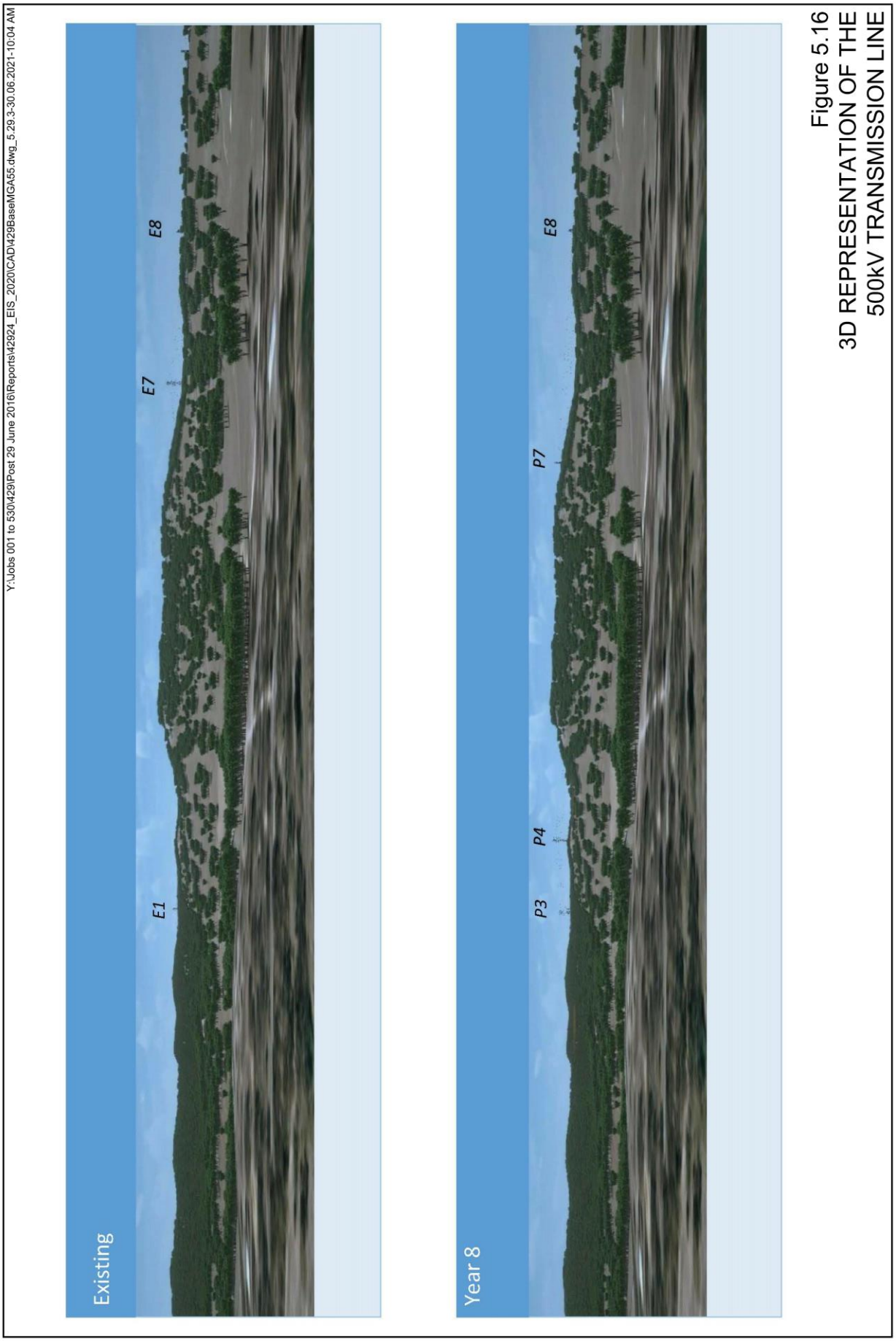


Figure 5.16
3D REPRESENTATION OF THE
500kV TRANSMISSION LINE

- indirect impacts (i.e. where the source of light is not directed at the viewer but the spread of light is observable); and
- sky glow (i.e. where light is reflected in the atmosphere).

In order to mitigate the lighting impacts on the local environment, a range of measures would be adopted to manage lighting within the Mine Site (see Section 4.9.4.4 of the EIS). Given the implementation of these measures, it was determined that the Project would comply with the limits for dark rural environments as stipulated in AS/NZS 4282:2019 *Control of the Obtrusive Effects of Outdoor Lighting*. LAS (2020) concluded that the Project would have minimal lighting impacts on the surrounding environment and Lue.

Representative Comment(s)

Light pollution would come into consideration, particularly on overcast or cloudy weather, when light would be reflected outwards.

(Name Withheld) of Totnes Valley, NSW (Submission SE-127486)

I am sure I will see (at my home 8km east of the Mine Site) *the glow of the lights from the proposed mine on certain nights.*

William Brown of Breakfast Creek, NSW (Submission SE-8630760)

Our property will be affected by the 24-hour operation of the mine having an effect on our lifestyle and environment due to skyglow.

Bruce Christie of Monivae, NSW (Submission SE-8635417)

…due to the light pollution, the ability to see stars at night will be minimised, this is a major attraction for visitors from cities.

Sally Nagel of Lue, NSW (Submission SE-8639269)

We are concerned that this mine, and specifically its lighting, should it go ahead, will contribute significantly to degrading the quality of our regional dark skies and thus threaten local, national and, international tourism to our region.

David McKinnon of Bathurst, NSW (Submission SE-8644478)

Response

The Lighting and Sky Glow Assessment (LAS, 2020) prepared for the Project specifically considers the impacts of lighting and sky glow at residences within and surrounding Lue. The calculations undertaken by LAS (2020) indicate that the proposed lighting for the Project falls well within the limits specified in AS/NZS 4282:2019 *Control of Obtrusive Effects of Outdoor Lighting* with the exception of the luminous intensity from certain viewing angles. However, it is noted that direct lighting impacts are of limited relevance to the Project due to the intervening topography between the Mine Site and surrounding residences. Direct views of Project-related lighting would exist from the southeastern boundary of the Mine Site, however, with the adoption of the mitigation measures outlined in Section 4.9.4.4 of the EIS, the Applicant would effectively minimise the opportunity for direct lighting to be observed. LAS (2020) has assessed that the Project would have minimal lighting impacts within and surrounding Lue.

Sky glow would not be visible under clear conditions although there would be a faint glow on low cloud directly above the Mine Site. The incremental increase in illuminance in Lue from the light reflected from the clouds would be around 0.3%. As the human eye can only discriminate a doubling or halving of illuminance, the visual impacts within Lue would be imperceptible. It would also be unmeasurable as the increase in overall illuminance is less than the uncertainty of a high-quality light meter which typically has a minimum range of 0.1 lux and an accuracy of 2%. In the rural areas immediately surrounding the Mine Site, the incremental difference in illuminance would be greater as the base illuminance would be less, but the levels would still be too low to measure and would only be perceptible with a fully dark-adapted eye. The luminance of the sky would only be noticeable under overcast conditions and then, it would only be a faint glow. The lighting would therefore have negligible impact on sky glow and the amenity of the residents in Lue and the rural area immediately surrounding the Mine Site.

Representative Comment(s)

I am able to see in the very dark night sky the glow of the lights at the Ulan and Wilpinjong coal mines which are tens of kilometres to the North. I am concerned that a mine 2kms to the West of my home will turn dark nights into something like bright moonlight or worse every night.

Michael Boller of Lue, NSW (Submission SE-8757975)

Response

The Ulan Coal Mine and Wilpinjong Coal Mine are significantly larger operations than the Project. These mines were constructed under the previous edition of *AS/NZS 4282 Control of the obtrusive effects of outdoor lighting* which does not include environmental limits as low as the current edition against which the Project was assessed. In addition, the previous edition did not have limits on upward light. As a result, it is considered that these mines are not indicators of the potential sky glow from the Bowdens Silver Mine. As discussed above, the luminance of the sky would only be noticeable under overcast conditions and then, it would only be a faint glow with negligible impact.

Representative Comment(s)

I am part of an international community of astronomers who submit images to various forums and databases to be used by the international scientific community as well as organisation like NASA and ESA for their planetary studies and mission planning. This work will be severely threatened by the proposal, due to the impact of the light pollution from the site.

The Lighting and Sky Glow Assessment shows no understanding that the forecast levels of light pollution as being no worse than the full Moon, are utterly incompatible with astronomy.

Niall Macneill of Bathurst, NSW (Submission SE-8658664)

It will severely impact me personally as I am an astrophotographer based at Wattle Flat, NSW which is approximately 57 kilometers from the site.

By definition, as stated in the Assessment document, a lighting level that is comparable to the full Moon makes the impact from these operations untenable from an astronomy perspective.

Niall Macneill of Bathurst, NSW (Submission SE-8658664)

Light pollution in a dark sky site so very close to the ASNSW's dark-sky observatory, a site which is entirely missing from document Part 8b Lighting and Sky Glow Assessment, and is a serious oversight.

Astronomical Society of NSW of Epping, NSW (Submission SE-8605297)

The suggested mitigation measures on p 8b- p41 will have a serious effect on the night sky of the Central West.

It is also an extravagantly wasteful use of electricity: the light which goes up into the night sky serves no useful purpose.

Astronomical Society of NSW of Epping, NSW (Submission SE-8605297)

Response

The Lighting and Sky Glow Assessment (LAS, 2020) specifically considers potential impacts of sky glow on astronomical observation facilities listed in the Astronomical Society of Australia list of Major Facilities, University/Publicly-funded facilities and Significant Amateur Society/Private Observatories in the vicinity, including the Siding Spring Observatory, Mudgee Observatory and Wiruna Observatory (ASNSW's Dark Sky Site). Although not on the list, the Mudgee Observatory and the site located near Breakfast Creek where astronomical observations are undertaken using mobile telescopes, were also considered.

Section 5.5 of LAS (2020) presents a number of calculations undertaken to determine the total lumens, total upward lumens and the illuminance of sky particles at varying levels above the Mine Site. These calculations were provided to the Siding Spring Observatory who calculated that the night sky brightness as a result of the Project would be negligible (see correspondence from the Siding Spring Observatory in Annexure D of LAS (2020)). LAS (2020) further assessed that Mine Site lighting would have negligible impacts on the observatories at Wiruna and Mudgee and minimal impact on observations from the site near Breakfast Creek when low elevation observations are made directly over the Mine Site.

The Lighting and Sky Glow Assessment (LAS, 2020) does not state that light pollution from the Project would be comparable to a full moon. Rather, the approximate illuminance from a full moon (0.5 lux) is provided as a comparison to demonstrate the slight increase to the vertical illuminance at Lue of between 0.0004 lux and 0.0016 lux during cloudy conditions. This increase in illuminance at Lue would be imperceptible to the human eye and unmeasurable using a light meter. Furthermore, this would only occur under overcast conditions and would therefore have no impact on astronomical observations.

It is also unclear how the mitigation measures identified within Section 4.9.4.4 of the EIS would adversely impact sky glow within the Central West. The proposed mitigation measures, including forward throw luminaires and shields, are designed to further decrease the upward light and therefore reduce sky glow.

5.30 WASTE ROCK EMPLACEMENT

5.30.1 Introduction

This subsection provides responses to submissions relating to the waste rock emplacement (WRE) and also specifically referencing information provided in the:

- Materials Characterisation Assessment (GCA, 2020); or

- Preliminary Design of PAF Waste Rock Emplacement, Oxide Ore Stockpile and the Southern Barrier (Advisian, 2020a); or
- TSF and WRE Closure Cover Design (Advisian, 2020b).

Submissions associated with the WRE covered a range of matters. These included implied risks to groundwater from leachate, principally associated with the installation, efficacy and durability of the proposed WRE liner. These risks were invariably linked to the reactive nature and geochemical characteristics of potentially acid forming (PAF) waste rock, another subject of submissions. Further submissions queried the arrangements for identification, classification and handling of waste rock for either placement in the WRE or use in on-site construction whilst others identified concerns with the proposed capping and closure strategy of the Mine Site. Finally, the potential risk from airborne transport of particulate matter from the WRE was also raised, reflecting community concerns over dust exposure.

During the preparation of the responses to submissions relating to the WRE, it was identified that:

- the geochemical characteristics and behaviour of the Bowdens deposit ore and waste rock are well understood;
- waste rock storage and encapsulation is a common strategy predicated upon management of well understood environmental risks;
- the WRE and its cover system have been professionally designed using best practice engineering principles; and
- the long-term landform would be physically and chemically stable, non-polluting and blend sufficiently into the surrounding terrain.

Most importantly, the characterisation and placement of the PAF waste rock within the WRE would be undertaken in accordance with operational procedures specifically designed to identify, classify, transfer and encapsulate PAF waste rock to avoid the long-term generation of leachate (acid mine drainage).

5.30.2 Waste Rock Destinations

Representative Comment(s)

Every truck load from the mine on every shift every day and night will need to be accurately classified and *dumped at the correct stockpile. There will be approximately 60,000 truckloads per year.*

Incorrect classification of material or incorrect placement of material will have negative economic and/or environmental consequences.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Mining operations need to classify and demarcate all extracted rock. This is critical to successful economic outcomes for any mining project requiring the separation of ore and waste rock through selective handling and treatment.

The materials that may generate environmental or adverse economic impacts, if incorrectly classified, are fortunately readily identifiable through visual inspection, portable X-Ray Fluorescence (XRF) detection, laboratory assay of grade control drilling and/or emerging continuous XRF down hole logging. When combined with conditional simulation in a risk management approach, measurements can be directed to areas of greatest uncertainty to economically reduce risks of misclassification systematically.

The grade control drilling would classify the rocks within the open cut pit as ore (high, medium or low grade), Non-Acid Forming (NAF) waste rock or Potentially-Acid Forming (PAF) waste rock. Bowdens Silver proposes an automated system for the analysis of drill chips providing certainty for this component.

Bowdens Silver would develop a procedure involving all relevant personnel on site in order to ensure the various rock types are correctly excavated and loaded into haul trucks and then transported to the correct destination within the Mine Site. This procedure would be subject to checking at appropriate intervals and only personnel that have been fully trained in the operations of the procedure would be allowed to undertake the nominated tasks.

Incorrect stockpiling of NAF or PAF material would not result in any off-site adverse environmental outcomes as all runoff from stockpiles would be collected in on-site water management infrastructure. Discharge from water management infrastructure would not occur unless it meets the water quality criteria specified in an Environment Protection Licence (EPL). In addition, regular monitoring of water management infrastructure would identify any unexpected changes to water quality.

Bowdens Silver's internal procedures for management of NAF and PAF would include contingency measures in the event any PAF waste rock is incorrectly placed within the Mine Site. This includes if remedial actions are required to redress the situation.

5.30.3 Characterisation of Waste Rock

Representative Comment(s)

how much cadmium and copper *might be present in the ore?*

Haydn Washington of Nullo Mountain, NSW (Submission SE-8514832)

Response

The ore of the Bowdens deposit is remarkably copper poor, averaging approximately 22ppm or 0.0022% (median 17ppm) with the maximum concentration of 0.046%. The estimated concentration of cadmium within the ore of the Bowdens deposit averages 16ppm or 0.0016% (median 13ppm) with the maximum estimated concentration is 233ppm which would account for approximately 0.000015% of the ore proposed to be mined.

Representative Comment(s)

There is very little detail about composition and physical properties of mining ore and wastes given in the EIS document. There needs to be further concentration data for all concentrates and wastes (tailings and unprocessed waste rock, including oxide ore) and particle size ranges needs to be characterised to assess likely exposure to Lue population.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 3

Response

Bowdens Silver recognises that information in the main body of the EIS relating to the geochemistry of the Bowdens deposit is generally associated with potential AMD generation and waste rock characterisation (see EIS Section 2.5). However, the Materials Characterisation Assessment, presented as Part 3 of the SCSC (GCA, 2020), included multi-element assay results (chemical composition) for the following materials.

- Waste rock: Tables 2, 6a, 6b, 6c, 6d and 6e
- Ore: Tables 4 and 6f
- Low Grade Ore: Tables 4 and 6f
- Tailings: Annexure 2, Table 2

GCA (2020) also presented results of mineralogical analysis for:

- Waste rock: Tables 7a, 7b, 7c, 7d and 7e;
- Low Grade Ore: Table 7f; and
- Tailings: Annexure 2, Table 3.

It is noted that information on the chemical and mineralogical composition of the Oxide Ore was not provided in the EIS or GCA (2020). The Oxide Ore is significantly weathered (oxidised) and therefore (generally) devoid of reactive materials.

As noted in EIS Section 4.8.5.2, the evaluation of particle size as the single factor in determining potential for particulate toxicity is difficult as potential health effects are also influenced by the chemical composition of the particulate. Notwithstanding, there is strong evidence to conclude that fine particles ($PM_{2.5}$) are more hazardous than larger ones (coarse particles - PM_{10} and larger). Therefore, to assess potential health impacts, enRiskS (2021) calculated the incremental changes in $PM_{2.5}$ exposure from the Project alone. This calculation focussed on the key health endpoint, mortality (all causes). The results calculated by enRiskS (2021) identified that the maximum incremental risk for exposure to changes in $PM_{2.5}$ at privately-owned residences was $5x10^{-5}$ (1 in 50 000). This level of risk is five times lower than the NSW EPA 1×10^{-4} (or 1 in 10 000) unacceptable risk level.

More information on the assessment of risks associated with the potential exposure of Lue and district residents to particulate matter generated by mining activities is provided in the Air Quality Assessment (Ramboll, 2021 and the Human Health Risk Assessment (enRiskS, 2021) These assessments were summarised in EIS Sections 4.4 and 4.8 respectively.

5.30.4 Geochemical Risks

Representative Comment(s)

…the processes to identify (and remediate) geochemical risks should be included.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

The key geochemical risk associated with the Project is potential leachate or acid mine drainage (AMD) generation which is also discussed in Section 5.14 of this document. Quantifying this risk was the principal objective of the Materials Characterisation Assessment (GCA, 2020). Based on the findings presented in GCA (2020), the management and mitigation of identified geochemical risks were key to the development of preliminary designs for relevant mine components. Subsequently, the following information was included in the EIS and SCSC.

- Section 2.5 and Appendix 5 of the EIS: Waste Rock Management.
- *Materials Characterisation Assessment* – Part 3 of the *Specialist Consultant Studies Compendium* (GCA, 2020).
- *Tailings Storage Facility Preliminary Design* – Part 16a of the *Specialist Consultant Studies Compendium* (ATC Williams, 2020).
- *Preliminary Design of PAF Waste Rock Emplacement, Oxide Ore Stockpile and the Southern Barrier* – Part 16b of the *Specialist Consultant Studies Compendium* (Advisian, 2020a).
- *TSF and WRE Closure Cover Design* – Part 16c of the *Specialist Consultant Studies Compendium* (Advisian, 2020b).

5.30.5 Cover Design

Representative Comment(s)

The cover design seems to be unproven.

Luciana Smink of Breakfast Creek, NSW (Submission SE-8627359)

Response

Cover systems/barriers for encapsulated waste are used throughout the modern mining industry and have been used for decades. As with any engineered solution, it is subjected to continuous improvements. As noted in EIS Section 5.14.2, given the importance of cover systems, long-term assessment programs testing the efficacy of various cover systems installed over a range of materials and in a variety of site conditions have been undertaken. These include the Australian Alternative Covers Assessment Program (A-ACAP), the Contaminated Site Clean Up Database and the Alternative Cover Assessment Program (ACAP) from the U.S. Environmental Protection Agency (USEPA) and others.

The proposed cover system for the Project is considered "state of the art" when assessed against current industry practice, as can be seen in "*Preventing Acid and Metalliferous Drainage - Leading Practice Sustainable Development Program for the Mining Industry*" (DFAT, 2016).

Representative Comment(s)

Construction to achieve the design will be challenging, time consuming and expensive. It will also be ongoing for the life of mine. Consistently achieving design is seen as a significant risk. The EIS does not consider quality control construction issues or failure to meet design issues. The design also requires the cover to be kept free of trees and large shrubs… It is not clear how this condition would be maintained in the long term.

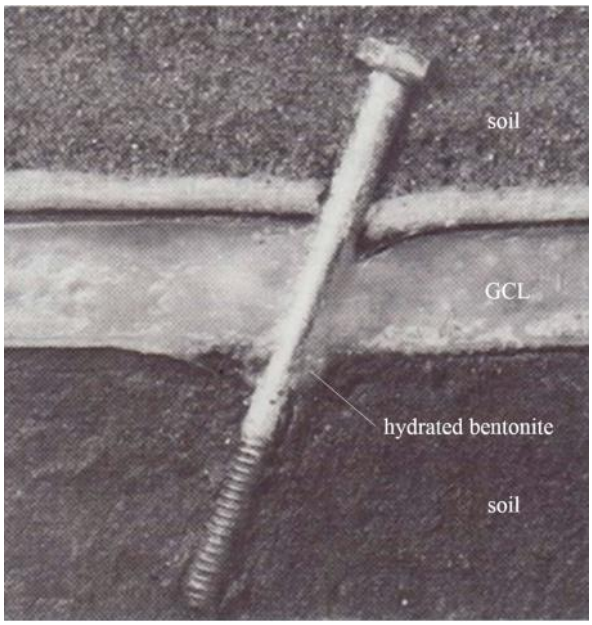
Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

Bowdens Silver recognises and accepts that costs associated with achieving design specifications over the Project life are critical to achieving sustainable community, environmental and economic outcomes. Progressive development of the WRE was adopted by Bowdens Silver as the preferred method of construction for a number of reasons, one of which being the early identification of any design constraints to allow for adaptive management strategies. This approach is consistent with mining operations across NSW and throughout Australia.

The principal design elements of the WRE include the WRE lining and final cover.

- Installation and management of the WRE lining.
- The selected final cover, i.e. incorporating a geosynthetic clay liner (GCL) has a "self-healing" effect for small holes. When punctured by materials such as roots, the bentonite hydrates and expands when in contact with moisture (see **Plate 5.6**). Additionally, the geotextile fabric that overlays the GCL is highly resistant to root penetration. During operations, Bowdens Silver would regularly assess the GCL and geotextile performance as part of progressive WRE development and rehabilitation.



(Source: Kong et al. 2017)

Plate 5.6 Self-Healing of GCL pierced by a Bolt

- Bowdens Silver would commence a series of trial plots for the long-term establishment of vegetation on the final cover of the WRE early in the Project life.

The principal aim of the trials would be to identify vegetation with suitable root structures (size and depth) that would be appropriate to establish on the WRE final surface. The trials would be undertaken concurrently with collaborative studies undertaken throughout the Australian and overseas mining industries. The final landform would be vegetated with the nominated species to provide a long-term cover that would continue to thrive in that environment. Details of the proposed trials and related studies would be presented in the Rehabilitation Management Plan for the Project, which would be updated throughout the life of the Project in response to the outcome of rehabilitation trials.

5.30.6 Liner Damage and Reliability

Representative Comment(s)

There are no contingency plans if this thin 1.5mm material fails.

Lara Altimira of Lue, NSW (Submission SE-8642008)

Response

A key objective of progressive WRE development during operations is the correct and proper installation of the HDPE geosynthetic liner that would be placed at the base of the WRE cells. This installation would only be undertaken by suitably qualified personnel who are accredited for this type of installation. Regardless, contingency plans would be in place to respond in the event the liner is punctured and there is a risk of leachate seeping from the structure.

Stringent construction and testing specifications would be provided with the detailed design of the WRE. HDPE geosynthetic liners are fabricated under high standards with quality control certificates provided by manufacturers for virtually every liner roll produced. Bowdens Silver would specify that every roll of liner must be certified and satisfies the required quality parameters.

The earthworks specification requires smooth and compacted surfaces prior to the liner deployment, with geotechnical testing control of one test every 500m^2 (~22m x 22m), to avoid differential settlement that would over-stress the liner.

Once placed and welded, the liner would be tested in accordance the following (as a minimum).

- Visual inspection.
- Seam tension test (destructive), where the seam is tensioned until rupture.
- Air lance test (non-destructive), where compressed air is applied using a nozzle along each seam to visually assess faulty welds (leaks).
- Vacuum box testing (non-destructive), where a sealed box is placed over the seam and the air pumped out to create vacuum. Faulty seams are observed when the pressure gauge doesn't respond to the pumping.
- Electrical conductivity/spark test (non-destructive) where leakage is tested through the passage of an electrical current.

Shallow groundwater monitoring bores would be installed at selected locations most likely on the downstream toe of the adjacent lower embankment. These bores would be used for the detection of seepage originating from beneath the liner. In the unlikely event any leachate is detected in any of the groundwater monitoring bores, the results of the monitoring would be reviewed and relied upon to inform the required adaptive management measures.

The opportunity for leachate to seep through the liner would diminish substantially once each cell is closed as there would be limited or negligible moisture infiltrating through the emplacement and down to the liner. The design of the WRE provides for the long-term isolation of the PAF waste rock which would result in a progressive reduction of any leachate. Hence, following closure of the Project, the impact of any seepage, if it does occur through a puncture in the liner would decrease to negligible levels.

Representative Comment(s)

At the base of the WEA a consistent coverage of crushed PAF rock at 0.5m will be difficult to achieve due to the irregular underlying natural surface. It is proposed to place the liner on a geotextile fabric directly onto the natural surface.

Damage to the liner could occur from sharp material above or below the liner. A sharp rock or remaining tree root below the liner could result in a perforation as weight is applied by loading from above as the waste rock is deposited.

If a large angular piece of run of mine PAF waste rock falls or rolls from height onto the 0.5m crushed rock layer above the liner this could perforate the liner and this would not be necessarily detected during operations.

Damage to the liner will not be detectable as the waste rock is dumped into a cell and if leakage is subsequently detected through water monitoring below the WEA then finding the location and fixing the leak may not be possible.

Waste rock placement is planned to be placed in 2 metre lifts and track rolled by a dozer to increase the material density. This is time consuming and expensive. If the planned final density for the WEA of 1.96 tonnes per cubic metre8 is not achieved then volumetric fit problems may occur (too much PAF rock to fit in the designed containment area).

Lue Action Group, NSW (Submission SE-8654995) – Attachment 1

Response

The earthworks specification requires smooth and compacted surfaces prior to the liner deployment, with geotechnical testing control of one test every 500m^2 (~22 m x 22 m), to avoid differential settlement that would over-stress the liner. Additionally, the construction specification (to be issued during the detail design) requires that irregular surfaces be rectified by either excavation or addition of appropriate clean fill.

A 500mm layer of crushed rock is considered adequate to protect the liner from the PAF materials placed upon it. This thickness and the proposed construction methodology have been largely and successfully used in many similar applications particularly in mines, throughout Australia. The 500mm is the minimum required thickness, localised depressions would receive a thicker layer.

Representative Comment(s)

The reliability of HDPE and clay liners for the designed operation (~500 years) should be discussed and the likely impacts to aquifers should be more accurately presented.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

For the HDPE liner, the main mechanisms that control its long-term integrity are:

i) ultraviolet degradation;

ii) thermal degradation;

iii) oxidative degradation;

iv) chemical degradation; and

v) tensile stresses.

Items (i) and (ii) can be overruled as the liner would be fully covered in a stable environment.

The oxidative (iii) and chemical (iv) degradations are difficult to estimate as they are dependent on the site conditions and amount of exposure. Nevertheless, numerous research projects have been conducted to estimate the "half-life" of geomembranes, which is the point at which 50% of the geomembrane has degraded under harsh conditions. Durability testing completed in laboratory and field conditions estimates that an HDPE geomembrane can achieve a service life (50% degradation) of >475 years.

Tensile stresses (v) can be controlled either by:

- the geometry of the substrate where the liner is applied, avoiding excessive shear stresses. HDPE liners are suitable for applications in slopes as steep as 1:2 (V:H) (27°). The WRE footprint has an average slope significantly gentler 1:7 (V:H) with maximum at 1:3 (V:H).
- quality of the seams, which are quality controlled by in situ and laboratory testing during installation.

GCL's do not have seams as the panels are only overlapped during the installation. The tightness of the GCL relies on the chemical properties of the bentonite that swells when in contact with water. Chemical reaction with the leachate is unlikely as the cover design includes a 'capillary break' created by the fine-grained 1m thick subsoil layer (oxidised NAF waste rock) sandwiched in between the GCL and the PAF waste rock beneath. Additionally, the GCL won't be significantly stressed by the "store and release" layer above and the comparatively gentle geometry of the emplacement 1:3 (V:H).

5.31 WATER SUPPLY

5.31.1 Introduction

Submissions associated with the Project's water supply covered matters relating to the water supply pipeline, water licensing, the implications of drought on water supply and associated

contingencies to sustain operations. Submissions relating to local and regional groundwater and surface water resources are addressed in Sections 5.11 and 5.24 respectively. It is noted that there is some crossover between those matters. However, this subsection provides responses to submissions relating to only the Project's water supply arrangements.

Bowdens Silver has investigated a number of water sources for the Project with the intention of providing contingency options and therefore flexibility to respond to unexpected constraints (such as prolonged drought). The Project requires make-up water that would be supplied from water that is surplus to the requirements of coal mining operations in the Ulan Coalfield. Bowdens Silver is continuing commercial negotiations regarding the supply of water. Regardless, it is considered that the environmental impacts of the proposed water supply arrangements have been thoroughly assessed and are acceptable.

Specifically, the review of Government agency, organisation and public submissions have identified the following.

- Bowdens Silver has licensed and landholder's rights entitlements to water resources exceeding that predicted to be lost from the system as the result of the Project.
- The proposed water supply arrangements provide sufficient contingency to sustain operations during periods of low rainfall (drought).
- The transfer of licensed inflows from mines in the Ulan Coalfield is permissible and would not adversely impact flow in the Goulburn River catchment.
- Installation and operation of the water supply pipeline would not impair existing land uses. However, the route of the water supply pipeline is the subject of ongoing consultation with landowners.
- The water supply pipeline would be subject to engineering design and include design elements to allow leak detection, water treatment at the start of the pipeline and isolation to reduce impacts in the event of pipe failure.

5.31.2 Groundwater Licensing

Representative Comment(s)

The registration of interest information included in the EIS indicates sufficient entitlement has been applied for to address peak requirements prior to closure, however it is unclear whether this process has been completed and the entitlement registered in a Water Access Licence.

We also note that the secured entitlement in the Sydney Basin MDB Groundwater Source is 29 unit shares less than the post closure peak water take.

DPIE – Water and NRAR Request:

Confirm that the Controlled Allocation Order process has been completed, relevant WALs obtained and peak water take accounted for.

DPIE – Water and NRAR

Response

Bowdens Silver has now secured the following water entitlements that account for peak groundwater take during mining operations.

- 907ML from the Lachlan Fold Belt (Other) Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources to cover peak inflow from this groundwater source in Year 4 of mining; and
- 194ML from the Sydney Basin Groundwater (Other) Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources to cover peak inflow from this groundwater source in Year 9 of mining.

NRAR notices of decision granting the Water Access Licences (WALs) were issued in May 2021. At the time the EIS was finalised, these entitlements were held as options to purchase, however, Bowdens Silver wanted it to be clear and certain that appropriate entitlements were held by the Company.

Bowdens Silver would secure further entitlements for the predicted post-closure inflows from the Sydney Basin MDB Groundwater Source. Post-closure requirements for all water sources would be re-assessed during operations via regular review and updates to the groundwater model. The groundwater model is conservative with respect to predicted inflow (see Section 6.2 of Jacobs (2021)). These updates would utilise operational groundwater monitoring data (water level and inflow volumes) to re-calibrate the model. Following re-calibration, predicted inflows would be re-assessed and validated with the necessary entitlements agreed with the regulator and acquired prior to closure. It is noted that Bowdens Silver has already been approached by water holders interested in selling water use entitlements, indicating water from these sources is not a scarce resource but may readily be purchased, as needed.

Representative Comment(s)

The water management zone details for the Water Access Licenses (WALs) RO12-18-111 and RO13-19-097 are unclear.

DPIE – Water and NRAR Request:

Clarify the water management zone details for the Water Access Licenses (WALs) RO12-18-111 and RO13-19-097 and confirm the project has sufficient entitlement in the correct zone which is the Sydney Basin MDB (Other) Water Management Zone of the Sydney Basin MDB Groundwater Source.

DPIE – Water and NRAR

Response

As noted in the above response, Bowdens Silver has purchased the volumetric entitlements of RO12-18-111 and RO13-19-097. The relevant notice of decision, received from NRAR identified the entitlements are for the Sydney Basin MDB Groundwater Source (Other) Management Zone.

5.31.3 Surface Water Licensing

Representative Comment(s)

The proponent currently holds 72 units of entitlement in this water source, therefore an additional 64 units is required.

DPIE – Water and NRAR Request:

Confirm that the proponent can acquire 64 units of entitlement within the Lawsons Creek water source.

DPIE – Water and NRAR

No discussion or consultation from the proponent has occurred about the acquisition and use of Water Access Licences (WAL) in this region. It is not possible to acquire a licence in the lower catchment and move the allocation upstream.

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

Bowdens Silver has acquired the necessary WALs accounting for the requisite entitlement to the applicable management zone within the Lawsons Creek water source. The WALs were acquired via water trading (purchase) from the existing pool of WALs and is not required to consult or discuss WAL acquisition with any parties other than the vendor and NSW regulatory agencies.

Bowdens Silver has secured a total of 139 units of entitlement within the Lawsons Creek water source under the following licences.

- WAL 42206 – 72 units
- WAL 43473 – 67 units

These WALs provide sufficient water entitlement to account for the predicted loss to Lawsons Creek from Project development and are not dissimilar to the entitlements held by other landholders to access water from this water source. It should be noted that Bowdens Silver would not take water directly (i.e. via pump) from Lawsons Creek but the required entitlement would account for water that would normally have entered Lawsons Creek from the Mine Site.

WALs relating to surface water are classified by catchment, not specific location and therefore may be used anywhere within a catchment subject to assessment of that use (as defined in the associated works approval) and approval by Water NSW.

Representative Comment(s)

It is not clear in the water balance table water table (sic) *how much water collected will be taken by the mine. If the water proves to contain too much sediment and is not available for environmental flows, does this require licencing?*

Has Silver Mines Ltd (SVL) secured sufficient allocation? How does this affect current entitlements of other users? Does the water exist, given this is not being fully utilised by current users?

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

The interception of runoff generated within catchments disturbed by mining activities (e.g. the TSF) and open cut pit development would reduce Lawsons Creek flows by a maximum 188.3ML/year or 2.2% (refer Table 8.1 of WRM (2020)). However, Bowdens Silver is entitled to a volume greater than this reduction under the secured entitlements. In addition, by sourcing additional water via the construction and operation of the water supply pipeline, the Project reduces its reliance on other sources.

Where possible, Bowdens Silver plans to treat and release water captured in the erosion and sediment control zone of the water management system (refer Section 4.6 of WRM (2020)), further reducing streamflow impacts. Should release prove difficult to achieve from a water quality perspective, Bowdens Silver may nominate the relevant sediment dam as a harvestable rights water storage and use the water for Project-related activities. In its submission, NRAR has noted this strategy would be permissible provided the total volume of harvestable rights water storages do not exceed 141.1ML.

Representative Comment(s)

The project proposes to increase the rate of fill of the final void by redirecting water from the TSF or via catchment runoff into the void.

DPIE – Water and NRAR Request:

Provide further detail on the proposal to increase the rate of fill of the final void by redirecting water from the TSF or via catchment runoff into the void.

DPIE – Water and NRAR

Response

The proposal to redirect water from the TSF and/or from within the local catchment was proposed to demonstrate Bowdens Silver had thoroughly considered strategies to improve environmental outcomes upon closure.

A final void would remain upon completion of mining operations in the open cut pit and this would form a pit lake that would act as a groundwater sink, drawing groundwater into the void. The ongoing groundwater inflows are predicted to create a drawdown cone that would expand over a period of approximately 16 years as groundwater levels reach a post mining equilibrium. After this time, the pit lake would reach equilibrium with water levels fluctuating between 571mAHD and 577mAHD (refer Section 7.2 of WRM (2020)). Minor increases to the drawdown cone would continue for approximately 50 years, but at a much slower rate. At equilibrium, it is predominantly evaporative pressure driving inflows into the final void.

Directing overland runoff to the final void post-closure would reduce the time taken to equilibrium in the pit lake. This would reduce the post-mining drawdown on the groundwater setting and therefore the cone (extent) of drawdown. It would effectively reduce the time to reach equilibrium water levels in the pit lake. This reduced time to reach pit lake equilibrium would also reduce the time of exposure of terminal faces of the final void to oxygen and therefore would marginally improve water quality in the final void.

This approach and the required work to achieve it would be investigated in rehabilitation planning through the Project's Rehabilitation Management Plan. Successful rehabilitation of the Project

does not rely on these measures being successful. It is expected that the following would be required to enable additional flows to the pit lake.

- Planning for water management to ensure that all water directed to the open cut pit lake is consistent with water access rights and licensing requirements.
- Minor earthworks at water diversion drains directing runoff around the open cut pit during operations to allow discharge into the final void.
- Monitoring of water levels in the pit lake as the equilibrium water level is approached.
- Reinstatement of water diversions in the final landform once the pit lake equilibrium water level is close to being reached to ensure the pit lake does not overflow during a high rainfall event.
- Removal of decant return infrastructure, and finalisation of TSF rehabilitation as a free draining landform.

It is acknowledged that this would require management of rehabilitation in the final void until the equilibrium water level is achieved. However, it is expected this may be achieved within the seven-year period allowed for rehabilitation and post-mining activities. Alternatively, external water sources may be used to complement overland flow and reduce the time taken to reach an equilibrium water level in the pit lake. However, this would be subject to the terms of commercial agreements on external water supply.

5.31.4 Water Supply During Low Rainfall Periods (Droughts)

Representative Comment(s)

The site water balance assessment for the available water supply from rainfall and runoff predicts a reduction of 41ML between the average scenario of 806ML and the low runoff scenario of 765ML. This appears to be a minor reduction.

DPIE – Water and NRAR Request:
Confirm the low runoff value and ensure adequate water is available at the site during low runoff periods from the proposed sources.

DPIE – Water and NRAR

Response

Bowdens Silver commissioned WRM to revise the low runoff scenario water balance model to test its sensitivity to further reductions in surface water runoff rates. This was undertaken to demonstrate possible impacts of more extreme climate scenarios, such as that experienced during the recent drought. A discussion and the results of this modelling are provided in Section 3.4. In summary, the revised low runoff scenario results in:

- a 7.6% reduction on the previously presented 765ML/year low runoff water balance scenario which is a 12% reduction on the average annual runoff scenario.

- decreased evaporative loss from the previously modelled 430ML/year, due to the reduced water surface areas; and
- 21% increase on average annual imported water requirements (from 331ML/year to 400ML/year).

Bowdens Silver considers the proposed external water supply would be more than sufficient to supply average annual demands of this magnitude.

Representative Comment(s)

In the most recent severe drought, many mines in Central West NSW experienced major water shortages.

Inland Rivers Network of Pyrmont, NSW (Submission SE-8645546)

The EIS *does not consider the contingencies available for the project during prolonged periods of drought.*

Mid-Western Regional Council

Response

Bowdens Silver recognises that extended periods of low rainfall have the potential to impact the Project and may constrain operations in the short term. This potential constraint is not unique to the Project and may be experienced across mining operations throughout NSW and Australia.

The implications of drought on operations and contingencies are described in EIS Section 2.10.1. This section identifies the range of options available for supplying water to the Project and discusses water supply alternatives. However, to ensure sufficient water is always available on a continuous basis for processing and dust suppression, Bowdens Silver proposes to construct a buried pipeline from the Ulan Coalfield to the Mine Site. This pipeline would have the capacity to convey up to 5.5ML of water per day, thereby removing any uncertainties related to the availability of other water sources such as runoff capture.

Bowdens Silver remains confident that this potential constraint can be managed appropriately to maintain the long-term viability of the operation.

5.31.5 Rainwater Collection and Tank Storage

Representative Comment(s)

…there is no allowance for more sustainable supplementary water supplies, such as harvesting rainwater and storing it in tanks.

Isabella Armitage of Lindfield, NSW (Submission SE-8639945)

Response

Runoff capture within the Mine Site is an integral part of the overall water supply strategy for the Project. EIS Section 2.10.1 presents an overview of this approach with Section 5.4 of WRM (2020) providing a more detailed description. Whilst tank storage would reduce evaporative loss from dams, the footprint required to store captured runoff in tanks would

necessitate a significant increase to the Project's disturbance area. Any such area would be in addition to the runoff collection dams that would still be required to prevent off-site discharge of potentially mine-affected water. As noted in Section 5.2.1 of WRM (2020), the Project would prioritise captured runoff as a make-up water source to maximise its use and reduce evaporative losses.

During detailed design Bowdens Silver would consider installing rainwater tanks for the collection of rainwater from roofed areas.

5.31.6 Borefield Assessment

Representative Comment(s)

The EIS (P2-64) *describes an intention to access groundwater with production bores.*

DPIE – Water and NRAR Request:

The proponent should clarify whether a borefield is part of this application and provide details of the proposed borefield review and approval.

DPIE – Water and NRAR

Response

Mineral exploration activities have provided Bowdens Silver with data on the presence of groundwater within the Mine Site. Sourcing water through advanced dewatering of areas that would be extracted or through establishing a borefield would provide another alternative water source for the Project should they be assessed to be reliable and acceptable in terms of changes to the groundwater setting. These investigations are still preliminary in nature. The primary water supply arrangements remain as presented in the EIS, namely, internal reuse, mine dewatering, rainfall and runoff which would be supplemented by water imported via a water supply pipeline.

Should additional groundwater supply options be identified in the vicinity of the Mine Site in future, then the appropriate investigations and assessment for approvals would be undertaken at that time.

5.31.7 Water Transfer from Goulburn River Catchment

Representative Comment(s)

An assessment should be undertaken of the potential impacts of transferring water from the Goulburn River catchment.

Further explanation of the proposed mechanism for effecting the transfer of water should be provided to ensure relevant stakeholders and the community are well informed of the impact on existing water access and supply agreements.

Mid-Western Regional Council

The water pipe going through Hayes Gap Road is an enormous drainage of water from the Goulburn River to enable this mine

(Name Withheld) of Hayes Gap, NSW (Submission SE-128115)

Water Sharing Plan Trading Rules (WaterNSW) for the Upper Goulburn Water Source does not permit any trading out of this water source.

Julia Imrie of Ulan, NSW (Submission SE-8624446)

This water is Goulburn river water and should stay there to protect the headwaters of this important river system and the much valued public amenity "The Drip picnic area and river walk".

Mudgee District Environment Group of Mudgee, NSW (Submission SE-8622333)

Releases of water treated by reverse osmosis from the three coal mining operations provide critical flows in the Goulburn River during times of drought.

Wollar Progress Association of Wollar, NSW (Submission SE-8652994)

Response

The proposed transfer of water that is surplus to mining operations in the Ulan Coalfield via the water supply pipeline for use in processing operations is permissible under current legislative and regulatory arrangements. Confirmation of this approach was provided by NRAR to Bowdens Silver prior to lodgement of the EIS.

The bulk of this water is taken under licence by the coal mine operators from groundwater inflows to underground workings. They are not directly associated with the Goulburn River surface water catchment and therefore would not naturally be part of the Goulburn River System. Placing this water in a pipeline for eventual use at the Mine Site is a use or management approach consistent with the relevant water sharing plan.

Representative Comment(s)

Ulan and Moolarben coal mines are obliged under their mining leases to return all excess water to the Goulburn catchment.

(Name Withheld) of Paddington, NSW (Submission SE-8584749)

Response

Neither the water management plan for the Ulan Coal Mine or the Moolarben Coal Mine identifies this obligation as a conditional arrangement in any approval for either operation.

5.31.8 Council's Road Infrastructure

Representative Comment(s)

What design / operational controls are proposed for the pipeline to protect (sic) *environment during both construction and operation?*

Lue Action Group, NSW (Submission SE-8654995)

Response

Section 2.10.4 and Section A5.9 of Appendix 5 of the EIS detail the activities associated with pipeline construction. These activities would be executed in conjunction with a Construction Management Plan that would include erosion and sediment controls. As noted in

EIS Section 2.10.3, a fibre optic communications cable would be laid in the same trench as the pipeline to provide efficient communications from instrumentation at pre-determined locations to enable leak detection.

However, should leakage of water occur from the pipeline, its water quality would not adversely impact the water quality in the watercourses traversed, as this water would be subjected to treatment prior to pumping to the Mine Site.

Representative Comment(s)

The following information *is required in order to fully assess the proposed impacts of the pipeline on Council's road infrastructure.*

- *management of traffic impacts;*
- *scope of physical works required;*
- *location; and*
- *timing of work.*

Mid-Western Regional Council

Response

As noted in EIS Sections 2.10.3 and A5.9, all construction work within any road reserves would be undertaken in accordance with the conditions imposed by MWRC on the Section 138 Consent under the *Roads Act 1993* for the works. Bowdens Silver would work collaboratively with MWRC staff to ensure all information relating to the construction of the water supply pipeline and management of temporary construction-related impacts complies with MWRC requirements.

Representative Comment(s)

Further consideration of how this will impact the ability of Council to maintain its existing road infrastructure and undertake future activities within the road reserve is required as *the majority of any road reserve would be occupied by what is essentially a private water pipe.*

Mid-Western Regional Council

Response

It is acknowledged that pipeline installation would require an approximately 10m wide corridor (see EIS Figure 2.23). However, any construction-related disturbance would be short-term with the excavation back-filled and surplus material removed. EIS Section 2.10.3 identifies the pipeline would be laid in a trench approximately 0.65m wide and between 1.2m and 1.4m deep for the bulk of its length. Whilst this trench would be within the road corridor, it would predominantly be adjacent to the road shoulder. All sealed roads traversed by the pipeline would be underbored whilst the pipeline would be placed in a trench excavated across or along any unsealed roads. The approach to crossing beneath or through roads would be determined in consultation with MWRC.

Therefore, it is not anticipated that following installation the water supply pipeline would impair the functionality, or the serviceability, of road corridors managed by MWRC.

5.31.9 Landowner Agreements

Representative Comment(s)

Property owners who are affected by the 60 km long water pipeline from the Ulan and Moolarben mines will have no recourse to object to the pipeline being laid through their property.

Philip Carkagis of Pyangle, NSW (Submission SE-8640592)

Response

This is incorrect. Whilst the water supply pipeline would be buried below the surface and only require temporary disturbance, its installation would require landowner consent to the creation of a deed of easement on the land title and appropriate financial compensation. Each individual landowner may refuse this process, with an alternate pipeline route then required. Bowdens Silver has discussed this easement with affected landowners and believes that all are aware of this requirement.

5.31.10 Compensation for Landowners

Representative Comment(s)

There is no compensation in any form to landholders affected by the pipeline that will disturb an area of land 10 meters wide for the entire length.

(Name Withheld) of Stony Creek, NSW (Submission SE-8601366)

Response

This submission is incorrect. As noted in EIS Section 3.2.2, a specialist consultant is currently engaged by Bowdens Silver to facilitate the preparation of documentation relating to compensation that would be determined with each landowner via an independent valuer. This was conveyed at the time of initial consultation whereby multiple phone calls and emails were exchanged with landowners in response to the initial letters sent via registered post that provided information about the water supply pipeline as well as individual maps showing locations of the proposed route on each property.

5.31.11 Ephemeral Watercourses

Representative Comment(s)

Trenching is proposed for the ephemeral watercourses and is to be completed within a day to minimise potential impacts. This concept is generally supported, however adequate design and rehabilitation to ensure stability can be achieved and to minimise impacts to existing aquatic habitat will be required.

DPIE – Water and NRAR Request:

Underboring should be considered at other locations where existing water presence or potential channel instability issues represent a potential risk that cannot be adequately mitigated for both short and long term impacts.

DPIE – Water and NRAR

Response

These comments have been noted. Prior to construction and following finalisation of the pipeline route, a geotechnical assessment would be undertaken to inform the construction methodology for the entire route. This would include assessment of key locations, such as watercourse crossings to identify site-specific mitigation measures to limit short and long-term impacts. Once the construction methodology is established, consultation between the contractor, Bowdens Silver, MWRC and regulatory agencies would occur with the proposed approach agreed upon.

5.31.12 Protection of Cropping Land

Representative Comment(s)

Any trench that traverses an area of cropping land must be laid to the maximum depth. This will minimising (sic) *the risk to the pipeline and farm infrastructure if the area is deep ripped etc.*

NSW DPI - Agriculture

Response

The pipeline would be laid in a trench between 1.2m and 1.4m deep beneath any land currently used for cropping. The exact depth of the trench would be determined by the contractor during its excavation and in consultation between Bowdens Silver and landowners in areas of cropping land. Markers would be required along the pipeline route to ensure the physical alignment is known to the landowner and Bowdens Silver. However, these markers would be placed to avoid operating areas and only used with the agreement of the landowner.

5.31.13 Vegetation Removal

Representative Comment(s)

In the construction process large quantities of native Eucalypts will be removed from the road side.

(Name Withheld) of Stony Creek, NSW (Submission SE-8601366)

The Hayes Gap Road has received over the years, funding from the State Government to establish an environmental corridor which has been very successful. This will be destroyed with the construction of the pipeline as the road is lined with century old trees and recent rehabilitation.

(Name Withheld) of Stony Creek, NSW (Submission SE-8642471)

Response

It is proposed that the pipeline would be laid in a trench approximately 0.65m wide and between 1.2m and 1.4m deep for the bulk of its length. Therefore, minimal vegetation clearing would be required and it is relatively simple to avoid significant vegetation. Bowdens Silver has planned a route for the water supply pipeline that avoids private properties, native vegetation and other natural features as much as is practically possible. It is acknowledged that the route is also subject to consultation with landowners, which is ongoing. Where it is feasible, native trees would be avoided, consistent with vegetation clearing for the Mine Site and relocation of Maloneys Road.

It should also be noted that disturbance for the water supply pipeline would be a temporary impact with construction followed by rehabilitation.

5.31.14 Monitoring

Representative Comment(s)

As part of the geotechnical assessment a record of soil stability measurements and observations be included, and any amelioration required noted as baseline information. This will assist with the monitoring of the land stability of the water pipeline and the removal of the pipeline and the final rehabilitation that is required. Ideally soil profile descriptions should be undertaken for each of the soil landscapes and for each position of a soil within a topographic unit of that landscape.

NSW DPI - Agriculture

As part of the monitoring, consultation with the landholders and photographic evidence of final pipeline construction be undertaken. This will assist with evidence for final land restoration when pipeline removal is undertaken.

NSW DPI - Agriculture

Response

As noted in EIS Section A5.9 of Appendix 5 of the EIS, a geotechnical assessment would be undertaken to inform the construction methodology for the water supply pipeline. Bowdens Silver would ensure appropriate information is collected during pipeline construction and installation to inform monitoring of the success of corridor rehabilitation (including reactive measures where needed) as well as ongoing and regular condition assessments.

This information would also be provided to individual landowners as part of individual deed agreements. Should pipeline removal form part of closure activities, the information would also be used in corridor rehabilitation.

5.31.15 Consultation

Representative Comment(s)

*We make this objection on the grounds that the Bowdens Silver Mine (henceforth the Applicant). Bowdens Silver has not engaged in adequate consultation with us (the Landholders) in the planning of this pipeline…*and *has made no attempt, beyond an initial meeting to inform the Landholder of their plan, to establish any such agreement.*

M. & W. Bryant of Cooks Gap, NSW (Submission SE-8628904)

Response

EIS Section 3.2.2 notes the following consultation was undertaken upon identification of the initial pipeline corridor alignments.

1. Letters were sent to landowners via registered post to introduce the pipeline alignment and seek permission for initial ecology and heritage surveys.

2. Multiple phone calls and emails were subsequently exchanged to provide further information, including individual maps of the proposed route on each property.
3. Bowdens Silver staff and its consultants conducted face-to-face interaction and meetings with 17 of the 19 landowners.

Bowdens Silver maintains that landholders have been informed of their rights during the consultation process and provided with opportunities to ask and seek more information. Bowdens Silver continues to engage with landholders and welcomes further discussions.

5.31.16 Water Quality

Representative Comment(s)

Bowdens claim they will suppress dust levels using water piped from Coal Mines at Ulan - will that be treated before being piped to Lue OR will that water be contaminated from Coal extraction mining.

Barbara Duff of Mount Frome, NSW (Submission SE-8624058)

…none of the water would be treated or filtered of the contaminants of oil, heavy metals, sediments and chemicals that are used in the extraction of coal.

Carl Tubnor of Lue, NSW (Submission SE-8645238)

Response

EIS Section 2.10.1 identifies that water sourced via the water supply pipeline would be treated near the initial section of the pipeline and identify reverse osmosis as the treatment method. This would permit quality water to be pumped within the pipeline and to be received at the Mine Site. Furthermore, EIS Section 2.10.1 and Section 4.2 of WRM (2020) also identify that the Project would source water from a range of internal sources that may be used in dust suppression activities.

Representative Comment(s)

Salinity is another major concern to us, the proposal to transport saline water from Ulan mine will place more pressure on a catchment that has worked extremely hard for many decades to control salinity.

(Name Withheld) of Havilah, NSW (Submission SE-8642118)

Response

The electrical conductivity of a soil or water sample is the ability of the solution to conduct an electrical current. The concentration and composition of dissolved salts influence electrical conductivity and therefore electrical conductivity is a common indication of salinity. The indicative electrical conductivity of pipeline water would be approximately 800µS/cm (refer EIS Table 2.7) with data collected by Bowdens Silver's long-term surface water monitoring program (refer EIS Table 4.43) returning median electrical conductivities ranging between:

- 948µS/cm to 1 230µS/cm for Lawsons Creek; and
- 460µS/cm to 702µS/cm for Hawkins Creek.

Consequently, Bowdens Silver does not consider that use of water sourced via the pipeline poses a salinity risk to the broader catchment. Notwithstanding this, water sourced via the pipeline would be used for the mining operations and not released to the downstream environment.

Representative Comment(s)

The water that will be transferred from the mines will have a high percentage of salinity and other minerals. As the pipeline is being placed underground, our valuable grazing land will be poisoned when it leaks which it will do.

(Name Withheld) of Stony Creek, NSW (Submission SE-8642471)

The pipeline will go along the Hayes Gap Road where I live and will contain waste water from Ulan. If the pipeline fails the land around my property will be contaminated.

(Name Withheld) of Hayes Gap, NSW (Submission SE-8760048)

Response

EIS Table 2.7 presents the indicative quality of water transferred via the pipeline. Comparison with the values shown in EIS Table 2.7 and long-term median Lawsons Creek and Hawkins Creek water quality (refer EIS Table 4.43) indicates that, in many instances, pipeline water is of better quality than natural watercourses and below ANZG 2019 guideline values.

Notwithstanding this, as noted in EIS Sections 2.10.3 and 4.7.7.3, the pipeline would be subjected to engineering design and include isolation valves and leak detection systems that would be in constant communication with the Mine Site control room via fibre optic cable. Should a leak be detected, the pipeline section would be isolated to reduce pressure and discharge prior to physical inspection. Bowdens Silver considers that these measures, coupled with treatment of water at the source and the depth of the pipeline, are sufficient to limit potential impacts to land resources in the event of pipeline failure.

Representative Comment(s)

Indicative water qualities of imported water are presented in Table 2.7 of R.W. Corkery & Co (2020), however, the location of the water treatment plant and where the effluent will go is not stated. If the water treatment plant is located at the Bowdens site, then the toxicity of residue left after mining is likely to include contaminants from the Ulan coal mine.

Lue Action Group, NSW (Submission SE-8654995) – Attachment 4

Response

EIS Section 2.10.1 presents discussion of the options for locating treatment facilities for water transferred via the pipeline. Each option identifies the methods of disposal for waste generated from the water treatment options. Should water treatment occur at the Mine Site or an intermediate location, waste would be transferred to the TSF for eventual encapsulation. As noted in Section 3.3, high resolution groundwater modelling, including groundwater tracer and dilution modelling identifies no impact to beneficial uses as the result of the TSF. Should treatment waste require disposal within the TSF, this would be considered during detailed design of the TSF and include additional assessment of water quality implications to maintain beneficial uses downstream of the TSF.

5.31.17 Pipeline Removal at End of Project Life

Representative Comment(s)

Council would require all water supply infrastructure to be removed at the end of the project life at the cost of the proponent, unless a suitable future use is agreed to.

Mid-Western Regional Council

Response

This is agreed. EIS Section 2.10.6 identifies that unless a third party operator and approved use is identified for the pipeline upon cessation of mining operations, the infrastructure would be removed in its entirety as part of decommissioning activities. Following removal of all pipeline infrastructure, the corridor would be rehabilitated.

6. RESPONSES TO SUGGESTED CONDITIONS OF CONSENT

6.1 INTRODUCTION

A number of State Government Agencies and MWRC provided DPIE with a range of suggested conditions that could be included in the Development Consent for the Project in the event the Project is approved. Each of the suggested conditions has been extracted and Bowdens Silver's response to each condition is provided in this section.

A number of private individuals who submitted an opposing submission also provided a range of suggested conditions in the event that the Project is approved. It is recognised that a number of these suggested conditions would not be realistic or feasible and accordingly are not considered appropriate to be addressed in this section. Feasible conditions suggested by submitters have been extracted and Bowdens Silver's response is also provided in this section.

6.2 DPIE – WATER AND NATURAL RESOURCES ACCESS REGULATOR

There is the potential for remnant pools to decline during low or no flow periods due to the project. This should be monitored during the project appropriate trigger levels and contingency measures developed.

Response

Bowdens Silver agrees, however, rather than being included as a specific condition of Development Consent, Bowdens Silver proposes that this matter is addressed in the Water Management Plan which would be the subject of a condition of Development Consent for the Project, if the Project is approved.

A Water Management Plan should be developed to address construction and operation stages of the project in consultation with DPIE Water and NRAR. Key elements will include a Sediment and Erosion Control Plan, Site Water Balance, Monitoring and Reporting and a Trigger Action Response Plan.

Response

Since planning for the Project commenced, Bowdens Silver has consistently acknowledged the need for such a plan, consistent with all mining projects in NSW. It is also noted that this plan would be progressively reviewed and updated throughout the Project life. The plan would be prepared to the satisfaction of the Secretary of DPIE.

Please provide annual reports on WMP with reference to the registered bore numbers and data in plotted and digital form (excel or text files).)

Response

Bowdens Silver agrees. This information would be incorporated into the Annual Review reporting for the Project.

Ensure the groundwater model plan includes additional groundwater level monitoring to enable improved model calibration across the model area and depth range.

Response

Bowdens Silver agrees and has committed to review and improve calibration of the regional groundwater model within two years of the commencement of mining operations. It would be vital that this update to the groundwater model be supported by actual groundwater monitoring. The groundwater monitoring program would be described in the Water Management Plan.

Prepare a groundwater model validation after two years of mining and update the plan in consultation with DPIE Water.

Response

This has been agreed by Bowdens Silver and would be described in the Water Management Plan for the Project.

Provide a peer reviewed report on the revised groundwater model to DPIE Water before the end of 5th calendar year of mining operation.

Response

This request is accepted by Bowdens Silver and would be described in a Water Management Plan for the Project. As noted above, it is proposed that work on calibration of the groundwater model would commence within two years of commencement of mining operations to apply monitoring data. This calibration and peer review would be undertaken, notwithstanding the peer review feedback commissioned by DPIE that confirmed the model was fit for purpose.

Accurately meter and monitor water take from surface and groundwater sources (for the) *ongoing review of actual versus modelled predictions.*

Response

Bowdens Silver agrees, however, rather than being included as a condition of Development Consent, Bowdens Silver proposes the requested information would be incorporated within the Water Management Plan.

The *dams are proposed to be constructed on minor streams to capture runoff from contaminated and sediment laden sources should be designed in accordance with relevant industry standards including the guideline Managing Urban Stormwater: Soils and Construction, Vol 2E Mines and Quarries (DECC 2008).*

Response

Bowdens Silver agrees, however, rather than be included as a separate condition in the Development Consent, Bowdens Silver proposes that this requirement will be addressed in the Water Management Plan.

Comprehensive design and rehabilitation to meet natural stream design criteria is (required) *to ensure the watercourse modifications achieve channel stability and long term ecological functioning.*

Response

Bowdens Silver agrees, however, rather than be included as a separate condition in the Development Consent, Bowdens Silver proposes that this requirement will be addressed in the Water Management Plan.

The proponent must ensure sufficient water entitlement is held in a water access licence/s to account for the maximum predicted take for each water source prior to take occurring.

The proponent must obtain relevant authorisations to change the Water Access Licences proposed to account for water take by the project to nominate the project site prior to the water take occurring.

Response

Based on the predictions of WRM (2020) and Jacobs (2021), under the current NSW regulatory framework Bowdens Silver is required to obtain water access licences to account for water resources predicted to be intercepted by the Project.

- 135.9ML/year from the Lawsons Creek Water Source of the Macquarie Bogan Unregulated and Alluvial Water Source to account for runoff intercepted by the TSF (123ML/year) and baseflow losses as the result of open cut pit development (12.9ML/year).
- 907ML from the Lachlan Fold Belt Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources to cover peak inflow to the open cut from this groundwater source in Year 4 of mining.
- 194ML from the Sydney Basin Groundwater Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources to cover peak inflow to the open cut from this groundwater source in Year 9 of mining.

With regards to the Lawsons Creek Water Source, Bowdens Silver holds the following entitlements totalling 139ML/year:

- WAL42206 – 72ML/year; and
- WAL42473 – 67ML/year.

With regards to the Lachlan Fold Belt and the Sydney Basin Groundwater Sources, Bowdens Silver has secured the following entitlements.

- 907ML from the Lachlan Fold Belt (Other) Groundwater Source of the NSW Murray Darling Basin Fractured Rock Groundwater Sources.
- 194ML from the Sydney Basin Groundwater (Other) Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources.

Based upon the above, Bowdens Silver has secured access to sufficient entitlements to cover the predicted surface water and groundwater intercepted by the Project. This does account for the water that would be sourced externally via the water supply pipeline. That water would be sourced

under agreement. Post-mining water entitlements would be confirmed in the proposed groundwater model validation (to be prepared after two years of commencement of mining) and sufficient water entitlements would be retained for this purpose.

All necessary administrative requirements for water take and licensing would be satisfied prior to any take of water for the Project.

The design, construction and management of works within waterfront land need to be in accordance with the "Guidelines for Controlled Activities on Waterfront Land (NRAR 2018)". Vegetated buffers to third order and higher watercourses are to be a minimum of 40m from the high bank

Response

Bowdens Silver acknowledges there are three 3rd order watercourses within the Mine Site that would be disturbed by the Project, namely:

- Walkers Creek (for TSF construction);
- Blackmans Gully (for open cut pit development); and
- Price Creek (adjacent to the waste rock emplacement (WRE) embankment).

However, EnviroKey (2021) found that riparian vegetation throughout the Mine Site is largely dominated by introduced grasses with little or no native vegetation present due to removal or significant alteration from past agricultural activity. Construction of the TSF and development of the open cut pits are all critical to the Project and Bowdens Silver considers that maintenance of vegetated buffers adjacent to Walkers Creek and Blackmans Gully watercourses is impractical for the areas of proposed disturbance.

With regards to Price Creek, as noted in EIS Section 5.6.2 and Cardno (2020), the aquatic ecology of this watercourse upstream and adjacent to the WRE is limited with its current flow path and floodplain having undergone significant alteration. Subsequently, Bowdens Silver contends that, as there is no longer a riparian zone associated with Price Creek adjacent to the WRE, there is no environmental benefit in maintaining vegetated buffers.

The proponent must comply with the rules of the relevant water sharing plans.

Response

Bowdens Silver agrees, as this is a requirement for all water use entitlements. This does not need to be included in the Development Consent as a specific condition.

Undertake watercourse diversion activities following established best-practice guidelines.

Response

Bowdens Silver agrees, however, rather than be included as a separate condition in the Development Consent, Bowdens Silver proposes that this will be addressed in the Water Management Plan.

6.3 HERITAGE NSW

In consultation with the RAPs, undertake an artefact analysis program post project approval and develop skill share opportunities to participate in the analysis for interested members of the RAPs.

Response

This is agreed to by Bowdens Silver, however, rather than be included as a separate condition in the Development Consent, Bowdens Silver proposes that this matter is addressed in the Heritage Management Plan.

6.4 MID-WESTERN REGIONAL COUNCIL

…a Disaster Management Plan be prepared and maintained to address the response to potential disasters for incidents such as failure of the tailings dam or a flood event that might cause the over-topping of the dam and result in toxic flows into the downstream environment.

Response

In the event the Project is approved, Bowdens Silver would prepare a range of management and monitoring plans covering a vast array of topics. Within that suite would be a Water Management Plan incorporating Surface Water and Groundwater and also a Tailings Storage Facility Management Plan including a Seepage Management Plan. These would include detailed monitoring regimes to ensure the compliance and stability of the TSF. In addition, workplace documentation would be required to cover emergency management protocols such as flooding, bush fire and site-based events.

The TSF has been preliminarily designed following a total of nine design standards from both the Australian National Committee on Large Dams Incorporated (ANCOLD) and the Dam Safety NSW. Details of these design standards are listed in Section 9 of ATC Williams (2020).

Also, a dam-break tailings run-out study would be carried out during detailed design of the TSF and once the full site-wide water balance has been confirmed.

It is therefore proposed that the responses referred to by MWRC would be incorporated within the respective management plans and hence there is no need for a separate Disaster Management Plan.

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*All costs associated with the construction and maintenance of the pipeline corridor (*required for the Project) *are to be borne by the developer. This includes establishing easements with individual property owners, obtaining relevant approvals, ongoing maintenance and any works or repairs required to Council infrastructure.*

Response

Bowdens Silver considers this reasonable and acknowledge that these matters have previously been discussed with MWRC staff.

All water supply infrastructure should be compliant with the WSAA Water Supply Code of Australia. Where the pipeline and corridor crosses any road reserve, installation must be in accordance with specifications determined by Council.

Response

All infrastructure will comply with the necessary statutory regulations. Where necessary, Bowdens Silver will ensure it complies with MWRC specifications and will work collaboratively with MWRC staff to achieve this.

An Accommodation and Workforce Strategy is prepared considering the total accommodation required under various workforce scenarios, assuming construction period overlaps with other major projects and considering peak tourism activity.

Response

Bowdens Silver will implement an Accommodation and Workforce Strategy upon the grant of Development Consent. This will encapsulate considerations raised by MWRC staff in previous consultation such as maximising the local workforce and suppliers where possible to ensure maximum local economic benefits while also minimising accommodation pressure on the local rental and tourist markets. The Social Impact Assessment included a skills audit within the region whilst also collating details of businesses and suppliers who were keen to work with Bowdens Silver. Aspects of this will be built upon to also fully understand the specific employment and skill requirements of the Project so that locals can be targeted and therefore local accommodation impacts minimised. It is acknowledged that this plan would benefit from close consultation with MWRC to ensure that the strategies do not conflict with MWRC's understanding of other requirements.

A *suitable arrangement* (is developed with Council) *for parking in urban areas during construction in order to minimise parking congestion for other local traffic.*

Response

This is a reasonable request and Bowdens Silver encourages the involvement of MWRC in planning for parking arrangements. Items such as the above will form part of Bowdens Silver's ongoing consultation with MWRC. Matters such of this would be communicated with the contractor and employee workforce at the commencement of their engagement on the Project.

Council requests that the proponent engage with Council and provide details of any proposed VPA.

Response

Bowdens Silver has had close dialogue with key MWRC staff to discuss suggested elements of a proposed Planning Agreement and has now presented a formal letter indicating agreement with the final terms. It is accepted that at least in-principle agreement between the parties on the terms of the Planning Agreement will be required prior to determination of the Development Application. It is expected that this will be finalised once the final terms are approved by MWRC.

Council requests that the Cyanide Management Plan *be prepared and approved by the appropriate regulatory authority, prior to works commencing.*

Response

Bowdens Silver would prepare a range of different management and monitoring plans which would include a Cyanide Management Plan (CMP) and a Principal Hazard Management Plan (PHMP).

The CMP would include the following.

- Measures to manage the delivery, storage and use of sodium cyanide at the required concentrations at all times.
- Measures to manage any wastes containing sodium cyanide containing waste entirely within the Mine Site.
- Measures to maintain sodium cyanide levels to within limits prescribed by the Development Consent.
- Contingency measures for sodium cyanide reduction.
- Details of a sodium cyanide monitoring program, including its products.

The PHMP would include the following.

- The identification of hazards (appraise risks) within the Mine Site in relation to cyanide.
- An assessment of the risks of injury or ill-health to workers from the hazards.
- The identification of the controls required to manage all risks.

In addition, Bowdens Silver will prepare a Pollution Incident Response Management Plan (PIRMP) and an Emergency Response Management Plan (ERMP) to manage pollution and emergency responses within the Mine Site and specifically in relation to cyanide. The PIRMP will be a condition of the Environment Protection Licence for the Project.

It is also noted that the proposed concentration of free cyanide (<3mg/L) and weak acid dissociable cyanide in the tailings for the Project are comparatively lower than those concentrations in tailings produced by the gold mining industry in Australia and internationally and substantially lower than the EPA's Tailings Cyanide Policy of 50mg/L or, where sensitive species occur, 20mg/L (90^{th} percentile) and 30mg/L (100^{th} percentile).

The use of sodium cyanide is regulated in NSW through:

- the *Protection of the Environment Operation Act 1997* administered by the Environment Protection Authority; and
- the *Work, Health and Safety Act 2011* administered by the NSW Resources Regulator.

Bowdens Silver would responsibly manage the sodium cyanide used on site in order to protect the wider community, its staff contractors and local flora/fauna.

All of the costs associated with the relocation and construction of the new Maloneys Road will be at the full cost of the proponent.

Construction of the new road and upgrade of part of Bara Lue Road must be carried out to an acceptable standard and require:

- *Appropriate intersection treatment and upgrade for Lue Road/Bara Lue Road;*
- *Any necessary railway level crossing treatment as determined by the Rail Authority;*
- *All road pavements to be of an acceptable Council standard;*
- *A new bridge crossing over Lawson Creek; and*
- *Appropriate intersection for the 'Relocated Maloneys Road' and Bara Lue Road.*

Response

The relocation of Maloneys Road is necessary for the Project and hence, Bowdens Silver is committed to bearing the costs associated with the relocation of this important piece of community infrastructure.

As outlined in the Traffic and Transport Assessment Report, *"the relocated Maloneys Road and mine access road would be constructed to a general carriageway width of 11.0 m, consistent with Austroads requirements for rural roads carrying more than 15 per cent heavy vehicles, and would be designed to meet the Austroads sight distance requirements for both cars and trucks."* Similarly, intersection treatments will also be designed to meet Austroads requirements while also meeting relevant MWRC requirements.

New crossings of the unused Wallerawang-Gwabegar railway line and also over the Lawsons Creek will be designed and constructed in line with the necessary requirements of Transport for NSW and DPIE Water.

Prior to the commencement of road construction, fully detailed design and specification documentation must be submitted to and approved by Council. Pavement design must be generally in accordance with Austroads standards and meet the following characteristics:

- *Bitumen Sealed traffic lanes (2 x 3.5 metres wide);*
- *Shoulders 2 x 1 metre wide;*
- *Pavement designed to provide for no less than a 20 year lifespan based on mine traffic volumes and vehicle characteristics with particular emphasis on vehicle numbers required to transport extracted and processed material; and*
- *Signage requirements as determined by a certified Road Safety Audit.*

Response

As previously stated, all road construction (and associated items such as signage) would be completed in line with Austroads requirements and Bowdens Silver would work collaboratively with MWRC to ensure MWRC requirements are met during the planning and construction stages.

6.4.1 Road Upgrades

Council expects that all road upgrades would be required as a condition of approval, and are not included in any VPA

Response

Bowdens Silver notes that the intent of conditions of Development Consent for State significant Development is to provide high level guidance in relation to legal requirements to be complied with. While Bowdens Silver agrees that a general statement in relation to road upgrades be included in any conditions of consent, detail of such upgrades should be left to the Planning Agreement (in relation to costs agreements) and separate approval of detailed designs in accordance with Austroads by MWRC.

The proposed Planning Agreement with MWRC outlines not only the monetary contributions from Bowdens Silver but also the preferred types of proposed infrastructure that these contributions should be allocated to for the benefit of the local communities.

6.5 NSW EDUCATION

6.5.1 Traffic

All heavy vehicles are also restricted during school periods (including pick up and drop off) from using Swanston Street (which forms part of Lue Road within Lue).

the Applicant to undertake soil surveys at Lue Public School prior to, and following commencement of operations of the proposal.

Response

It is not feasible, nor appropriate, to prevent project related heavy vehicles, particularly those not covered or controlled by Bowdens Silver, from traveling through Lue and past the Lue Public School during school periods (including pick-up and drop-off). Rather, Bowdens Silver would prefer to avoid heavy vehicles travelling past the school between 8:00am and 9:30am and 2:30pm and 4:00pm during school drop off and pick up periods and require the vehicles to approach the Mine Site outside these times. It is proposed that this requirement of heavy vehicle drivers would be achieved through the Driver's Code of Conduct that all drivers regularly travelling to and from the Mine Site would be required to sign as part of their induction.

During the first six months of the construction period, traffic travelling through Lue would comprise employee traffic in cars and buses and heavy vehicles delivering earthmoving equipment and buildings / buildings materials. Daily heavy vehicle movements (excluding buses) travelling through Lue would typically vary from 10 to 32 per day, i.e. 5 to 16 return heavy vehicles per day. When placed in perspective, traffic counting undertaken by TTPP (2020) revealed:

- during the period 8:00am to 4:00pm on weekdays, there were an average of approximately 480 vehicles travelling past the school; and
- an average of 62 heavy vehicles past the school on a weekday, many of which would have been between 8:00am and 4:00pm.

Once the relocated Maloneys Road is operational, the number of heavy vehicles travelling past the Lue Public School would reduce noticeably, with only the occasional heavy vehicle travelling to the Mine Site from the east of Lue. The drivers of these vehicles would similarly be required to sign the Driver's Code of Conduct to ensure that the requirements that are important to the Lue Public School are fully complied with.

Bowdens Silver proposes to consult with Lue Public School during the preparation of the Driver's Code of Conduct to ensure that realistic requirements for travel past the school and along the relevant school bus routes are appropriately incorporated within the Code.

6.6 NSW RURAL FIRE SERVICE

A Fire Management Plan (FMP) shall be prepared in consultation with NSW RFS Cudgegong Fire Control Centre. The FMP shall include:

- *24 hour emergency contact details including alternative telephone contact;*
- *Site infrastructure plan;*
- *Fire fighting water supply plan;*
- *Site access and internal road plan;*
- *Construction of any Asset Protection Zones (APZ) and their continued maintenance;*
- *Location of hazards (Physical, Chemical and Electrical) that will impact on fire fighting operations and*
- *procedures to manage identified hazards during fire fighting operations;*
- *Emergency management and evacuation procedures for fires;*
- *Such additional matters as required by the NSW RFS District Office (FMP review and updates).*

Response

Bowdens Silver agrees to the need for a Fire Management Plan.

A minimum 100 metre Asset Protection Zone (APZ) shall be established around any occupied or hazardous materials storage buildings. The APZ shall be managed in accordance with Appendix 4 of Planning for Bush Fire Protection 2019.

Response

Agreed, however, the required asset protection zones for the Project would be incorporated within the Fire Management Plan rather than as a separate condition of Development Consent.

To allow for emergency service personnel to undertake property protection activities, a 10 metre defendable space (APZ) that permits a minimum 4 metre wide, unobstructed vehicle access is to be provided around the perimeter of any fixed infrastructure.

Response

Agreed, however, the required 10m defendable space asset protection zone for the Project would be incorporated within the Fire Management Plan rather than as a separate condition of Development Consent.

6.7 PUBLIC

Representative Comment(s)

…if the Bowdens Mine is given approval then the proposal should be amended to include a requirement that Bowdens purchase the properties at current market value and compensate families to relocate from the village of Lue.

Lara Altimira of Lue, NSW (Submission SE-8642008)

Response

Bowdens Silver has demonstrated through at the EIS that whilst Lue residents would be periodically aware of the activities being undertaken on site, i.e. through noise, blasting, local increases in traffic levels, their levels of impact are considered acceptable under NSW planning guidelines and not a basis upon which to purchase any of the properties within Lue. The NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP) (NSW Government, 2018) governs the conditions under which properties may be acquired voluntarily and mitigation negotiated to the benefit of landowners. Should this policy be triggered at a private property as a result of the Project, Bowdens Silver would acquire the property or negotiate suitable mitigation of impacts.

Representative Comment(s)

To provide inter alia:

- *potable water for my home, domestic use for my family, garden and roses, apple and pear tree orchard.*
- *potable water at Rylstone Olive Press for all staff, Cellar Door, Tourists and Events attendees.*
- *irrigation water for my olive trees at 4 meg/ha for 16 hectares per year on going. 64 megL per annum*

(Name Withheld) of Rylstone, NSW (Submission SE-8642238)

Response

The EIS has demonstrated that the Project would not impact the current water supply relied upon for the Rylstone Olive Press and those properties within Lue that currently use groundwater drawn from registered groundwater bores.

Representative Comment(s)

That Bowdens must enter into an agreement with all land owners who may experience exceedances before turning the first sod, as proposed by Bowdens in the EIS at page ES-5.

Margaret Cameron of Lue, NSW (Submission SE-8645423)

Response

It is noted that EIS page ES-5 refers to agreements required for the Project but notes that agreements with landowners would be made in accordance with the VLAMP. The agreements required under the VLAMP are discussed in detail in Section 5.23.7. The VLAMP does not require that agreements must be in place for applications to be approved or before commencement of mining. The policy sets out mechanisms for an affected landowner to voluntarily request mitigation and/or acquisition. However, if the terms of agreement are not satisfactory to all parties, development may still be approved based on its merits and taking into account the predicted impacts.

It is Bowdens Silver's preference that acquisition or negotiated agreement be achieved with landowners whose properties are predicted to experience impacts that trigger mitigation and/or acquisition under the VLAMP. However, in the event this does not occur before determination of the application, Bowdens Silver agrees that conditions of consent would be set to the predicted noise levels and voluntary mitigation and/or acquisition rights continue to apply for a period in the respective condition. It is noted that the VLAMP includes a dispute resolution process, however this relates to the agreement of reasonable and feasible mitigation measures or agreement on land valuation and not the predicted impact, which in the case of the Project have been peer-reviewed and assessed by the EPA and DPIE.

Based on the modelling of predicted impacts, the Wyuna property falls in to the "moderate" range of impacts due to predicted noise levels at certain times of the operation under certain climatic conditions. There is no requirement under the VLAMP for Bowdens Silver to acquire the Wyuna property owned by Mrs Cameron. Properties within the "moderate" category must be offered mitigation of predicted impacts, which Bowdens Silver has offered to this landowner on numerous occasions. There are no predicted exceedances of air quality criteria at this property which is also a consideration of the VLAMP. At the time this document was finalised, an agreement had not been made with the above landowner, however Bowdens Silver will continue to engage with the Cameron family with the aim of reaching an agreement that is acceptable to both parties.

Representative Comment(s)

Bowdens provide a buffer zone between all aspects of the mining operation and the Lue village of at least 10 kilometres.

Margaret Cameron of Lue, NSW (Submission SE-8645423)

Response

A buffer zone is typically the area around an activity in which the required noise, air quality, blasting and potentially surface water and/or groundwater criteria cannot be met. Conversely, the area beyond the buffer zone is an area where these criteria can be met and therefore achieve an acceptable level of impact. No activity within NSW is required to have a buffer zone of at least 10km. It is noted that the location of the Project is determined by the location of the ore reserves which cannot be changed.

Representative Comment(s)

If water is used from Ulan that it be a condition that water quality is below 802 EC before leaving Ulan.

Hunter White of Havilah, NSW (Submission SE-8658633)

Response

Bowdens Silver is committed to the use of a reverse osmosis water treatment plant that would treat the water from the Ulan Coalfield prior to it being pumped to the Mine Site. Water moved in this manner would be of sufficient quality that risks of pollution would be low.

6.8 ORGANISATIONS

Representative Comment(s)

Blast, Noise and Vibration Monitoring at various escarpment and boulder rock shelters as chosen by the Registered Aboriginal Parties must be part of the approval conditions if this project were to be approved at all.

Gallanggabang Aboriginal Corporation of Orange, NSW (Submission SE-8384568)

Response

It is not expected that blasting activities would result in noise or vibration impacts at known-escarpments and rock shelters of Aboriginal heritage value. Bowdens Silver agrees to consider impacts at locations nominated by the local Aboriginal community. However, monitoring and management measures would need to be established commensurate with the risk of impact.

7. EVALUATION OF THE PROJECT

7.1 INTRODUCTION

This section provides an update to the evaluation of the merits of the Project presented in Section 6 of the EIS. It takes into account amendments made to the Project and refinements to management and mitigation that have been made in response to the submissions received from Government agencies, organisations and the public. As the majority of assessment outcomes have not changed as a result of the review of submissions, this section presents the relevant updates to the merits of the Project. That is, this section does not replicate or supersede the evaluation of merits presented in Section 6 of the EIS, except where it discusses the amended outcomes of assessment. A final review of the public interest is provided in conclusion to the document.

7.2 AMENDMENTS AND REFINEMENTS TO THE PROJECT

This *Submissions Report* should be read in conjunction with the *Amendment Report for the Bowdens Silver Project* (the Amendment Report). The Amendment Report describes the realignment of the existing 500kV transmission line that traverses the proposed main open cut pit. This realignment was envisaged to form a separate application however, it is now proposed as part of the current Project and is the only amendment that substantially changes the Project as presented in the EIS. Whilst other refinements have been incorporated, they are designed to add further mitigation or management measures in response to submissions and do not change the essence of the Project.

Assessment of the 500kV realignment was incorporated within the EIS for the Project and therefore the amendment to include it does not change the environmental or social outcomes of the Project. However, additional assessment of electric and magnetic field (EMF) generation from the transmission line is included within the Amendment Report. This assessment concluded that risks associated with exposure to EMF would be low and managed during design and construction, in accordance with TransGrid's requirements.

Notwithstanding the above, Bowdens Silver requested its consultants to undertake a detailed review of the matters raised in submissions and provide the necessary clarification, additional information or, where needed, reassess potential impacts. In addition, DPIE has commissioned independent peer reviews of the assessment of groundwater, human health risks and economic benefits. As a result of the above, the following technical assessments for the Project have been updated.

- The Groundwater Assessment (Jacobs, 2021) has been updated and is provided as **Appendix 3**. This assessment was updated principally in response to DPIE Water's review that requested editorial changes and clarifications whereby the description of detailed modelling matters were relocated to an appendix. Additional refined modelling in the vicinity of the TSF was also undertaken to further quantify seepage risks and management.
- An Biodiversity Assessment Report (BAR) (EnviroKey, 2021) has been updated and is provided as **Appendix 4** and incorporates additional survey outcomes relating to several individual Small Purple-pea plants (*Swainsona recta*) and Silky Swainsona-pea plants (*Swainsona sericea*) identified within the Mine Site. AREA Environmental Consultants & Communication Pty Ltd (AREA) was commissioned

to undertake targeted ecological field surveys for these and other threatened species (the AREA reporting associated with this survey is presented as Annexure 9 of the BAR).

- Bowdens Silver has also consulted with the Commonwealth Department of Agriculture, Water and the Environment regarding potential impacts to Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to the Summer 2019/2020 bushfires. As a result, Niche was commissioned to undertake an assessment that considered the known habitat of threatened species listed under the EPBC Act and the extent of recent bushfires (2019/2020) (see **Appendix 5**).
- The Air Quality Assessment (AQA) prepared by Ramboll (2021) (see **Appendix 6**) has been updated to correct a clerical error in Table 7.7 relating to metal concentration in dust and to correct an error in units applied for data relating to sampled copper and manganese levels. A sensitivity analysis of metal concentration assumptions was also included.
- A range of clarifications have been included within an update to the Human Health Risk Assessment (HHRA) (**Appendix 7**) in response to the review of public submissions and an independent peer review commissioned by DPIE.

In addition to the updated technical reporting supporting the EIS, a range of minor refinements or clarifications to assessments have been undertaken that did not warrant any updates to the relevant technical reports. This included updates to noise modelling assessments, clarification of the inputs to the surface water assessment and further review of the economic assessment and social impact assessment.

A key outcome from the review of all submissions, is that the overall conclusions of all technical assessments supporting the EIS have not changed. The BAR now includes an assessment of the proposed impact to the Small Purple-pea plant (*Swainsona recta*) and Silky Swainsona-pea plant (*Swainsona sericea*). However, this change has not resulted from review of submissions but has been included after individuals of the Small Purple-pea plant were identified in routine monitoring within the Mine Site by Bowdens Silver personnel. Further justification for approval of the Project is presented in Section 7.4 and refers to the final outcomes of environmental, social and economic assessment.

7.3 UPDATED CONTEXT FOR THE PROJECT

7.3.1 Statutory Context

A thorough analysis of the statutory context for the Project was presented in Section 3.2.3 of the EIS.

Although the submissions provided to DPIE in response to the public exhibition of the Bowdens Silver Project EIS express overwhelming support for the Project in the local, regional and NSW context, the level of objection is sufficient that the consent authority for the Project will be the Independent Planning Commission (IPC). As a result, DPIE will prepare an assessment report and recommendation for consideration by the IPC who will then determine the Development Application for the Project.

Since the EIS was finalised, the water sharing plans relevant for the groundwater setting in the vicinity of the Project have been repealed and replaced as follows.

- The *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources, 2011* has been repealed and replaced by the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources Order, 2020*
- The *Water Sharing Plan for the NSW Murray Darling Fractured Rock Groundwater Sources, 2011* has been repealed and replaced by the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources Order, 2020.*

As there are no savings or transitional provisions in these water sharing plans, the Groundwater Assessment (Jacobs, 2021) has considered the rules described within these plans in relation to the assessment. The change to these water sharing plans has not required amendment to the groundwater modelling, assessment outcomes or proposed management of groundwater impacts.

There have been no other changes to the statutory context for the Project and all other information presented in Section 3.2.3 of the EIS remains relevant.

7.3.2 Strategic Context

The strategic context of the Project remains an important component of its merits. This relates to the geological setting of the Mine Site, the economic context for the commodities that would be mined and the social context for the development and operation of the Project.

The mineral deposit being targeted by the Project occurs as a thick zone extending from surface, and near surface, to vertical depths of at least 180m. To date, drilling has identified that Silver mineralisation extends to depths of approximately 600m (that is, substantially beyond the mining depth proposed by the Project). Exploratory drilling has continued since the exhibition of the EIS and, coupled with previous exploration, has increased the Company's confidence for the Project. This means that Bowdens Silver remains fully committed to Project development and continued exploration efforts within its exploration tenements. This information justifies Bowdens Silver's continued investment to explore, plan and seek the necessary approval for the Project.

The strategic context for metalliferous mine development has also markedly improved since EIS exhibition. In the EIS and Economic Assessment, an average Silver price of US$20 was assumed to support the Project's economic viability. Since that time, the Silver price has substantially improved and was approximately US$26 at the time this document was finalised. Not only has the current price improved but price forecasts are equally optimistic. This position in the market supports the viability of the Project and the proposed significant investment in generating jobs, supply opportunities and flow-on benefits for the State of NSW and local community. At the same time, the NSW Government is continuing to strengthen the regulatory regime for mining, such that the boost to mining activity receives the same or higher scrutiny. Bowdens Silver welcomes this level of scrutiny and is committed to the adoption of contemporary best practice during operations.

From the commencement of investigations, Bowdens Silver has had a focus on being involved in the local and regional community. Project objectives include preserving the existing character of Lue and to provide a stimulus for the Lue, Mudgee, Rylstone, Kandos and district economies.

Several submissions supporting the Project noted appreciation and support for the current and proposed investment in the community. Through this engagement, Bowdens Silver has become aware of the effects that project closure has had on levels of unemployment in the region. Whilst this was reflected in the EIS and since public exhibition, the Bylong Coal Project has been refused development consent and an appeal in the Land and Environment Court has been unsuccessful. Regardless of the merits of this decision (on which we provide no opinion), it is understood that this outcome has caused distress to many community members who were relying upon the jobs and economic stimulus arising from the Bylong Coal Project. The Bowdens Silver Project is not on the same scale as the Bylong Coal Project and in no way is considered to replace it. However, the response to this decision underscores the need for environmentally and socially sound projects to provide employment and economic stimulus in the region.

7.4 UPDATED JUSTIFICATION OF THE PROJECT

7.4.1 Health Considerations

The HHRA considered potential impacts on community health in relation to the predicted / assessed changes in air quality, water (both surface water and groundwater) and noise. In addition, a comprehensive range of possible community exposure pathways have been considered for metals. Review of the matters raised in submissions and the DPIE commissioned independent peer review of the HHRA have resulted in minor updates to the HHRA to assist in clarifying the approach taken to assess the various matters raised. However, the outcomes of the HHRA remain consistent with those originally presented, that is, the Project presents no health risk issues to the local community.

7.4.2 Social and Economic Considerations

Many submissions raised matters that have social implications, both positive and negative, including those provided within a review of the SIA commissioned by LAG. It is noted that the matters raised by LAG are consistent with the feedback received during preparation of the SIA and addressed in that document. Notwithstanding the significant level of support in the region and within NSW (74% and 75% support respectively), for those submissions that listed their address as being within Lue, the level of support and objection is fairly equal (52% object, 46% support and 2% comment). This is consistent with feedback in community surveys completed for the SIA, albeit that the community survey used a random selection method and were anonymous. They therefore did not rely on the individual choosing to make a submission but rather to answer questions anonymously over the phone.

Regardless, it is acknowledged that the Project would be experienced differently by different people and while there is support for the social outcomes of the Project, some members within the community of Lue and surrounds remain concerned about potential impacts associated with the Project. A of matters relating to the social implications of the development have been clarified in this document. However, there has been no change to any of the social risk classifications for the Project and no new social impact mitigation is considered necessary. Overall, Bowdens Silver is confident that the outcomes of the SIA reflect community expectations and the potential social impact risks for the Project.

The following key mitigation and enhancement strategies are proposed to minimise negative effects and ensure the benefits of the Project are distributed as equitably as possible.

- Expansion of the existing Community Investment Program.

- Development of a local employment and procurement strategy.
- Development of a Good Neighbour Program and continued employment of a dedicated Community Liaison Officer.
- Implementation of a Planning Agreement with the Mid-Western Regional Council under which funding would be provided for local projects including roads.
- Development of a Social Impact Management Plan that provides for monitoring and evaluation of social and community aspects of the Project.
- Prepare an appropriate complaint receipt / response and incident notification / reporting processes to respond to community concerns and complaints.
- Regular public reporting of relevant statistics, monitoring results and engagement outcomes in order to keep the community informed, maintain transparency, and to remain accountable.

With the implementation of these measures, the social benefit of the Project would be maximised and negative social impacts minimised.

An independent peer review of the Economic Assessment was commissioned by DPIE and a response to this review has been prepared on behalf of Bowdens Silver. Notwithstanding the outcomes of the peer review, Gillespie Economics remains confident of the conclusions of the assessment and projected economic benefits of the Project. Further to this, an additional peer review of the Economic Assessment prepared by Ernst & Young supports the Economic Assessment conclusions and suggests that further benefits should be presented. Regardless of the assessment outcomes, it is clear that the Project would have substantial economic benefits for the local and regional community as well as for the State of NSW.

7.4.3 Biophysical Considerations

A detailed summary of the biophysical outcomes of assessment for the Project were presented in Section 6 of the EIS. A brief summary of the outcomes following review of the submissions received by Bowdens Silver is provided below, noting that there have been no changes to the outcomes of technical assessment as a result of review of the Government agency, organisational and public submissions. **Appendix 2** provides an updated summary of environmental management and management measures, noting that the only substantial change is the addition of seepage management measures as discussed in Section 3.3.6.

- **Noise and Blasting** - Review of the comments made in submissions relating to noise generation and blasting have resulted in no material change in the assessment of potential noise and blasting impacts or conclusions as presented in the Noise and Vibration Assessment (SLR, 2020). The assessment undertaken by SLR (2020) concluded that the noise climate around the Mine Site would change and a number of residents of Lue and the surrounding area would hear mine noise for the first time. The noise levels experienced would be low and would be mainly audible during periods of adverse weather conditions, i.e. gentle winds towards residences or evening or night-time temperature inversion. Exceedances of the relevant criteria have been predicted at 11 residences and these exceedances have been addressed in accordance with the VLAMP.

- **Air Quality** - None of the outcomes or conclusions from the Air Quality Assessment (Ramboll, 2021) have changed as a result of a review of submissions. The Updated AQA continues to predict that there would be no exceedance of the relevant air quality criteria for particulate matter (TSP, PM_{10}, $PM_{2.5}$) at any privately-owned residences or receivers, either from the Project alone or cumulatively. It is also predicted that there would be no exceedance of the impact assessment criteria at any receivers (Project-related or private) for metal dust concentrations, respirable crystalline silica or HCN.

- **Greenhouse Gases** – There has been no change to the outcomes of assessment of greenhouse gas generation for the Project undertaken by Ramboll (2021). That is, the predicted annual average Scope 1 Greenhouse Gas emissions generated by the Project would represent approximately 0.02% of total Greenhouse Gas emissions for NSW and 0.004% of total Greenhouse Gas emissions for Australia.

- **Groundwater Resources** - The Groundwater Assessment (Jacobs, 2021) has been revised principally to provide editorial comment and report re-structuring, whereby technical modelling information was moved from the main report to a technical modelling appendix. A review of the groundwater modelling by DPIE Water and an independent peer review commissioned by DPIE both concluded that the modelling assessment is fit for the purpose of predicting changes to the regional groundwater setting. Therefore, no revised modelling was required to assess groundwater take (inflows to the open cut pits) or regional groundwater impacts associated with drawdown of groundwater levels and reductions to baseflow contributions to Lawsons Creek and Hawkins Creek.

  Higher resolution modelling in the vicinity of the TSF has provided increased certainty with regards to groundwater predictions in its vicinity. While the proposed TSF liner, as presented in the preliminary design (ATC Williams, 2020) would meet EPA requirements, Bowdens Silver has elected to incorporate additional design controls to provide certainty in relation to potential seepage risks from the facility. The additional modelling adopted a deliberately conservative approach that likely overpredicts potential seepage impacts. This assessment clearly demonstrates that, despite the highly conservative (i.e. worst case) approach, the proposed seepage mitigation limits potential impacts to the groundwater setting (and Lawsons Creek), such that the existing or future use of these water resources would not be impaired.

  The Groundwater Assessment has reaffirmed that the Project meets the NSW Aquifer Interference Policy's Level 1 Minimal Impact Considerations for highly productive, alluvial, porous rock and fractured rock aquifers and that the predicted impacts are acceptable under this policy.

- **Surface Water Resources** – A detailed response to matters raised in submissions has added to the information presented in the peer-reviewed Surface Water Assessment prepared by WRM (2020). WRM (2020) assessed the potential impacts of the Project on downstream water quality, water availability, flooding and the consequences of Mine Site water management and the predicted water demand.

Whilst further clarification and information has been presented, there has been no changes to the outcomes of WRM's assessment (WRM, 2020). Potential risks associated with surface water resources have been addressed in detailed planning and design of the Project. Therefore, it remains the conclusion of WRM (2020) that potential effects on downstream flows in both Hawkins and Lawson Creeks are predicted to be minimal and potential risks to surface water quality are acceptable and would be monitored and managed over the life of the Project.

- **Terrestrial Ecology** – The BAR for the Project has been updated to incorporate additional survey outcomes relating to several individual Small Purple-pea plants (*Swainsona recta*) and Silky Swainsona-pea plants (*Swainsona sericea*) identified on site during routine environmental monitoring by Bowdens Silver personnel.

  Taking into account the substantial biodiversity offsetting proposed for the Project, it is considered that the residual impacts to native vegetation and fauna habitat are acceptable. This includes the Small Purple-pea plants and Silky Swainsona-pea plants, and takes into account the constraints on regional habitat availability following the 2019/2020 bushfires.

- **Aquatic Ecology** - There has been no change to the outcomes of the Aquatic Ecology Assessment undertaken by Cardno (2020). That is, that the Project would not cause any direct impacts to the ecology of Hawkins and Lawsons Creeks. Several ephemeral watercourses with limited aquatic habitat located within the footprint of the Mine Site would be displaced and realigned.

- **Traffic and Transportation** - There has been no change to the outcomes of the Traffic and Transport Assessment undertaken by TTPP (2020). That is, the traffic travelling to and from the Mine Site would be accommodated on the surrounding road network with virtually no adverse impacts to road users, the condition of the road network and the amenity of the residents of Lue.

- **Soils and Land Capability** - There has been no change to the outcomes of the Soils and Land Capability Assessment undertaken by Soil Management Designs (2020). That is, there is no Biophysical Strategic Agricultural Land located within the Mine Site. The proposed use of appropriate soil stripping, handling and stockpiling procedures would maximise the value of soils as a resource for rehabilitation purposes and minimise losses through erosion. There is no indication that soil conditions would constrain rehabilitation success.

- **Aboriginal Heritage and Historic Heritage** - There has been no change to the outcomes of the Aboriginal and Historical Cultural Heritage Assessment undertaken by Landskape (2020). The Project would result in the salvage of artefacts from 25 identified sites of Aboriginal cultural value and remove three sites of potential historical heritage significance within the Mine Site. Assessment of these impacts has concluded the sites are mostly of low heritage significance, noting that the Aboriginal cultural significance may only be determined by the Aboriginal community and the community considered all sites to be of high cultural significance. More significant sites that would be removed include an Aboriginal

rock shelter site and some hut ruins. An approach to salvage of Aboriginal artefacts (including an inclusive educational program as requested by Heritage NSW) would be developed in consultation with Aboriginal stakeholders prior to any salvage program commencing.

- **Visibility** - There has been no change to the outcomes of the Visibility Assessment undertaken by Richard Lamb and Associates (2020) or the Lighting and Sky Glow Assessment undertaken by Lighting, Art & Science (2020).

  It has been concluded that, while components of the Project would be visible to varying degrees and at varying stages of the development, the limited visibility of the mining activities within the Mine Site and the range of visual controls would achieve an acceptable level of impact. Importantly, no components of the Mine Site would be visible from Lue.

  The potential for lighting impacts on the local environment (including sky glow) has been assessed to be minimal.

- **Public Safety Hazards** - There has been no change to the outcomes of the bushfire assessment for the Project or the SEPP 33 Screening Study for Dangerous Goods undertaken by Sherpa (2020). These risks would be managed in accordance with best practice throughout the life of the Project.

- **Agricultural Resources, Land Uses and Enterprises** - There has been no change to the outcomes of the Agricultural Impact Assessment prepared by RWC (2020). That is, the Project would have a negligible to minor impact upon the agricultural resources and enterprises through the region.

7.5 THE CONSEQUENCES OF NOT PROCEEDING WITH THE PROJECT

The consequences of not proceeding with the Project relate directly to the strategic context for the development. These remain largely unchanged since the exhibition of the EIS and include the following.

- The lost opportunity to mine a strategically significant deposit with substantial prospects for future development.

- Refusal may also influence other local mineral exploration by both Bowdens Silver and others and therefore forego the opportunity to diversify the local mining industry (currently dominated by coal mining).

- The numerous uses and demand for silver, zinc and lead and the associated pricing indicate that the Project would easily market its concentrates and would be viable. The products of the Project would need to be sourced from elsewhere if the Project were not to proceed and the associated economic and social benefits would be foregone.

- The overwhelming support for the Project in the region is evident from the 682 individual submissions from residents of the Mid-Western Regional LGA that supported the Project (74% of all submissions for the region). This is a strong

indication of the need for environmentally and socially sound projects to support the regional economy, especially in the Lue, Kandos, and Rylstone localities. If the Project were not to proceed the opportunity for local employment, procurement of services and direct local benefits (such as through the Community Investment Program) would be lost.

- Diversification of industry and opportunity in communities is important to maintain resilience and sustainability. The Mid-Western Regional LGA is a diverse region with coal mining being by far the largest local industry representing approximately 47% of economic output for the region. The balance of the top 5 industry sectors (construction, agriculture, real estate and manufacturing) contribute approximately 27% of the Mid-Western Regional LGA's economic output. Recent focus on the climate implications of coal mining and use, as evident from scientific analysis, community objection and political pressures places increased pressure on this industry. The apparent reliance on new coal mine developments and coal mine expansions may not be an appropriate long-term strategy for the region. It is therefore important that there is diversity through growth in other industry sectors. The Bowdens Silver Project would be an example of such diversification.

7.6 THE PUBLIC INTEREST

The consideration of the public interest presented in Section 6.4 of the EIS noted that the feedback from the community in the form of public submissions would provide some indication of the public interest with regards the Project. A detailed analysis of the submissions received has been presented in Section 2 and confirmed the following.

- There is overwhelming support for the Project generally (1 504 submissions or 79% of all submissions supported the Project).
- There is overwhelming support for the Project in the Mid-Western Regional LGA (682 submissions or 74% of all submissions from this area supported the Project).
- Within the area described as 'Lue and surrounds' 95 submissions objected to the Project (62%) and 57 submissions supported the Project (37%).
- For those submissions that listed an address as being within Lue, 45 submissions opposed the Project (52%) and 40 supported the Project (46%). This is consistent with feedback in community surveys completed for the SIA for the Project.

The most frequently identified matters in all submissions referred to the benefits of employment and workplace training that the Project would provide (905 submissions) and direct reference to the economic benefit to the local community (342 submissions).

The technical environmental matters raised in objecting submissions have been reviewed by Bowdens Silver and its consultants and a detailed response prepared and presented in this document. However, there have been no changes to the assessment outcomes and overall conclusions as a result of the review of submissions. This includes for the concerns raised most frequently in objecting submissions relating to surface water resources, the health implications of lead, groundwater resources and the proximity of the mine to Lue. Bowdens Silver has also

committed to additional design controls within the TSF in order to provide certainty in relation to potential risks associated with seepage from the structure. The only significant change to assessment has been an adjustment to the biodiversity offsetting obligations of the Project due to the identification of threatened flora. The species were initially identified by Bowdens Silver personnel during routine monitoring and subsequently verified through ecological field survey. This is evidence of the environmental responsibility of the Company.

Many submissions referred to social impacts associated with change that might affect the local sense of community and sense of place, health and wellbeing and social amenity. These concerns would be managed throughout the life of the Project through a comprehensive range of social mitigation measures. However, equal consideration must be given to the many submissions that commented on the social benefits of the Project including employment opportunities, maintaining sustainable communities and ensuring their ongoing resilience. These opportunities would be supported through the expanded Community Investment Program and other social mitigation measures.

The following provides a brief justification for the conclusion that the Project would be in the public interest.

- Bowdens Silver has designed a Project that ensures efficient development of the Mine but which also considers the likely experience of the Mine for the local community and the predicted short-term and longer-term environmental outcomes.
- There is a strong indication of the need for environmentally and socially sound projects to support the regional economy, especially in the Lue, Kandos, and Rylstone localities.
- Bowdens Silver considers that the Project would be of sufficient scale to provide a boost to the local economy but not cause substantial adverse environmental or social impacts.
- The outcomes of environmental, economic and social assessments for the Project have confirmed that the Project would operate in accordance with the legislation, policies and guidelines developed to ensure responsible environmental practices for development.
- The Project is considered to be consistent with the principles of ecologically sustainable development (Section 6.1.3 of the EIS), would satisfy all relevant planning considerations (Section 6.1.4 of the EIS) and would achieve the objectives of the Project (Section 6.1.5 of the EIS).
- The environmental, economic and social assessments have not only considered the immediate impacts of the operation but also longer-term outcomes involving potential land use conflict and residual impacts to resources (such as groundwater) that may be utilised by others. In each case, worst case scenario outcomes were considered to ensure a precautionary and conservative approach was taken.
- Bowdens Silver has made a range of clear commitments to the public that would be given legal force by way of conditions of a development consent.

- The expanded Community Investment Program would ensure that the economic outcomes are distributed locally, while programs for environmental and social monitoring, regular reporting and auditing of performance would ensure that the commitments to responsible environmental management are achieved.
- The legacy of the Project has been considered with regards to the rehabilitation and final land use options and mechanisms to preserve the existing character of Lue, while providing sufficient economic stimulus to ensure its sustainability.

The Project, as presented is considered to be in the public interest as it would provide an acceptable balance of environmental and social outcomes, whilst generating substantial benefits for the local, regional and State economies.

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