

# Determination for a Mining Proposal for the Bird-in-Hand Gold Project

## Mining Act 1971

NOTICE is hereby given in accordance with Regulations 30(3) and 49(3) of the *Mining Regulations 2011* determining the minimum information required to be provided in a mining proposal and/or management plan for a mineral lease (ML) and any associated miscellaneous purposes licence (MPL) applications for a project incorporating the Bird-in-Hand Gold Deposit located in Woodside South Australia.

### 1 REQUIREMENT FOR DECLARATION OF ACCURACY

The mining proposal and/or management plan must include a signed statement by the applicant in accordance with Regulation 30(4) and/or Regulation 49(4) that the content of the mining proposal and/or management plan has been reviewed and is accurate.

Provide a summary of the steps undertaken to review the mining proposal and/or management plan and ensure its accuracy.

### 2 DESCRIPTION OF THE EXISTING ENVIRONMENT

*Each of the elements of the existing environment listed in Sections 2.1–2.19 must be described only to the extent that they may need to be considered in assessing the potential impacts of the proposed mining operations. If the element is not likely to be impacted by the operation, a statement to that effect must be included (note: the environment is defined in Section 6(4) of the Mining Act 1971).*

#### 2.1 Topography and landscape

Provide a description and map of the topography and landscape of the:

- application area
- general surroundings.

#### 2.2 Climate

Provide:

- a summary of rainfall and temperature patterns, evaporation rates, and wind directions and speed (including maximum wind gusts)
- details of the maximum average recurrence interval or annual exceedance probability rainfall event used for the operational and closure design of the project, and the justification for the value(s) selected
- Include graphs of cumulative deviation from the mean rainfall for the nearest weather station(s)

#### 2.3 Topsoil and subsoil

Provide:

- a description of the soil profile (type and depth), and the characteristics and/or productivity of all soils on the application area (show this information on a map if there is a variation in soils over the application area)
- identify any soil characteristics, including (but not limited to) erodibility, acid sulfate, sodic or non-wettable soils, that may require control measures to reduce environmental impacts during operations or rehabilitation.

#### 2.4 Geology

Provide a description of the following, as a minimum:

- regional geology
- geology within the application area, including but not limited to;
  - location, dimensions and orientation (dip and strike), and extent of the mineral resource and ore reserve
  - composition of all rock types that are proposed to be disturbed
  - interpretation of the stratigraphy of the rocks hosting the deposit as well as any overlying and adjacent rock units
  - a description and plan of potential for extension to the orebody
- representative cross-sections, long projection and a geological map of the lease application area showing the location of rock types and rock units present
- the exploration data on which the geological interpretation was based on.

#### 2.5 Geochemistry and geohazards

Provide:

- a geochemical assessment of all rock types that are proposed to be disturbed, based on representative sampling and analysis that includes the identification and quantification of, but not limited to, sulfide minerals that have the potential to generate acid or mobilise metals into the environment. All data used in this assessment must be provided.
- a mineralogical assessment of all the rock types that are proposed to be disturbed, based on representative sampling and analysis for the presence and quantification of (but not limited to) radioactive minerals, asbestos or minerals that have the potential to produce respirable silica. All data used in this assessment must be provided.

Describe the potential for any of the following natural geohazards to be present in the application area:

- structural instability, including slips, faults, karst features or geological discontinuities
- major seismic events (based on historical data).

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

### 2.6 Hydrogeology

Provide:

- a description of the local and regional hydrogeology, detailing both the stratigraphy and hydrostratigraphy (Note: The information provided for Sections 2.4 and 2.6 must be consistent).
- details of local groundwater systems, including:
  - information on water quality and static water level (including seasonal fluctuations), recharge and discharge mechanisms, aquifer hydraulic properties, location of any aquifer (shown on a plan) and static water level of any other known drillholes;
  - analysis of seasonal and long term water level trends, incorporating rainfall cumulative deviation plots and groundwater use (eg: licenced groundwater volumes, allocations and extractions);
- the environmental value of the water resource(s) determined according to the *Environment Protection (Water Quality) Policy 2015* and Australian and New Zealand guidelines for fresh and marine water quality (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, National Water Quality Management Strategy Paper No 4, 2000) or as amended.
- a description of the existence, location and value of all water dependent ecosystems within the application area and within and immediately surrounding the extent of predicted hydrogeological impact of the proposed mine operations.
- an assessment of current and historical abstraction of local groundwater by the landowner(s), other users and historic dewatering from the Bird-in-Hand Mine and related information, including baseline survey of bores, water level, groundwater quality, bore construction details, status and purpose, estimated volume and timing of use, pump depths, and collar/ground elevations.
- provide details on the current availability of water resources within both the Eastern Mount Lofty Ranges Prescribed Water Resources Area and the Western Mount Lofty Ranges Prescribed Water Resources Area.
- a plan, to scale, identifying the application area, all drillholes and boreholes relevant to the identification of hydrogeology, water dependent ecosystems, direction of groundwater flow, any potential paleochannels and recharge areas.
- if proposed mining operations are likely to intersect one or more aquifer units, provide:
  - a plan showing potentiometric groundwater elevation contours (annotated with data points) for each aquifer and include the location of all drillholes and boreholes and supporting tabulated data used in developing the contours. The extent of the plan must be the same as the plan required by section 2.6.1;
  - the relationship between aquifer units and stratigraphic units. Should the MP describe a single aquifer across multiple stratigraphic units, information to justify this conclusion must be provided; and
  - cross-section(s) of the interpreted hydrostratigraphy showing the known and inferred groundwater levels, groundwater flow direction, recharge and discharge mechanisms (if applicable), proposed mining operations, and relevant drillholes (with screened intervals) and boreholes used in developing the cross-section(s). Cross sections must be accurate, scaled and developed from supporting drill hole data, and show the predicted extent of the zone of influence of the proposed mine on groundwater.

#### 2.6.1 Groundwater Modelling

Develop a numerical groundwater flow model as per the Australian Groundwater Modelling Guidelines (2012) to model the existing groundwater environment and to model the potential impacts of proposed mining operations on groundwater receptors (as required by Section 6 of this Determination). Include an independent peer review by an experienced hydrogeologist with modelling experience as per the Australian groundwater modelling guidelines (2012).

Provide:

- the full modelling report as an appendix to the mining proposal including a plan showing the modelled potentiometric groundwater elevation contours (annotated with data points) for each aquifer
- Map of maximum extent of drawdown for each aquifer resulting from the mining operation
- Map of residual drawdown for each aquifer resulting from the mining operation post closure
- Table providing modelled drawdown impacts on each well including well depth, pump depth and water level
- Table providing modelled drawdown impacts on each water dependent ecosystem
- a summary of the modelling report in the main body of the mining proposal; and
- the final independent peer review report which must include; an assessment of whether the model is fit for purpose, verification of model inputs, the results of the review of the model against Tables 9-1 and 9-2 of the Australian groundwater modelling guidelines (National Water Commission Waterlines Report Series No. 82, June 2012), the scope of the review and details of any actions undertaken as a consequence of the findings of the review

### 2.7 Hydrology

Provide a description and map of the current drainage patterns for the application area and water catchment including:

- location of watercourses, drains and dams
- surface water catchment boundaries
- direction of drainage and discharge from the application area
- a statement describing if the application area is within an area where the water resources are prescribed under the *Natural Resources Management Act 2004*, and provide details on the current availability of water resources within the prescribed area
- a statement if the application area is within a water protection area including areas under the *River Murray Act 2003*
- groundwater – surface water interactions

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

Provide water quality data for identified watercourses, where there is potential for discharge into that watercourse from the proposed mining operation (whether intentional or not). Should identified watercourses be ephemeral, and it is not possible to collect water samples, provide a characterisation of sediments sampled from the watercourse bed upstream and downstream of the application area.

If there is potential for changing a flow regime (including change in flow volume) or discharge into these watercourses from the proposed mining operations, an assessment of the use of this water by the landowner, downstream users and water dependent ecosystems must be included.

### 2.8 Vegetation, weeds and plant pathogens

Provide:

- a description of existing flora (native and introduced) in the application area and surroundings, and display on a map
- the State conservation status and habitat value of native vegetation present in the application area
- a description of the presence of Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* listed species and ecological communities
- a description of the extent the application area and adjoining land is affected or potentially affected by pathogens and weeds, including phytophthora and broomrape
- if known, the history of land use to identify if the existing vegetation is the result of deliberate cultivation or natural regrowth arising from previous clearance.

### 2.9 Fauna

Describe the native and feral fauna that may be present in the application area noting State or Commonwealth conservation status of all species, in particular if they are species of conservation significance or feral.

### 2.10 Caves

Describe the presence of any caves in karst (limestone) areas within, or near to, the application area. A survey for the presence of caves must be performed if the application area is within, or near to, known caves or significant limestone formations. Provide a summary of the results of the survey.

### 2.11 Local community

Provide a description of (including references to the source of any data used in forming the description):

- the local economy, services and employment;
- the nearest towns or urban areas, with a summary of the demographics of the local population.

### 2.12 Landowners and land use

Provide a description of (including references to the source of any data used in forming the description):

- the land ownership for all titles within and adjacent to the application area
- the land use (historical, current and potential) for the application area and the areas potentially to be impacted by proposed mining operations
- all commercial activities undertaken in proximity to proposed operations
- the zoning as defined by relevant council (or out of council) development plans
- any policies relevant to the application area, including council wide, zone specific and sub areas within a zone
- known plans for future land use changes by other parties
- a statement as to whether the application area falls within the Murray Darling Basin
- any other interests or restrictions on the application area, including:
  - public utility easements
  - if the application is within land used for defence purposes
  - any overlapping or adjacent tenements under the *Mining Act 1971* or *Petroleum and Geothermal Energy Act 2000*
  - any applicable exempt land under Section 9 of the *Mining Act 1971*, and any waivers of exemption obtained, and/or information on the status of waivers of exemption yet to be negotiated/finalised under Section 9AA of the *Mining Act 1971*
  - the status of negotiations with Native Title holders or claimants, if the application area includes non-freehold land.

Provide information relating to the prospect of obtaining access to land required for the proposed mining operation.

### 2.13 Proximity to infrastructure and housing

Provide information and maps identifying the following within and near the application area:

- residences potentially to be impacted by the proposed mining operations
- other human infrastructure such as (but not limited to) schools, hospitals, commercial or industrial sites, roads, sheds, bores, dams, ruins, pumps, cemeteries, scenic lookouts, roads, railway lines, fences, transmission lines, gas and water pipelines, and telephone lines (both underground and above ground)
- public roads to be utilised or affected as part of proposed mining operations, including an estimate of the existing traffic movements.

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

### 2.14 Amenity

Provide a description of scenic or aesthetic values for the application area and immediate surrounds, including caves or karst features or other features of community, tourist or visitor interest.

### 2.15 Air quality

Provide a description of the existing levels of dust and contributors to air quality including odour (both natural and anthropogenic).

### 2.16 Noise

Provide a description and measurement data of the existing levels of noise and contributors to noise (both natural and anthropogenic).

### 2.17 Heritage (Aboriginal, European, geological)

Detail:

- any registered heritage sites in or adjacent to the application areas that are protected under legislation (in so far as may be permitted under the relevant legislation)
- include a statement concerning whether or not an Aboriginal cultural heritage survey has been conducted by the proponent and, if so, the results of the survey.

### 2.18 Proximity to conservation areas

Provide information on proximity to national parks and reserves, private conservation areas, Commonwealth recognised conservation areas, heritage agreement areas and geological heritage sites.

### 2.19 Pre-existing site contamination and previous disturbance

Provide information on any known existing contamination of the site and of any disturbance by previous mining operations or other activities.

## 3 DESCRIPTION OF THE PROPOSED MINING OPERATIONS

*Each of the elements listed in Sections 3.1–3.10 must be described only to the extent that they apply to the proposed mining operation. If the element (or part of the element) is not applicable to the proposed mining operation, a statement to that effect must be made and the element (or part of the element) description may be omitted.*

### 3.1 General description and maps/plans of operations

Provide:

- a summary description of all elements of the proposed mining operation, including mining, processing and waste management (include maps/plans).

#### 3.1.1 Options

Provide:

- a summary description of relevant options considered for mining, processing and mine waste management strategies, and provide justification for the chosen strategies, including a description of any elimination or substitution strategies that have been adopted to control a hazard in order to protect the environment.

### 3.2 Reserves, products and market

#### 3.2.1 Ore reserves and mineral resources

Provide:

- a statement of the current ore reserve and mineral resource estimates in the application area and a brief description of the basis of this estimate; include Australasian Joint Ore Reserves Committee (JORC) compliant reserve and resource estimates (and categories) if available
- a statement of what reserve and/or resource forms the basis for the application
- details of other known or potential ore reserves, mineral resources, historic mines or exploration targets adjacent to, or in close proximity to, the application area
- a description of the potential for other known or potential ore reserves, mineral resources, historic mines or exploration targets adjacent to, or in close proximity to, the application area to increase the life of mine

*and*

- steps that have been taken to ensure proposed mining operations will not sterilise/prevent future extraction of mineral resources.

#### 3.2.2 Production rate and products

Provide:

- a statement of the relevant commodities listed in Section 3.2.3 below that are proposed to be extracted, processed and sold, and the expected market or end use
- a statement of any other commodities present in the application area that are not proposed to be recovered for sale, and the reasons for this decision

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- a quantitative estimate of production of mine gate product(s) for the life of mine, and a schedule of the annual production of mine gate product(s)
- a statement if any extractive minerals (as defined by Section 6 of the *Mining Act 1971*) will leave the lease.

### 3.2.3 Commodities list

#### Refined metals

Cobalt; Copper; Gold; Iron; Lead; Silver; Steel/pig iron; Thorium; Zinc

#### Mineral ores and concentrates

Iron ore – hematite direct shipping ore (DSO); Iron ore – magnetite DSO; Iron ore – magnetite concentrate; Heavy mineral concentrate; Rare earth elements; Contained copper in ore, concentrate or cement; Contained gold in ore or concentrate; Contained silver in ore or concentrate; Contained lead in ore or concentrate; Contained zinc in ore or concentrate

#### Gems and semi precious stones

Amethyst; Calcite; Chrysoprase; Diamond; Jade; Opal; Quartz; Sapphire; Scholizite; Talc; Staurolite; Topaz

#### Industrial minerals

Alunite; Andalusite; Anatase; Barite; Calcrete (agricultural purposes); Celestite; Cement shale; Diamond; Dolomite (use either industrial or agricultural); Diatomite; Feldspar; Garnet; Graphite; Gypsum (use either plaster, cement or agricultural); Ilmenite; Kaolin; Kyanite; Leucoxene; Lime sand (calcareous dune sands; use either chemical, agricultural or flux); Limestone (use either chemical, agricultural, cement, flux or whiting); Magnesite; Marble (use either chemical, agricultural, cement or flux); Mica; Micaceous hematite; Monazite; Palygorskite; Peat; Phosphate; Potash; Rutile; Salt; Shell grit (use either industrial or agricultural); Silica (rocks containing mainly silica-quartzite, flint, vein quartz etc.); Silica sand (use either filter, foundry or glass); Sillimanite; Talc (use either pharmaceutical or filler); Vermiculite; Wollastonite; Xenotime; Zircon

## 3.3 Exploration activities

Provide information that details all exploration activities to be undertaken within the application area as a part of the proposed mining operation, including:

- purpose of the activities (i.e. resource drill-out or resource extension)
- types of drilling
- geophysical techniques likely to be used
- earthworks required to conduct exploration activities
- equipment required to conduct exploration activities
- rehabilitation methods for exploration works (including that not yet rehabilitated from previous tenure).

## 3.4 Mining activities

### 3.4.1 Type or types of proposed mining operation to be carried out

Provide a clear statement on the type or types of mining operation proposed to be carried out, such as:

- the mining method(s) to be adopted

### 3.4.2 Underground workings

Describe proposed underground workings, including (but not limited to):

- proposed stoping methods
- potential surface disturbance resulting from underground mining
- declines, shafts, tunnels, boreholes, ventilation intakes and exhausts
- maps, plans and cross-sections.

Where underground fill is proposed, describe:

- type of fill to be used
- chemical stability of the proposed fill
- the volume percentage of underground void to be filled
- sequence of filling
- source and proportion of fill
- maps, plans and cross-sections showing the proposed fill.

Where grouting of underground workings is proposed to control groundwater inflows describe and provide:

- the proposed grout type
- parts of the underground workings to be grouted
- information that demonstrates the effectiveness of the proposed grouting strategy including references to any mines that have used similar grouting strategies to limit groundwater into underground workings.

### 3.4.3 Material movements

Provide:

- expected life of mine (including scope for extension)

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- annual mine production rates and mine production schedule of ore and waste rock over the life of mine
- life of mine and annual strip ratios.

### 3.4.4 Use of explosives

If explosives are used, describe:

- type of explosives used on the site
- proposed timing and frequency of blasting
- size of blasts
- storage of explosives (amount, type, detailed location and method of storage).

### 3.4.5 Type of mining equipment

Provide a description of the equipment (fixed and mobile) proposed to be used in the mining operation in terms of:

- type, size and capacity of machines
- approximate number of units
- noise outputs
- exhaust outputs
- fire ignition sources.

### 3.4.6 Mine dewatering

Provide:

- full calculations of estimated inflows of groundwater, stormwater and water from any other mining activities into mine workings
- details of proposed mine dewatering infrastructure, and mine water management and disposal
- contingency measures for greater than planned water inflows into mine workings
- a mine water balance of water inflows and water outflows during operations and at mine completion (if not included in the water balance in Section 3.7.8).

### 3.4.7 Sequence of mining and rehabilitation operations

Provide the following information on the sequence of operations in both text and map form:

- description of the sequence of mining stages
- proposed sequencing of progressive and final rehabilitation, including demonstration that progressive rehabilitation has been integrated with the mining plan
- an estimation of the quantities of sulfide minerals that have the potential to generate acid or mobilise metals, or other hazardous minerals to be mined at each mining stage
- any mineral resource that may be sterilised from future mining by the proposed mining operations.

### 3.4.8 Rehabilitation strategies and timing

Describe all activities, strategies and designs relating to mine closure for rehabilitation of open pit and/or underground workings, stockpiles, explosives storage, mining equipment and mine dewatering infrastructure. Include timing of these activities and all opportunities for progressive rehabilitation. Include (but not limited to) the maximum area of land disturbed by proposed mining operations at any time, battering of mining faces and other earthworks, mine void backfilling, abandonment bunds, sealing of portals and ventilation shafts, soil management, revegetation and expected water infill rates.

## 3.5 Surface ore, mine waste handling, stockpiling and transport

### 3.5.1 Type of mobile equipment

For mobile equipment to be used in surface ore, mine waste handling and in transporting the mine product to the point of sale, describe:

- type, size and capacity of machines
- approximate number of units
- noise outputs
- exhaust outputs
- fire ignition sources

### 3.5.2 Product transport

For product transport, describe:

- destination of mine product point of sale, and proposed transport route
- estimated daily vehicle movements of product transported from the mine site to point of sale
- any designs for enclosing or sealing the truck loads for product transport

### 3.5.3 Conveyors and pipelines

Provide a description of any conveyors or pipelines to be used for transporting material to or from the mine, processing facilities and the point of sale including:

- length, size (volumes to be transported), design and type of construction and location
- the material being transported
- noise sources

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- dust sources and composition
- fire ignition sources
- maps, plans and cross-sections.

### 3.5.4 Stockpiles

Describe:

- location, size, shape and height of ore, product, subsoil and topsoil stockpiles
- method of placement
- method of stabilisation and erosion control of all stockpiles
- water movement through stockpiles

The location, maximum height and extent of all stockpiles must be shown on a map.

### 3.5.5 Rehabilitation strategies and timing

Detail all activities, strategies and designs relating to mine closure for removal, disposal and rehabilitation of material transport systems, including timing of these activities.

## 3.6 Wastes

### 3.6.1 Waste rock facilities

For waste rock facilities provide:

- the estimated tonnes and volumes of all waste rock to be stored
- the reserve and any resource or potential resource that the estimated tonnes and volumes of waste rock is based on
- the type, location, size, shape, height and method of construction of permanent and temporary waste storage facilities
- a geochemical and geotechnical assessment of the waste rock based on the geochemical and geotechnical properties determined from the analysis of representative sampling of all waste rock types to be disposed
- an assessment on the weathering and erosive potential of waste rock to be disposed
- conceptual specifications, drawings and plans for the design, construction, operation and completion of all facilities
- the method and rate of waste rock disposal
- where relevant, a description of the placement and encapsulation of waste material deemed to be hazardous, including potentially acid forming material (PAF)
- the method of stabilisation and erosion control of waste storage facilities, both during operations and post completion
- surface water runoff control on disturbed and rehabilitated areas
- a geotechnical stability assessment and a factor of safety analysis
- an assessment of seepage of liquids through the waste rock storage facilities
- strategies for the containment of any seepage that has the potential to impact the environment
- an assessment of the post completion chemical and physical stability of the structure following rehabilitation, including the expected extent of erosion
- an assessment of the source, pathway and ultimate fate of any potential mobile contaminants.

### 3.6.2 Other processing wastes

Provide:

- the volumes and composition of all solid and liquid wastes produced
- estimated volumes of waste processing water, reverse osmosis reject water, water content of solid wastes, and method of disposal or recycling
- waste water composition
- disposal and management of any hazardous material or contaminants within waste including radioactive, toxic, corrosive or flammable materials
- the source, pathway and ultimate fate of any potential mobile contaminants.

### 3.6.3 Industrial and commercial wastes

List any industrial and commercial wastes generated including, but not limited to:

- putrescible waste, including sewage
- oils and other hydrocarbons
- tyres.

For each waste type, describe the method of disposal including:

- offsite disposal
- on site waste disposal (including size, location and construction details)
- recycling (either on or offsite)
- the type, area and layout of sewage systems to be installed at the site

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- describe what, if any approvals are required for the disposal of waste.

For each type of waste, describe any potential contaminants that may be generated from onsite storage, and the ultimate fate of those contaminants.

### 3.6.4 Rehabilitation strategies and timing

Detail all activities, strategies and designs relating to mine closure, including timing of these activities and all opportunities for progressive rehabilitation of waste rock and any other waste to be left on site.

## 3.7 Supporting surface infrastructure

### 3.7.1 Access

Describe:

- access route to the proposed mining operations
- indicate if any new roads are to be constructed, or if existing roads or intersections (public and private) are to be upgraded
- transport system(s) used to and from the proposed mining operations and the estimated number of vehicle movements per day
- airport/airstrips to be constructed.

### 3.7.2 Accommodation and offices

Describe:

- number, area, size, type of construction and location of accommodation buildings, caravans or camp, and associated structures to be used on site
- state if temporary or permanent.

### 3.7.3 Public services and utilities used by the operation

Describe:

- sources of external services that are supplied to the proposed mining operations
- proposed routes for connection if any new connections to public infrastructure are required
- any existing surface infrastructure that has been and/or the extent it may be affected by the proposed mining operations.

### 3.7.4 Visual screening

Describe the type of screening, including existing or proposed vegetation (i.e. species and density of plantings).

### 3.7.5 Fuel and chemical storage

For all fuels and chemicals stored on site, detail:

- types of bulk chemicals and the volumes of each
- details on storage, bunding and containment for all chemical and fuel storage vessels.

### 3.7.6 Site security

Describe infrastructure and measures that will be adopted to prevent unauthorised access by the public, including fencing, signage etc.

### 3.7.7 Stormwater, silt control and drainage

Describe:

- location and design of silt management structures
- runoff control on disturbed and rehabilitated areas
- storage, diversion and disposal of clean water (discharge water must comply with the applicable Environment Protection Authority South Australia water quality policy)
- a whole of site stormwater balance, if not included in the water balance in Section 3.5.4.

Provide a plan showing the surface water movement for the whole mine site.

### 3.7.8 Water management

Describe how water will be managed to meet the objectives of the relevant Water Allocation Plan(s)

Provide:

- a water balance including:
  - approximate water volumes required
  - a summary of the inputs and outputs (including any proposed discharge of water from or within the proposed tenement)
  - determination of net surplus or deficit
  - process flowsheet showing all streams including stormwater management and mine dewatering

tabulated yearly water balance showing all estimated inputs and outputs for the life of mine

- a description of all water storage infrastructure, including:
  - size, capacity, layout and location of ponds/tanks

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- design and construction methods
- quality of water to be stored in each pond/tank
- minimum freeboard to be maintained.

### 3.7.9 Rehabilitation strategies and timing

Detail all activities, strategies and designs relating to mine closure for rehabilitation of supporting surface infrastructure. Provide details for timing of closure activities, including all opportunities for progressive rehabilitation.

### 3.8 Modes and hours of operation

Describe:

- the proposed operating hours for each element of the mining operation, including but not limited to:
  - underground mining; and
  - surface ore operations, waste handling, stockpiling and water management operations; and
  - ore transport; and
  - maintenance; and
  - onsite office hours.
- how the operating hours have been designed to take into consideration potential impacts on surrounding businesses and landowner(s)

The description of operating hours must detail whether the proposed mining operation will be worked on a continuous (24 hour, 7 days a week), regular periodical or campaign basis.

If the proposed elements of the mining operation are to be worked on a regular periodical basis, specify:

- proposed period(s) (daily, weekly and public holidays) to be worked
- proposed start and finish hours the site is to be worked per period.

If the proposed elements of the mining operation are to be worked on a campaign basis, specify:

- minimum hours the site is to be worked per year
- the minimum time of each campaign
- the maximum and minimum time between campaigns
- define the beginning and end of each campaign
- hours of mining operations during campaign
- days of mining operations during campaign
- determining factors for initiating and ceasing a campaign
- maximum and minimum tonnage of each campaign
- maximum and minimum tonnage of production per year.

### 3.9 Vegetation clearance

#### 3.9.1 Description of vegetation clearance

If clearing of native vegetation is proposed, a plan and description of the vegetation present in the application area must be provided, showing:

- the extent of any proposed vegetation clearance
- the likelihood of the presence of threatened flora.

### 3.10 Mine completion

#### 3.10.1 Description of mine site at completion

Provide a description of the mine site as it will be at completion after all rehabilitation and closure activities have been completed, including:

- potential land use options
- landforms
- proposed vegetation covers (including native vegetation that will not be disturbed due to proposed mining operations)
- natural contours of land not to be disturbed by proposed mining operations
- any mining infrastructure that will remain on site and will become the responsibility of the landowner
- location, description and management of waste disposal areas
- location of reshaped and rehabilitated areas showing proposed surface contours and revegetation
- mine voids
- location of stored and/or exposed PAF material and/or other hazardous materials
- expected final water level and time to reach this level, and water quality of mine voids
- location of surface water infrastructure including ponds and diversions
- representative plans and cross-sections that show:
  - pre-mining natural surface
  - emplacement areas, waste disposal areas and disturbed areas

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- final rehabilitated surface
- where relevant, backfilled and remaining underground workings
- predicted final groundwater levels
- interpreted geology including all rock types.

Provide a description of the proposed mechanism for transferring responsibility for any potential residual liability (i.e. ongoing maintenance or monitoring) subsequent to surrender of the tenement.

### 3.11 Resource inputs

#### 3.11.1 Workforce

For the proposed workforce (for all mining operations (mining, processing, waste management and supporting surface infrastructure) describe:

- how operations on the site will be managed
- number and workforce breakdown by job type
- source of employees.

#### 3.11.2 Energy sources

For the proposed energy sources and usage provide:

- estimates of total annual energy usage (from all sources, including personnel transport and ore transport to point of sale)
- expected sources of energy
- potential for efficiency gains
- amount and percentage of zero emission energy to be utilised
- equivalent annual CO<sub>2</sub> generated
- any carbon offsets proposed.

#### 3.11.3 Water sources

Provided details on the source(s) of water to be used at the mine, expected usage, including:

- expected annual water usage by source
- indicate if any water usage by source will be more than 5% of the total annual water withdrawal for that source
- percentage of water that will be recycled
- water discharge by quantity, quality and destination.
- Estimated annual water budget showing all inputs, outputs and a water budget flow diagram.

## 4 DESCRIPTION OF POTENTIAL BENEFITS

### 4.1 Social

Describe anticipated social benefits with justification where available, including:

- number of full-time employee positions that would be directly created by the proposal (not to include existing positions)
- the proportion of the workforce that would reside in the local community and the estimated impact on local employment
- the proportion of the workforce that would reside in South Australia
- any programs to target and assist Indigenous or local employment at the mine
- training to be provided to employees and potential employees
- approximate timelines for creation of the positions
- potential for local business participation, and procurement of local goods and services
- public health benefits
- tourism or recreation opportunities
- any other potential social benefits and opportunities proposed during the development of the project, operation of the proposed mine and post mine completion.

### 4.2 Economic

Describe anticipated benefits, with justification where available, for the local, regional and state economy, including:

- revenue to be generated at the mine gate
- the breakdown of capital and operating expenditures (spending in goods and services in local community, state and external to state)
- wages and other employee benefits
- potential for value adding of a mined commodity
- flow-on economic effects
- economic benefits derived from local employment
- potential to bring forward development of other mines in the area by utilising this mine's infrastructure
- approximate royalty payments and other direct state government taxes profile
- any other potential economic benefits and opportunities proposed during the development of the project, operation of the proposed mine and post mine completion.

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

### 4.3 Environmental

Describe anticipated environmental benefits with justification where available, including:

- potential environmental benefits associated with the proposal
- environmental benefits over and above rehabilitation activities to be paid or made in association with native vegetation clearance
- acquisition of new baseline environmental data.

## 5 CONSULTATION

### 5.1 Community Engagement Plan

Provide the Community Engagement Plan (CEP) that:

Includes (but not limited to) the plan for engagement on:

- the preparation of the mining lease application;
- the applicant's response to public submissions received during the statutory consultation for the mining lease application;
- the proposed mining operations for the duration of the proposed mine as described in the Mining Lease Proposal.

Sets out the purpose, objectives and parameters of engagement with the community;

Identifies all community with an interest in or likely to be affected by the proposed mining operations;

Sets out the tools and techniques that the applicant intends to use for:

- identifying community attitudes and expectations;
- providing information to the community;
- receiving feedback from the community;
- analysing community feedback and considering community concerns or expectations; and
- registering, documenting and responding to communications from members of the community; and
- outlines an action plan to commence and maintain the engagement activities.
- on the development of the proposed environmental outcomes in consultation with the owner of any land on which the mining operations are proposed to be carried out and any other person who, in the opinion of the applicant, may be directly affected by the proposed mining operations;

### 5.2 Results of Consultation

Summarise the results of the consultation that has been undertaken with any person who may be directly affected by the proposed mining operations, including:

- the results of the consultation undertaken with those identified stakeholders, including:
  - the concerns/issues raised; and
  - the response (if any) that is proposed to address those concerns.
- if any individual or group of similar affected persons were not able to be consulted, what steps were taken to consult with them; and
- a description of the steps taken to consult with the landowner and any other person who may be directly affected by the proposed mining operations on the development of the environmental outcomes proposed in Section 6.2.3.

## 6 MANAGEMENT OF ENVIRONMENTAL IMPACTS

### 6.1 Assessment of environmental impacts

#### 6.1.1 Elements of the environment

Describe the specific elements of the environment (the *environment* is defined in Section 6(4) of the *Mining Act 1971*, which includes existing or permissible land use (Section 6(4)(c))) that may reasonably be expected to be impacted by the proposed mining operation during construction, operation, and indefinitely post mine completion. Existing or permissible land use includes commercial and community business activities.

For each element of the environment identified:

- provide a description of the methods used to engage with stakeholders to gather information on the element of the environment and potential environmental receptors
- provide a summary of any issues or considerations raised by stakeholders, and any relevant legislated or recognised standards in relation to the element of the environment
- describe all potential environmental receptors including existing or permissible land use
- undertake an impact assessment of how the element could be potentially impacted by proposed mining operations (during construction, operation and post mine completion) through the provision of the information listed in the following Section 6.1.2.

#### 6.1.2 Potential impact events

Describe potential impact events associated with each phase of the proposed mining operations (construction, operation and post mine completion) and relevant to each element of the environment.

For the purpose of the impact assessment, a potential impact event is the combination of a source, a pathway and an environmental receptor.

The source, pathway and environmental receptor of each potential impact event must be described prior to the implementation of engineering or administrative control measures.

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

For each potential impact event identified in Section 6.1.2, provide:

### 6.1.2.1 Source

A description of the source of the potential impact event which alone or in combination has the potential to cause harm to an environmental receptor.

### 6.1.2.2 Pathway

A description of the potential pathway, means or route (with consideration of any natural barriers) by which an identified environmental receptor can be exposed to, or may reasonably be expected to be impacted by an identified source.

### 6.1.2.3 Environmental receptor

A description of the environmental receptors, including existing or permissible land use that may reasonably be expected to be adversely impacted by the source, taking into account the considerations for the element of the environment described under 6.1.1

### 6.1.2.4 Description of uncertainty

Describe any significant degree of uncertainty pertaining to the evaluation of sources, pathways and environmental receptors, including (but not limited to) lack of site specific information, limitations on modelling and quality of data. Describe any assumptions connected with the identified uncertainty.

So far as is relevant, identify the sensitivity to change of any assumption that has been made, including whether a change in assumption may result in a new environmental impact.

### 6.1.2.5 Confirmation of impact events

For each potential impact event provide:

- an analysis of whether a source, pathway and receptor does exist (and if not, or if it remains uncertain, provide an explanation for the conclusion)
- a description of the likely impact from the source on the environmental receptor.

## 6.2 Control measures, uncertainty assessment, statement of environmental outcomes and criteria

For each impact event confirmed in Section 6.1.2.5, the information listed in Sections 6.2.1 – 6.2.5 must be provided:

### 6.2.1 Control measures

Describe the measures proposed to manage, limit or remedy each impact event. Demonstrate that the measures proposed are commensurate with the potential impacts, achieve compliance with other applicable statutory requirements and promote progressive rehabilitation.

Control measures proposed to manage, limit or remedy groundwater impact events must be peer reviewed by a suitably qualified independent expert. The review report must assess whether the control measures proposed are likely to achieve the proposed groundwater outcome/s. The report must also include identification of any risks, assumptions and uncertainties associated with the relevant control measures.

If native vegetation is proposed to be cleared, state the estimated quantum of significant environmental benefit (SEB) to be gained in exchange for the proposed clearance and describe how the SEB will be provided.

### 6.2.2 Description of uncertainty

Describe any significant degree of uncertainty pertaining to the likely effectiveness of proposed control measures, including (but not limited to) lack of site specific information, limitations on modelling and quality of data. Describe any assumptions connected with the identified uncertainty.

So far as is relevant, identify the sensitivity to change of any assumption that has been made and assess the likelihood of an outcome not being achieved if an assumption is later found to be incorrect.

### 6.2.3 Statement of proposed environmental outcomes

Provide a statement of the proposed environmental outcome(s) (including mine completion outcomes) for each impact event confirmed in Section 6.1.2.5.

The statement of environmental outcome(s) must describe the likely consequence of the expected impact on the environment by the proposed mining operations subsequent to the implementation of the control measures described in Section 6.2.1.

For impact events where the environmental receptor is a permissible land use, the likely economic and possible consequential loss arising from the expected impact on that permissible land use must be quantified.

Environmental outcomes must meet other applicable legislative requirements.

Provide a description and evidence of the steps taken to consult with the owners of any land on which mining operations are proposed, and third parties who may be directly affected by the proposed mining operations in the development of each environmental outcome.

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

Where clearance to native vegetation is proposed, the environmental outcome must state a commitment to compliance with the *Native Vegetation Act 1991* and Native Vegetation Regulations 2003.

Mine completion outcomes must at least address the issues listed under Regulation 30(1)(d).

### 6.2.4 Draft measurement criteria

Provide a draft statement of the criteria to be adopted to measure each of the proposed environmental outcomes. The draft criteria must as far as practical, comply with Regulation 65(2)(d).

Where appropriate, recognised industry standards, codes of practice or legislative provisions from other Acts should be used as criteria.

Where native vegetation is proposed to be cleared, the criteria will include demonstration of the successful implementation of the significant environmental benefit.

### 6.2.5 Draft leading indicator criteria

As required by Regulation 65(2)(e), where there is a high level of reliance on control measures to achieve an environmental outcome, provide a draft statement of leading indicator criteria that will be used to give an early warning that a control measure may fail or be failing.

### 6.3 Assessment of economic impacts on permissible land use

The information relating to permissible land use provided in accordance with Sections 6.1 and 6.2. must be developed by a person who is suitably qualified and experienced in economic impact assessment.

Information relating to permissible land use provided in accordance with Sections 6.1 and 6.2 must be peer reviewed by a suitably qualified (experienced in economic impact assessment) independent expert. The scope of the review, the report arising from the review, and a report of any actions undertaken as a consequence of the findings of that review must be included as an appendix to the mining proposal.

## 7 FORMAT OF THE MINING PROPOSAL

Unless otherwise specified by the Director of Mines or delegate:

- five hardcopies and an electronic version of the mining proposal must be submitted; the information in all must be identical
- each page, plan or other separate sheet must include the mineral claim number(s), date of the mining proposal preparation and sequential page numbering
- The electronic version must be submitted in one single Acrobat PDF file. Microsoft WORD compatible files must be submitted if requested by the Director of Mines or delegate.

## 8 MAPS AND PLANS

Unless otherwise specified by the Director of Mines or delegate, the elements described in Sections 8.1–8.4 must be included where applicable to the proposed mining operation.

### 8.1 General requirements for maps, plans and cross-sections

All maps and plans must conform to the following standards:

- Australian Height Datum (AHD)
- state and show the relevant datum
- metric units
- title, north arrow, scale bar, text and legend
- date prepared and author
- be of appropriate resolution and scale for represented information
- be legible in both the hardcopy and electronic versions of the submission.

All cross-sections must conform to the following standards:

- Australian Height Datum (AHD)
- state and show the relevant datum
- metric units
- title, scale bar, text and legend
- date prepared and author
- be of appropriate resolution and scale for represented information
- be legible in both the hardcopy and electronic versions of the submission.

### 8.2 Location plan(s)

Provide location plan(s) of the existing environment showing:

- proposed tenement boundaries
- cadastral information
- location of existing roads, rails, fences, transmission lines, buildings and pipelines
- land titles and ownership

## Determination for a Mining Proposal for the Bird-in-Hand Gold Project

- existing surface contours
- existing vegetation
- location of watercourses, including ephemeral and permanent rivers, creeks, swamps, streams and any man-made water management structures
- location and extent of all previously disturbed areas, including those associated with previous mining
- location and extent of any adjacent conservation reserves, Aboriginal and/or European heritage sites (in so far as may be permitted by the relevant legislation) or any other significant areas.

### 8.3 Proposed mining operations plan(s)

Provide plan(s) of proposed mining operations showing

- tenement boundaries
- existing or modified surface contours
- geology within the application area, including but not limited to; location, dimensions and orientation (dip and strike), and extent of the mineral resource and ore reserve
- location of all proposed extraction areas
- location of existing ephemeral and permanent rivers, watercourses, creeks, dams and water management structures
- location and extent of all areas proposed to be disturbed from mining (including waste rock and soil/subsoil stockpiles, silt/slime dams, mine infrastructure, processing plant, waste disposal facilities and pits)
- location and extent of all areas proposed to be progressively rehabilitated during mining
- sequence of mining and rehabilitation in appropriate time intervals, or per stages (depicting progressive rehabilitation)
- final open pit and/or underground workings.

### 8.4 Vertical sections/cross-sections

Provide a series of representative cross-sections at appropriate time intervals or stages that adequately represent:

- pre-mining natural surface
- the staged profile indicating the conceptual location and shape of the active mining area, emplacement areas and rehabilitated areas
- the conceptual final rehabilitated surface
- final open pit and/or underground workings

Show where the cross-sections are oriented to the mine plan.

*In accordance with Regulation 30(3) and 49(3) of the Mining Regulations 2011 this notice will have effect from 4 April 2017*

**Greg Marshall, Director Mining Regulation**

---