REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE *ENVIRONMENT EFFECTS ACT 1978*

REFERRAL FORM

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

It will generally be useful for a proponent to discuss the preparation of a Referral with the Department of Planning and Community Development (DPCD) before submitting the Referral.

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

- Mark relevant boxes by changing the font colour of the 'cross' to black and provide additional information and explanation where requested.
- As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
- Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once DPCD is satisfied that it has been completed appropriately.
- Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:
    - a brief description of potential changes or risks to environmental assets resulting from the project;
    - available information on the likelihood and significance of such changes;
    - the sources and accuracy of this information, and associated uncertainties.
- Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
- A CD or DVD copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 2MB.** A completed form would normally be between 15 and 30 pages in length. Responses

should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.

- The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address

Minister for Planning
PO Box 500
EAST MELBOURNE VIC 3002

Couriers

Minister for Planning
Level 17, 8 Nicholson Street
EAST MELBOURNE VIC 3002

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to ees.referrals@dpcd.vic.gov.au is encouraged. This will assist the timely processing of a referral.

Figures

Tables

Appendices

PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION & LOCATION

1. Information on proponent and person making Referral

Name of Proponent:	**Jabiru Metals Limited**
Authorised person for proponent:	**Ian Blucher**
Position:	**Stockman Feasibility Study Manager**
Postal address:	**PO BOX 1114, West Perth, WA, 6872**
Email address:	iblucher@jabirumetals.com.au
Phone number:	**08 9426 8300**
Facsimile number:	**08 9426 8399**
Person who prepared Referral:	**Eric Sjerp & Simon Lee**
Position:	**Principal Constant & (former) Senior Environmental Consultant**
Organisation:	**Ethos NRM Pty Ltd**
Postal address:	**PO BOX 204, Bairnsdale, VIC, 3875**
Email address:	mailto:info@ethosnrm.com.au
Phone number:	**03 5153 0037**
Facsimile number:	**03 5153 0038**
Available industry & environmental expertise: (areas of 'in-house' expertise & consultancy firms engaged for project)	▪ **Terrestrial Ecology:** Ethos NRM Pty Ltd ▪ **Project Water Sources:** Lane Piper Pty Ltd ▪ **Traffic & Transport:** Maunsell Australia Pty Ltd ▪ **Water Quality:** Ecowise Environmental Pty Ltd ▪ **Cultural Heritage:** Environmental Resource Management Australia Pty Ltd (ERM) ▪ **Processing Plant:** Abesque Engineering & Construction Ltd ▪ **Mine Development:** Jabiru Metals Limited & Mining and Cost Engineering Pty Ltd ▪ **Fauna Investigations:** Wildlife Unlimited

2. Project – Brief Outline

Project title:

The Stockman Base Metals Project (Stockman Project)

Project location: (describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context)

The Stockman Project is a proposal to re-commission the currently closed underground Wilga Mine and simultaneously develop and mine the Currawong deposit, 4km to the north. The former was partially mined by Denehurst between 1992 and 1996. The project location is shown in Figure 2.1.

The Currawong deposit is located 581,211mE; 5,906,791mN and Wilga at 578,602mE; 5,904,358mN (Zone 55, MGA94).

Both deposits are copper-zinc-lead-silver-gold "volcanogenic massive sulphide" (VMS) deposits and are located 470km by road east of Melbourne, 30km north east of Omeo (Figure 2.1) and 19km ESE of Benambra.

Located in State Forest, the project area is identified as Exploration Licence Tenements E.L. 5045 and E.L. 5198. These tenements covered a combined area of approximately 16,693 ha. when granted and now occupy an area of 13,279 ha. (E.L. 5045 - 13,186 ha, E.L. 5198 – 92 ha.) following the compulsory second year reduction in size of E.L. 5045. The tenements are 100% owned by Jabiru Metals Limited (Jabiru).

The development proposed under this EES Referral would be undertaken on a Mining Lease, which would be of sufficient size to accommodate the proposed infrastructure and any potential extensions to the mineralisation beyond what has been identified to-date. The mining lease would supersede portions of both existing E.L.s.

Current access to the proposed mine is from Benambra via the Benambra–Limestone Road and then south on McCallums Road.

The area lies within the Upper Tambo River catchment on steep north to north-westerly facing slopes at an average elevation between 640 and 1,160m ASL.

Short project description (few sentences)**:**

The Stockman Project is based on the re-commissioning of the currently closed underground Wilga Mine and the development and mining of the adjacent Currawong deposit by standard underground methods. A processing plant would be constructed on site for the production of copper-zinc-silver (and potentially gold) concentrates and additional facilities including a tailing storage facility (TSF) and waste rock emplacement (WRE) would be developed in support of the operations.

The decommissioned Benambra TSF, which is managed by the Department of Primary Industries (DPI) would not be used for tailings disposal or affected by the Stockman Project.

Two processing options for copper-zinc-silver-gold concentrates produced by the project are under consideration:

1. Transportation to and shipping from the Port of Corio, Victoria, for sale to smelters located in South-East Asia (**Concentrate Option**). Depending on the outcome of economic and metallurgical studies, a lead concentrate may also be produced, or
2. Further processing on site by biological leaching to produce Cu and Zn metal products which are recovered by solvent extraction and electrowinning (SX/EW) (**Metal Production Option**). Silver and gold can also be recovered as by-products of this process.

The second of these two processes, which is still subject to detailed evaluation, would (if proven economically viable) result in the transport of metal cathode, oxide or carbonate products off-site for sale within Australia to downstream fabricators.

It is estimated that a total of at least 11.9 million tonnes at a grade of 1.8% copper (Cu), 3.6% zinc (Zn), 33g/t silver (Ag) and 1g/t gold (Au) would be processed over an 8 to 13 year period at a milling rate of between 1 and 1.5 million tonnes per annum (Mtpa) to produce approximately 248,000 tonnes of copper, 516,000 tonnes of zinc and 5.39 million ounces of silver contained in concentrate. Gold could also be produced in concentrate; however the quantity has yet to be determined. A total of 711,000 tonnes of copper concentrate and 672,000 tonnes of zinc concentrate would be produced by the Project. These estimates are based on Jabiru's current understanding of the project; its scale and duration may change depending on economic projections and exploration success.

Ancillary infrastructure, such as power transmission lines, water pipelines and upgrades to the road network, would also be required to support and supplement the Stockman Project.

3. Project Description

Aim/objectives of the project (what is its purpose / intended to achieve?):

Jabiru is proposing to re-commission the currently closed underground Wilga Mine and develop the Currawong area for the purpose of mining, extraction and processing of copper, zinc, lead, silver and gold (Cu-Zn-Pb-Ag-Au) ore on Crown Land within an original granted tenement area of 16,600ha, which has subsequently been reduced to 13,186ha. This area was previously subject to extensive mineral exploration, mining and processing in the 1980's and 1990's.

Exploration Licences currently exist and exploratory drilling is being conducted in line with the conditions set out in the Works Approval issued to Jabiru by DPI dated the 9th April 2008. The exploration program is not the subject of this referral.

The proposed mining operation would comprise:

1. The extraction of copper, zinc, lead, silver and gold minerals by underground mining methods;
2. Processing of the minerals by crushing, grinding and differential froth flotation to separate the economic minerals to produce copper-silver (and potentially gold) concentrate, a zinc-rich concentrate and potentially a lead concentrate (**Concentrate Option**), and
3. The transportation to and shipping of concentrates from the Port of Corio, Victoria or elsewhere on the eastern seaboard of Australia for sale to smelters located in South-East Asia, or the biological leaching of the concentrate and recovery of metals by SX/EW processes (**Metal Production Option**).

Background/rationale of project (describe the context / basis for the proposal, e.g. for siting):

The tenement E.L. 5045 was acquired through a competitive tender process (Victorian Government Invitation to Tender T301412) and was awarded to Jabiru on the 20th July 2007. As a condition to being awarded the tender, there is a minimum statutory expenditure commitment of $19.6 million to be spent over a five-year period. To meet this commitment, Jabiru has commenced an active exploration programme with the overall aim of:

- Delineating Joint Ore Reserves Committee (JORC) compliant Zn-Cu-Ag-Au resources at Wilga and Currawong, which has been completed;
- Exploring for further Zn-Cu-Ag-Au deposits;
- Successful completion of a positive mine feasibility study that would lead to a long term mining operation, and
- Pegging of a Mining Lease to allow for future mining activities.

These activities are being undertaken in accordance with the Victorian Code of Practice for Mineral Exploration, the tenement conditions relating to E.L. 5045 and other relevant statutory requirements.

Main components of the project (nature, siting & ca. dimensions; attach A4/A3 plan(s) of site layout if available):

Subject to investigation of the project alternatives discussed in Section 4 of this referral, the following is an overview of the requirements for each mine, as well as the ancillary infrastructure requirements to enable development.

Wilga Mine (Refer to Figures 3.1, 3.4 and 3.6)

- Clearing, re-levelling and extending the previous portal site to accommodate **workshops**, **hydrocarbon and waste water storages** and **electricity generation facilities**;
- Re-establish the site located approximately 250m to the northeast of the mine portal and previously used for the **short term storage of run-of-mine (ROM) ore** prior to transfer of the ore to the processing plant;
- Refurbishment of existing **tracks** to enable the construction of **mine ventilation infrastructure** or the installation **of mine water infrastructure**;
- Installation of **transportable offices**, **change rooms** and **ablutions** on a previously cleared and levelled site located approximately 300m to the north of the mine portal; and
- **De-water** the existing underground water and following **suitable treatment**, dispose of it into the new tailings storage facility to be created for the project (see below);
- Re-establish **mining positions** and commence **mining of the remaining portion of the ore body** (Figure 3.6).

Currawong Mine (Refer to Figures 3.1, 3.3 and 3.7)

- Establishment of an **access road** for the purposes of hauling ore from the mine to the processing plant. This road would partially utilise existing tracks where a suitable gradient can be achieved;
- Establish an **explosives magazine** and storage for other **classified goods**;
- Establishment of the **mine portal** through excavating a bench into the hillside and utilising derived clay and weathered material to line a **rock storage facility** extending out into the valley from this position (Figure 3.3);
- Establishment of **surface infrastructure** for the installation of **mine ventilation systems** and **mine water handling**;
- Developing an **underground decline** to be initially used for the exploration phase of the project, with all rock being disposed of into the rock storage facility;
- Depending on the results obtained from the exploration phase, proceed with **establishing access** to the ore bodies and **mining** of economic minerals (Figures 3.3 and 3.7);
- Clearing approximately 20 ha. of vegetation on the broad ridge adjacent to and west of the Currawong mine to provide for the construction of a **rock storage area** as part of the **ROM ore handling pad**, the **mineral processing plant infrastructure** (including concentrate storage and load-out facilities), **workshops**, **stores** and an **office complex;**
- Partial utilisation of the previously developed processing plant site on Waxlip Spur (previously rehabilitated) for the construction of a **diamond drill core processing and storage facility**, **emergency helipad** and **telecommunications infrastructure**, and
- Installation of **settling dams and environmental protection dam(s)** down slope of the rock repository to manage surface water quality prior to its release down stream or disposal into on-site storage.;

Tailings Storage Facilities – A proportion of the tailings produced would be disposed of underground; however there would still be a requirement for surface storage of tailings. The topography surrounding the Currawong mine and mill site provides few opportunities for the long term storage of tailings; however two potential sites at Straight Creek (immediately downstream of the existing TSF) and Teapot Creek Track (on the southern flank of an unnamed tributary of the Tambo River) have been identified which, providing appropriate environmental and geotechnical criteria can be met, may be suitable. Refer to Appendix 9 for further information.

Metal Production Option – Post-processing of concentrates would be evaluated to include producing metallic, sulphate or carbonate products, which if it can be shown to be economically viable, would require infrastructure to support this process. This infrastructure would be located on land purchased for this purpose (Figures 3.1 and 3.2) outside of the State Forest, immediately to the north of the project area and is likely to include:

- *Leach Pads* – The biological leaching of sulphide concentrates would require the flotation products to be coated onto an inert substrate and then stacked onto geomembrane lined pads to a pre-determined height. The stacks would be irrigated with solutions to promote the development of bacteria that consume sulphur and as a by-product release the contained metals into solution. The pregnant solution would then be pumped to the SX/EW plant. The barren material left in the pads would be reclaimed and the depleted concentrate washed off and processed further to recover the gold content. The barren material would then be disposed of into the TSF and/or underground as backfill to support the mined-out stope (stope fill).
- *SX/EW Infrastructure* - The leachates derived from the bio-leaching process would be processed by solvent extraction methods to recover metals such as copper and zinc into an inorganic solution. The pregnant liquor would then be treated by electro winning processes to deposit metal out onto stainless steel plates or further processed to precipitate out metal-oxides or sulphates.

Ancillary components of the project (e.g. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):

In addition to the on-site infrastructure, off-site infrastructure is required to ensure the Projects' viability and is likely to include:

Water Supply Infrastructure - Water is an essential component of the projects' processing requirements. Investigations to-date indicate that the most appropriate water supply solution would be a combination of the development of bore fields in the vicinity of Benambra and surrounds, surface

storage in farmland to the north of the proje ct area, and water so urced from ei ther the Da rtmouth or Kiewa Dams. A pipeline network for pumping of water from the source to the storage facilities or works environment would also b e required. Refer to Figur e 3.5 for location of the con ceptual wate r pipeline corridor. Project water requirements may also be partially met through the construction of water storage dams l ocated on land pu rchased to the north of th e proje ct are a (Figu re 3.2) and fro m reclaimi ng tailings water and runoff water from the TSF.

Electricity Supply Infrastructure - Studies undertaken to-date in dicate that co nnection to the State's power grid, either thoug h the Mt. Beauty to Dartmou th or Bairnsd ale to Benam bra grids (refer Figure 3.5 for con ceptual po wer transmissio n corrid ors), is ne cessary to enha nce t he proje cts' economic viability. It is l ikely that the capacity of line required would be either 66 or 133kv depending on whether the con nection is to Bairnsdale (pre dominantly over head 66kv tra nsmission) or from the Dartmouth – Mt Beauty grid (substantially 133kv subsurface). It is anticipated that onsite power generation would be undertaken by die sel and or ga s po wered generators until t he a ppropriate studi es h ave be en completed and a power line installed.

Should e conomic stu dies indicate tha t the const ruction of ne w electri city in frastructure materially impacts on the proj ects' eco nomics, consi deration would be given to maintai ning a die sel powe red generation capa city on site or tru cking comp ressed natu ral ga s to power gas-fired reci procating generators.

Site Roads - There would be a requirement to up grade a nd maintain road s within the area of E.L. 5045, and possibly the development of new tracks to enable exploration and ore extraction activities.

Transport Routes - The re are two p otential routes along which concentrates can be trucked from the mine site to the railhead at Bairnsdale;

1. Nunniong –Timbarra Rd to Buchan South, then to Bairnsdale (Eastern Route) or
2. Via Limestone Rd to Benambra, then along the Great Alpine Rd from Omeo.

Studies undertaken to-date (Appendix 6) indicate that substantial upgrade works to the Eastern Route are required such a s changes to gradi ents a nd the radius of curves, plu s u pgrading the t rafficable surface to en able yea r rou nd op eration in a safe and efficient ma nner. T he Great Alpine Rd ro ute is currently utilised by loggi ng contra ctors an d ot her heavy haula ge and was u sed fo r the transport of concentrate during the o peration of the o riginal m ine a nd i s th e p referred route fo r the tran sport o f Stockman concentrates.

Accommodation - Accommodation f or mi ne site empl oyees not resi dent in the dist rict wo uld be required and it is anticip ated that for the majori ty of these this wo uld be motel-style and located adjacent to the town ships of Benambr a, Omeo, or the mine site proper. It is likely that su ch a facility would p rovide a ccommodation for 15 0 – 1 80 p eople. De pending on staffing l evels and operational requirements, it may also be necessa ry to accomm odate a small number of employee s clo se to the operations; howeve r the numbe r of p eople li kely to be involve d and the p recise lo cation of this accommodation has not been determined.

In addition to the pro posed motel-style acco mmodation, between 10 and 15 p ermanent h ouses may need to be constructed to house senior staff preferably in the vicinity of Omeo.

Key construction activities:

The key construction activities can be divided into four stages:

1. Exploration Stage (On-going)
   - Development of access tracks and drill pads;
   - Development of water t ransport pi pe network for supply of water to expl oration drilling operations;
   - Development of core storage and core processing facilities (off-site);
   - Upgrades to the road network (where required) throughout the site.

Note that the above exploration stage activities are being undertaken in accordance with the conditions of the exploration licence and other statutory approvals, and hence are not subject to this referral. Exploration activities would be ongoing during construction.

2. Pre-d evelopment Stage
   - Re-establish access to the Wilga decline for evaluation and exploration purposes;
   - Construction of a roadway to t he decline portal (entrance) locati on, utilising in part existing tracks;
   - Development of the Currawong boxcut and portal; and
   - Construction of the first stage of the Curraw ong decline to enable further evalu ation of the

Currawong ore bodies.

3. Mining and Processing Stage (Refer also to Section 3 – Main components of the project)
   - Construction of storage and handling facilities for bulk stores and mining operation consumable supplies at the Currawong portal and at the processing plant location;
   - Construction of firebreaks;
   - Development of an electricity and water supply infrastructure;
   - Development of a communications network;
   - Continued development of the Currawong and Wilga decline access and mining positions;
   - Construction of non-sulphidic and sulphidic mined rock storages for material that is not to be processed but may be used for underground fill or road and foundation construction;
   - Construction of processing facilities, including:
     - Run-of-mine (ROM) ore storage area;
     - Milling equipment and infrastructure, including leach pads and SX/EW infrastructure (if required);
     - Transport facilities;
     - Pipelines for the transport of tailings to the TSF, and returning reclaimed water to the processing facility;
     - Bulk handling and truck loading facilities for transport of concentrates;
     - A new TSF, and
     - Clean water storage facilities.
4. Decommissioning Stage
   - Clean and make good all hazardous storage structures;
   - Removal of all building and processing infrastructure;
   - Re-contouring of tracks and working areas to natural slope;
   - Revegetation and ongoing monitoring;
   - Closure and sealing of mining openings, and
   - Closure and rehabilitation of the rock and tailings storage facilities.

Key operational activities:

Ore would be extracted from the two mines, with the Wilga ore stockpiled short term at a dedicated site adjacent to the Wilga decline portal prior to transport to the short term ROM storage area at the processing plant, and the Currajong ore transported directly from the Currawong mine to the ROM storage area at the plant site. This stockpiled material is then fed into the processing plant, which is schematically shown in Figure 3.8.

The proposed mine design is based on maximising extraction and minimising dilution of the existing Wilga and Currawong resources, minimising capital and operating expenditure and providing continuous feed at a rate of up to 1.5 million tonnes per annum (Mtpa) to the processing plant infrastructure which would be located adjacent to the Currawong mine.

Currawong Underground - Initial development of the underground mine at Currawong would require the establishment of a box-cut and decline portal, with the final design and location to be based on a geotechnical assessment of subsurface conditions. The drill core obtained for geotechnical assessment purposes would also be utilised to determine the likely acid forming potential of the rock to be excavated during mining.

The box-cut and approach road excavation contains approximately 54,000 bank cubic metres (bcm) of comprised of clays and highly weathered, non-sulphidic sedimentary and volcanic material. This inert material would be used to form the base of the rock storage area at the entrance to the decline.

Access to the orebody would be via a 5.0m wide x 5.5m high, 1 in 7 decline (downwards sloping tunnel). Development is proposed to be undertaken in two stages:

1. Establishing an exploration decline to provide access to suitable areas which would enable drilling into the zones (or Lodes) which contain economic quantities of the copper sulphide mineral chalcopyrite and the zinc sulphide mineral sphalerite. This material would be assayed and subject to metallurgical test work to assist in establishing ore reserves and processing parameters.

   In addition, the drill core would provide structural and rock mass information which would assist in the design of all underground openings, and

2. Continue d eveloping the decline a nd the sequ ential develo pment of p roduction l evels and stoping blocks. The proposed mining methods for both the Currawong and Wilga orebodies are transverse sublevel stopi ng, longitudinal sublev el stoping and overha nd cut and fill stoping supplemented with ceme nted paste fill in primar y stopes and classified tailings backfill in selected secondary stop es. The se mi ning meth ods allo w for maximum ex traction of the orebodies (d epending o n their varying geometry an d geote chnical con straints) and would be subject to ongoing review during the Feasibility Study.

Wilga Underground - Development of the Wilga mine is based on the same premise as th e Currawong mine; ho wever th e sequence would di ffer a s the mine i s already pa rtially develo ped. Preparatory works required before mining of the Wilga orebody commences include:

- Securing the high wall above the portal entrance;
- Removing rock from the existing portal position;
- Refurbishment of the portal and existing decline, and
- Pumping out the flooded workings; water derived from this process would be treated by similar methods to those ad opted by other ope rations in Victori a prior to di sposal into the decommissioned Benambra TSF or another appropriate storage facility.

Waste Rock Management - Sulphidic rock produced by the mining operation would be re-located to clay or geomembrane lin ed storage s a t the Curra wong ROM, from whi ch it would be util ised a s a coarse component in the manufacture of paste fill for use in underground support. No permanent above ground storage of sulphidic waste rock is expected to be required.

Non-sulphidic rock would be utilised to assist in the construction of the external walls of tailings storage facilities (Figures 3.1, 3.3) and may also be used in the production of mine backfill and use d to cap the existing TSF late in the mining sequence to enable a suitable cover to be established over this area.

Ore Processing - Ore delivered to the ROM would be crushed and ground and then pa ssed through two froth flotation streams to sepa rate the economic minerals to p roduce copper-silver-gold and zinc-rich concentrates and is conceptually shown in Figure 3.8. The concentrates produced by this process would either be:

- Trucked to Bairnsdale and delivered by rail transport to a suitable port for shipment to smelters located in South-East Asia (Concentrat e Option). It is ant icipated that the port to be utilised would be th e Port of Co rio, Victori a, however de pending on th e eco nomics this coul d b e elsewhere on the eastern seaboard of Australia, or
- Further tre ated by bi ological le aching and solvent extractio n a nd ele ctrowinning (SX/EW) processes to produce copper and zinc metal, sulphate or carbonate products and possibly also silver and gold (Metal Production Option).

A final deci sion on th e processing path to be a dopted would depend o n the o utcome of m etallurgical testwork and economic modelling to be carried out as part of a Bankable Feasibility Study.

Tailing Storage Facility (TSF) – Th e TSF would be constructed to A NCOLD standards with d ue consideration of geotechnical, seismic, water inflow, seepage and major rainfall risks. The likely mode of operation for the TSF would be a s a centrally thickened discharge system where a large proportion of the contained water is extracted prior to the tailings being pumped to the storage facility. Tailings are then discharged from central points within the confines of the facility, which enables further recovery of water as the waste material settles out.

By minimisin g the volum e of water discharged, th e evapo ration rate from the TSF i s minimised, enabling the reuse of this resource to be maximised.

Site Water Management - Water m ovement into, through an d from minin g activity area s woul d be managed in such a manner to avoid, as far as is practical, any impact on the aquatic environment. This would be achieved through establishing a SWMP. The SWMP would:

- Establish a s ite water balanc e model onc e t he final layout of the operational areas has been established throu gh utilisi ng long -term region al rai nfall, river flow and eva poration data in conjunction with similar observations from th e p revious o perator. Th e S WMP would be developed in a similar manner to that incorporated into the Environmental Effects Statement for the original mine (Kinhill, 1987) a nd would incor porate risk asse ssment strategies to focu s on the most likely events that would require management, and also
- Adopt and implement strategies for the:
    - Capture an d redirectio n o f run-off from operational areas into mi ll processin g water storages or the TSF;
    - Appropriate alignments of direction and camber of access roads;

- Construction of settlement dams downstream of construction areas to reduce the likelihood of run-off borne sediment entering streams;
- Siting of excavations in areas which are least prone to erosion, and the
- Release of surplus run-off water under agreed discharge and quality constraints into the main waterways in the event of unmanageable extreme weather-related inflows.

Key decommissioning activities (if applicable):

Decommissioning activities would be progressively undertaken during the life of the project (e.g. closure and re-vegetation of tracks which are no longer required) and at the end of mining and processing activities, and would include:

- Clean and make good all hazardous storage structures;
- Sealing and rehabilitation of the mine portals, ventilation shafts and access roads;
- Contouring, topsoiling and revegetating any waste storage areas not rehabilitated during the life of the operation;
- Removing infrastructure including mill, workshops and offices, plus their footings and rehabilitating the site(s);
- Using agreed closure processes, implement tailings dam closure activities, decommission the leach pads and SX/EW plant sites, rehabilitate access tracks and bore fields and continue the environmental monitoring programmes setup during the construction of these facilities for the agreed period following cessation of activities, and
- Ongoing revegetation monitoring following rehabilitation for an agreed period post-closure.

A rehabilitation plan would be developed during the project development phase. Issues identified to date for inclusion in the rehabilitation plan include:

- Flora, fauna and native vegetation management and monitoring;
- Appropriate topsoil stockpiling for seed bank viability;
- Collection of local seed for propagation and revegetation;
- Erosion control to prevent topsoil degradation and silt deposition into the local waterways;
- On-going management of fire breaks coupled with the development of fire management plans and processes;
- On-going prevention of surface and water table contamination, and
- Weed and feral animal control.

Is the project an element or stage in a larger project?

☒ No ☒ Yes If yes, please describe: the overall project strategy for delivery of all stages and components; the concept design for the overall project; and the intended scheduling of the design and development of project stages).

The project is presented in this EES Referral in its entirety, incorporating all stages of execution from development, construction, operation and closure as discussed in Section 3 and schematically shown in Table 6.1. The project described in this document is in its fully developed and operational form, with all calculations and assessments of impact being made on the full-scale end project, not on components expected to be developed in 1, 2 or 5 years.

Is the project related to any other past, current or mooted proposals in the region

☒ No ☒ Yes If yes, please identify related proposals.

The site within and around the area of E.L. 5045 has been periodically operating as a mining or exploration area since the 1970's, when the deposits were first discovered in a joint venture involving Western Mining Corporation and BP Minerals Australia Limited.

An Environmental Effects Statement was prepared for the site in November 1987 by Kinhill Engineers Pty Ltd (Kinhill 1987) on behalf of Macquarie Resources Limited and mining operations on the site subsequently commenced in October 1992 through a joint venture between Denehurst Limited and Macquarie Resources Limited. The Wilga mine was in operation until 1996 when the mine operator, Denehurst Limited, went into administration.

Due to the failure of Denehurst, mining operations ceased without the post-mining rehabilitation works required to restore the environment being undertaken. The mine was then placed under the care and maintenance of the administrator (PriceWaterhouseCoopers) and the Department of Primary Industries (DPI). Previous exploration and mining licences that have been granted in the area of E.L. 5045 are

listed in Table 3.1.

Table 3.1 - Previous Exploration and Mining Tenements in the Vicinity of E.L.s 5045 & 5198

E.L. No.	E.L. Holder	Grant Date	Expiry Date
E.L. 68	Aust Geophysical Pty Ltd	14/11/1966	10/07/1968
E.L. 114	Rio Tinto Exploration Pty Ltd	28/10/1968	25/08/1971
E.L. 156	Gippsland Minerals NL	19/01/1970	29/03/1972
E.L. 432	WMC Resources Ltd	27/10/1972	26/10/1982
E.L. 433	WMC Resources Ltd	13/10/1972	28/05/1975
E.L. 456	WMC Resources Ltd	27/10/1972	26/10/1982
E.L. 473	Jennings Mining Limited	20/07/1973	17/08/1977
E.L. 537	WMC Resources Ltd	13/12/1974	26/10/1982
E.L. 570	WMC Resources Ltd	8/04/1976	7/04/1982
E.L. 641	WMC Resources Ltd	1/03/1978	28/02/1983
E.L. 843	Freeport Australia Minerals Ltd	15/08/1980	10/02/1983
E.L. 1206	Seltrust Mining Corporation Pty Ltd	31/03/1983	15/08/1983
E.L. 1233 (ex E.L. 432)	Macquarie Resources Pty Ltd	16/09/1982	15/09/1988
E.L. 1234 (ex E.L. 456)	WMC Resources Ltd	16/09/1982	15/09/1988
E.L. 1235	Macquarie Resources Pty Ltd	16/09/1982	15/09/1988
E.L. 1236 (ex E.L. 570)	Macquarie Resources Pty Ltd	16/09/1982	15/09/1988
E.L. 1237 (ex E.L. 641)	Macquarie Resources Pty Ltd	16/09/1982	15/09/1988
E.L. 1287	Canyon Resources Pty Ltd	5/07/1983	4/07/1985
E.L. 1302	Canyon Resources Pty Ltd/ Plagolmin	5/07/1983	4/07/1985
E.L. 2368	Bendigo Gold Associates Pty Ltd	13/04/1989	13/04/1991
E.L. 3458	Macquarie Resources Pty Ltd/ Denehurst Ltd	10/08/1993	22/04/2004
M.L.1865	Rio Tinto Exploration Pty Ltd/ Denehurst Ltd	12/04/1989	11/04/2004
MIN 4279 (ex DL 1167)	Denehurst Ltd	18/05/1993	11/04/2004
MIN 4281 (ex DL 1194)	Denehurst Ltd	18/05/1993	11/04/2004

E.L. 5198 lies over the area previously occupied by the processing plant (subsequently removed) used by the Wilga mine and is adjacent to the decommissioned Benambra TSF which was the impoundment used for the tailings produced by the previous mill. Portions of E.L.s 5025 and 5198 are currently under mining lease application MINA5523.

4. Project Alternatives

Brief description of key alternatives considered to date (e.g. location, scale or design alternatives. If relevant, attach A4/A3 plans):
Brief description of key alternatives to be further investigated (if known)**:**

Table 4.1 – Stockman Project Implementation Alternatives

Activity/Action	Alternatives	Issues/Consideration	Overall assessment
Mining methods	Open cut - Currawong	Currently not economically viable: • Near surface resources not present; • Large volume of waste produced, • Metal prices not high enough.	Not to be further assessed
	Underground		• To be further assessed, • Economics not assured
Tailing storage facility location	Straight Creek	• Proximit y allows better monitoring; • Pumping distances are reduced; • Likelihood of wet cover being maintained; • Remnant Montane Swamp present.	To be further assessed
	Teapot Creek	• Pumpi ng distance increased. • Monitoring more difficult; • Final cover type unknown	• To be further assessed, • Economics not assured.
Processing facility location	Previous site	• Size, • Distance to Currawong.	
	Proposed site	• Ore haulage distance minimised; • Relatively flat area, • Adjacent to Straight Creek TSF site.	Favoured position.
Ore processing	• Conc entrate, • Biol ogical leach, • Producti on rate.	• Energ y use; • W ater use, • Econom ic outcome.	To be further assessed.
Electrical power source	• Stand alone diesel or gas generated; • Grid connection; • Ren ewable energy.	• Cost of supply; • Cost of establishing infrastructure, • Continuity of supply.	Establishing a grid connection is likely to make the project uneconomic.
Water source and storage location	• Pipi ng from Dartmouth Dam; • Piping from Kiewa Dam; • Development of deep bore fields in the vicinity of Benambra • Storage dams in cleared land to the north of the Project area.	• Surface water allocations, • Catchme nt management	Security and continuity of supply is required to assure economic success of project.
	Tributaries of Tambo within forest	No dams on the Tambo Policy.	
	Benambra TSF or the Drillers Dam on Straight Creek.	Insufficient supply available.	Will not be assessed further.
	Treated sewage effluent from Omeo or Bairnsdale;	• Pumpi ng distance, • Insufficient supply available.	Will not be assessed further.

Activity/Action	Alternatives	Issues/Consideration	Overall assessment
Access Routes	• Nunniong – Timbarra – Buchan South, • Alpine Way. (Refer Section 15 of this referral)	• Year-ro und accessibility; • Upgr ade costs. • Interaction with other users, • No of truck movements, • T raffic management.	Alpine Way (the route previously used) would be used subject to appropriate Social Impact studies.
Accommodation location and function	• Perman ent housing; • Motel style accommodation.	• Senior staff and families; • Conti nuous roster personnel; • Employees sourced in the district; • Avail ability of suitable subdivisions; • Availability of schools and medical support; • Power, water and sewage supply and disposal issues, • Lack of capacity in Benambra township infrastructure.	Likely to be a mix of: • Permanent housing in or adjacent to Omeo, and/or • Motel style adjacent to Benambra or to the north of the project area in farmland.

5. Proposed Exclusions

Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:

Current exploration activities are excluded as they have previously been approved and are already underway.

Potential upgrades to rail and port facilities for transport and export of concentrates are not proposed to be assessed at this time as the need for augmentation is unclear and would not be directly undertaken by Jabiru.

6. Project implementation

Implementing organisation (ultimately responsible for project, i.e. not contractor)**:**

Jabiru Metals Limited (Jabiru)

1205 Hay Street, West Perth, WA.

ABN: 51 060 620 751

ACN: 060 620 751

Implementation timeframe:

Exploration and Pre-Development Activity

Work on the exploration drilling phase of the proposed project has commenced under the conditions set out in the DPI issued Works Authority, received by Jabiru Metals on the 9th April 2008. The project's operating life is expected to include 8 to 13 years of active mining from the deposits, not including the lead up time for exploration and site development prior to commencement of mining activities, or the time for de commissioning once economic extractable ore is exhausted. Table 6.1 outlines the early implementation stages of the Stockman Project.

Proposed staging (if applicable):

Table 6.1 – Implementation Schedule

Activity	Year 1 2008	Year 2 2009	Year 3 2010	Year 4 2011	Year 5 2012	Year 6 2013	Year 7 2014
Exploration Drilling	→	→	→	→	→		
Scoping and Feasibility Study	→	→	→				
Planning and Approvals Process		→	→	→			
Exploration Decline				→	→		
Mine Construction					→	→	
Mill Construction and Ramp-up						→	→
Production of Concentrate							→

Mining Activity

Mining schedules, developed as part of the scoping studies undertaken by Jabiru at a conceptual rate of 1.5Mtpa show production increasing steadily in year 1 and varying between 1.1 and 1.5Mtpa for a period of at least 8 years after which the mining inventory approaches depletion and the production rate cannot be sustained, leaving year 9 as the period of mine closure. Production rates of 1Mtpa potentially extend the life of the project to 13 years.

This time frame is indicative and subject to change given exploration success and/or changed economic conditions.

7. Description of Proposed Site or Area of Investigation

Has a preferred site for the project been selected?

☐ No ☒ Yes If no, please describe area for investigation.

If yes, please describe the preferred site in the next items (if practicable).

General description of preferred site, (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site & surrounds, showing project footprint.)

Topography/Landform

The Stockman Project mine area is dominated by high elevation landscapes with steeply dissected uplands and upland plains, which are typical of the alpine areas of south-eastern Australia, with altitudes ranging from 500m ASL to in excess of 1,500m ASL. The majority of the proposed working areas within the project area range from 650m ASL to approximately 1,200m ASL.

The mining activity areas are located within the catchment of the Tambo River, on the side of ridges and spurs that border the headwaters of the river. The terrain is steep and elevated and is covered in snow for parts of the year. Slopes in the vicinity of Currawong and Wilga prospects are of the order of 15 to 25 degrees. Any water runoff directly contributes to the Tambo River, which at this location is a small, shallow waterway approximately 0.5 to 1m in width. Rainfall for the project area ranges between 900 and 1 000mm per annum, with a slightly wetter period extending from September to December (seasonal variation is based on Omeo BOM data).

Geology and Soil Types

The Currawong and Wilga massive sulphide deposits are hosted within the complexly deformed Enano Group volcanics of Silurian age located within the Limestone Creek Graben. The Limestone Creek Graben and the Wombat Creek Graben together comprise the Cowombat Rift, which is the southernmost of the Silurian basins in the Lachlan Fold Belt that is known to contain massive sulphide deposits. At project scale, the two deposits are hosted within the Gibsons Folly Formation which comprises interbedded siltstone, volcaniclastic sediments and extrusive and intrusive volcanics ranging in composition from rhyolite to basalt that are interpreted to have been emplaced in a moderate to deep subaqueous environment.

The soils derived from the host lithologies are shallow, rocky and poor in nutrients, ranging from shallow stony or organic loams to more complex friable earths, peats, brown earths and sandy duplex soils. Soil distribution is strongly controlled by geomorphology and steep topography. Sheet erosion is a significant factor for soil formation and integrity in the region, with bushfires and water runoff playing a significant role.

A distinctive characteristic of soils in the vicinity of the Wilga and Currawong deposits is the high background levels of base metals present that have been derived from the weathering of near surface mineralisation.

Elevated levels of base metals in soil were the primary tool used by Western Mining to locate all the mineralised zones in the Stockman Project area and led directly to the discovery of the Currawong and Wilga mineralisation. The maximum levels obtained for Copper (Cu), Lead (Pb), Zinc (Zn) and Arsenic (As) identified during this pre-mining exploration work are shown in Table 7.1. The levels obtained are location specific and vary with soil type, underlying geology and slope angle.

Table 7.1 – Pre-Existing Base Metals Levels in Soil: Wilga and Currawong

Location	Cu (ppm)	Pb (ppm)	Zn (ppm)	As (ppm)
Wilga	3150	1600	1580	900
Currawong	490	1470	2200	650

Drainage/Waterways

The Stockman Project mine site is located in the upper reaches of the Tambo River, which flows south from the Great Dividing Range to enter Lake King in the Gippsland Lakes system (Figure 7.1). The project area also contains Straight Creek and De Greaves Creek, and has a number of other minor, unnamed tributaries feeding into the Tambo River. Waterways within E.L. 5045 are flowing through forested country in deeply incised valleys with virtually no floodplain environments.

Named waterways also intersect the existing Bairnsdale to Benambra power line corridor and the

potential routes for the Kiewa or Dartmouth to Benambra power line routes (Ethos, 2009c).

Section 13 of this referral contains greater detail regarding drainage and waterways and other water related issues that are potentially impacted by the Stockman Project.

Vegetation

The Stockman Project mine site lies at the convergence of three separate bioregions; the Highlands Northern Fall, East Gippsland Uplands and the Victorian Alps. There are 16 DSE mapped Ecological Vegetation Classes (EVC's) within the boundary of E.L. 5045 and their conservation status is as follows:

- Ten are of Least Concern conservation status;
- Rocky Outcrop Shrubland originally described by the DSE as rare, has now been reclassified as Least Concern as a consequence of detailed fieldwork undertaken by Ethos NRM;
- Montane Grassy Woodland, Sub-alpine Wet Heathland/Sub-Alpine Grassland Mosaic and Sub-Alpine Wet Heathland are classified as vulnerable, and
- Montane Riparian Woodland and Limestone Pomaderris Shrubland are classified as endangered.

Figure 7.2 shows the distribution of Bio-regions in relation to the Stockman project area, and Figure 7.3 displays the distribution of EVC's on the basis of conservation status. Further information on the vegetation of the Stockman Project area is outlined in Section 12 of this referral.

Built Environment

No built environment exists within the project area, other than former mining and exploration access roads and tracks as discussed in Section 15 of this referral.

Site area (if known): 60 - 140 ha (hectares)

The area proposed for the processing site, Currawong and Wilga declines, ventilation shafts and water and rock storages would occupy an area of approximately 25 to 30ha. which includes re-using approximately 3ha. that was cleared for the original processing infrastructure. The construction of tailings storage facilities would require an additional 35 - 60ha.

If the biological leaching and SX/EW process option is implemented, this would occupy an additional area of approximately 50 ha. The siting and size of additional water storage impoundments has not been determined, however they are likely to be located proximal to this area if required (Figure 3.2).

Route length (for linear infrastructure) Up to 150km **and width** ……20 - 50m

Routes for water and power infrastructure have not been finalised at present and would be incorporate an assessment of economical and environmental aspects. It is not anticipated that any new linear infrastructure for the transport of concentrate would be required as the existing infrastructure is suitable for this purpose.

Current land use and development:

The area covered by E.L.s 5045 and 5198 is Crown Land, zoned as a Public Conservation and Resource Zone within the East Gippsland Planning Scheme. There are areas within the tenement that are identified as Special Protection, and Special Management Zones within the *'Forest Management Plan – East Gippsland'*, and areas specifically identified for significant flora and fauna records, or protection of specific EVC's.

There are no commercial or residential land uses in the area covered by E. L. 5045 or E.L. 5198, however the area has previously been utilised for mineral exploration and mining which resulted in the construction of a mineral processing plant on Waxlip Spur (Figure 7.4) and which subsequently was decommissioned and dismantled and the site rehabilitated. In addition, the decommissioned Benambra TSF is located immediately adjacent to E.L. 5198, both of which are surrounded by E.L. 5045.

The previous mill site is now incorporated into E.L. 5198; however the tailings dam is managed by the DPI in an area that is currently under moratorium for exploration purposes.

The existing Bairnsdale to Benambra power line passes through a mix of open farmland and wooded areas. The routes of the other two potential water and electricity infrastructure corridors pass through or are adjacent to a mix of National Park and State Forest for much of their length or would traverse open farm land and road reserves.

Description of local setting (e.g. adjoining land uses, road access, infrastructure, proximity to residences & urban centres):

The area adjacent to E.L. 5045 is predominately native vegetation, which is located within State Forest, Nature Conservation Reserve, or National Park. Areas to the north of E.L. 5045 are utilised for agricultural production, principally as grazing land, with no obvious signs of recent crop production and are generally sown to permanent or improved pasture. Cattle and minor sheep grazing occurs in the area, with sheep-based enterprises having declined due to the difficulty in maintaining economic flocks arising from problems with feral dog-related stock losses and declining terms of trade for sheep enterprises throughout the region.

The community in the vicinity of the proposed mine and mill sites, personnel village and other ancillary developments consists of the towns of Benambra, Omeo and Swifts Creek located approximately 19km WNW, 30km WSW and 34km SWW respectively of the area where the mining and milling would take place. The Omeo-Benambra-Swifts Creek townships and surrounding districts have a total population of 962 people (Omeo – 481, Benambra 250, Swifts Creek 281) (http://www.censusdata.abs.gov.au). The larger towns of Bairnsdale and Lakes Entrance form part of the wider community and are located more than100km to the south.

There are several farmhouses located along the roads leading to the main access road to the site (McCallum's Road), but none are located within 10km of the project area. In all cases, mountainous terrain is located between community members and the area in which the proposed mining and milling may take place.

Planning context (e.g. strategic planning, zoning & overlays, management plans):

East Gippsland Shire Council Planning Scheme

The proposed development of the Stockman Project is consistent with the broader economic development strategies of the East Gippsland Shire Council and with mineral development strategies for Victoria.

E.L. 5045 is principally zoned Public Conservation Resource Zone (PCRZ), with a small area of Farming Zone (FZ1). The only overlay within the boundary of E.L. 5045 is an Environmental Significance Overlay (ESO16), established for the protection of three fauna species, namely;

- Glossy Grass Skink (*Pseudemoia rawlinsoni*);
- Mountain Dragon (*Rankinia diemensis*), and
- Alpine Water Skink (*Eulamprus kosciuskoi*).

Power, Water and Road Infrastructure Zoning

The zoning and overlays which apply to the proposed off-site infrastructure routes are detailed in Appendix 11.

Forest Management Plan for Gippsland

The Stockman Project is influenced by the *'Forest Management Plan – for Gippsland'* (DSE 2004), which indicates that 19 Special Protection Zones (SPZ) and three Special Management Zones (SMZ) fall within or are adjacent to E.L. 5045 (Tables 7.2 and 7.3, Figure 7.5). In addition, the eastern boundary of E.L. 5045 abuts the Alpine National Park which is managed under the *'Alpine National Park Management Plan'* (DCE 1992).

Table 7.2 - Special Protection and Management Zones Within and Adjacent to E.L. 5045

SPZ No.	Value	Description
629	EVC Protection	Rocky Outcrop Shrubland, Wet Forest, Montane Riparian Woodland
	Old Growth Values	Heathy Dry Forest, Rocky Outcrop Shrubland, Wet Forest, Montane Dry Woodland, Montane Damp Forest, Montane Riparian Woodland, Montane Herb-rich Woodland
	VROT Flora	Purple Eyebright (*Euphrasia collina spp. muelleri*), Crested Hair-grass (*Koeleria cristata*), Spreading Knawel (*Scleranthus fasciculatus*)
	Landscape Value	Tambo River North Branch
631	VROT Flora	Snow Fescue (*Austrofestuca eriopoda*)
632	EVC Protection	Montane Riparian Thicket
633	EVC Protection	Montane Riparian Thicket
	VROT Flora	Blue-tongue Greenhood *(Pterostylis oreophila)*, Spreading Knawel *(Scleranthus fasciculatus*)
636	VROT Flora	Golden Moths Orchid *(Diuris lanceolata s.l.)*
637	VROT Flora	Strawberry Buttercup *(Ranunculus collinus)*
638	EVC Protection	Montane Riparian Thicket
639	Old Growth Values	Shrubby Dry Forest, Montane Dry Woodland, Montane Herb-rich Woodland
	Landscape Values	Tambo River South Branch
	Recreation Site	Bicentennial National Trail
640	EVC Protection	Wet Forest
	Old Growth Values	Heathy Dry Forest, Wet Forest
	VROT Flora	Fairy Bluebell *(Wahlenbergia densifolia)*
	Landscape Values	Tambo River South Branch
	Recreation Site	Bicentennial National Trail
641	EVC Protection	Wet Forest, Montane Riparian Thicket
	Old Growth Values	Heathy Dry Forest, Wet Forest, Montane Herb-rich Woodland
	Landscape Values	Tambo River South Branch
642	EVC Protection	Montane Riparian Woodland, Montane Riparian Thicket, Sub-alpine Wet Heathland
	Fauna	Masked Owl
	VROT Flora	Mountain Aciphyll *(Aciphylla simplicifolia)*, Tall Acrotriche *(Acrotriche leucocarpa),* Blue-tongue Greenhood *(Pterostylis oreophila)*, Alpine Bush-pea *(Pultenaea fasciculata)*, Strawberry Buttercup*(Ranunuculus collinus)*
	Landscape Values	Tambo River South Branch
643	VROT Flora	Tall Acrotriche *(Acrotriche leucocarpa)*
735	Old Growth Values	Heathy Dry Forest, Montane Dry Woodland, Montane Damp Forest
	Recreation Site	Bicentennial National Trail
758	EVC Protection	Sub-alpine Wet Heathland
768	EVC Protection	Montane Riparian Thicket
769	EVC Protection	Montane Riparian Woodland, Montane Riparian Thicket
770	Historic Site	New Claim Battery
771	VROT Flora	Lanky Buttons (*Leptorhynchos elongatus*)
798	VROT Flora	Marsh Leek-orchid *(Prasophyllum niphopedium)*

Table 7.3 - Special Management Zones Within and Adjacent to E.L. 5045

Special Management Zones		
SMZ No	**Value**	**Description**
635	VROT Flora	Crested Hair-grass (*Koeleria cristata*)
645	VROT Flora	Blue-tongue Greenhood *(Pterostylis oreophila)*, Spreading Knawel *(Scleranthus fasciculatus*)
783	VROT Flora	Mountain Wheat-grass *(Australopyrum velutinum)*

Local government area(s):

The proposed mining activity is located entirely within the East Gippsland Shire Council Local Government Area (LGA). Ancillary infrastructure identified in Section 5 of this document, may be sited either wholly or in part in the following Shires:

- Alpine Shire;
- Indigo Shire,
- Towong Shire, and
- Wellington Shire.

8. Existing Environment

Overview of key environmental assets/sensitivities in project area and vicinity
(cf. general description of project site/study area under section 7)**:**

Project area and environs - The key environmental assets/ sensitivities of the immediate area surrounding the two mines, processing facility, TSF and potential leach pads which comprise the Stockman Project site, located within or adjacent to E.L. 5045, are:

- ***Land*** - The geology and topography of the project site are not unique within the regional landscape, however the Marble Gully - Mt Tambo Nature Conservation Reserve to the south-west of E.L. 5045, and the Alpine National Park on the eastern boundary of E.L. 5045 are of significance. It is not anticipated that either of these areas would be impacted.
- ***Water*** - The Project site lies within the uppermost portion of the Tambo River catchment. Current baseline surveys of water, sediment chemistry and macroinvertebrates indicate that the river and tributaries in the vicinity of the project are highly variable in the composition and quality in relation to location and season. In particular, there is a well documented, naturally occurring spring located immediately downstream of the Wilga mine which discharges elevated levels of base metals into the stream bed of the Tambo River and contributes to the pH of the stream becoming strongly acidic at times of low stream flow. The effects of these natural inputs have been found to be diluted below detection by the time that this western branch of the Tambo joins the eastern branch, some 5km downstream (Chessman 1989; Hart et. al. 1992). This spring and associated heavy metal inputs to the Tambo River was in existence prior to the mining of the Wilga mine and prior to the more recent works undertaken by Jabiru on the Stockman Project.
- ***Flora and Fauna*** - The Project site is located on and adjacent to the convergence of three bioregions (Figure 7.2), with 16 different Ecological Vegetation Classes formally identified onsite.

  A total of 24 different significant fauna species have been identified as occurring within 5km of the Stockman Project site, three of which have been identified onsite by recent targeted surveys (Wildlife Unlimited, 2009)

  DSE (Biodiversity and Ecosystems Services branch) data searches revealed twenty-two rare or threatened flora species within 5 km of the project. Three of these species have been identified onsite, with a further three species of note, not previously listed for the site, identified during field surveys undertaken by Ethos NRM (Ethos NRM 2007b, 2009a).

  An EPBC Act Protected Matters search identified an additional three flora species as either the species or species habitat being likely to occur within 5km of the Stockman Project. No flora species listed in the EPBC Protected Matters search have been found onsite.
- ***Archaeological and Cultural Heritage*** - Aboriginal heritage sites are known to exist to the west and to the south of E.L. 5045. At least one European heritage site (a water wheel) is located adjacent to the western edge of E.L. 5045, well removed from any areas likely to be developed. In addition, at least two cattlemen's huts are known to exist to the north of Teapot Creek Track on private land.
- ***Aesthetics/Community*** – The site is located in a relatively isolated area with limited recreational and tourism values. The only known activities that occur over the actual project area are deer hunting, however bushwalkers utilise parts of the adjacent National Park.

  More readily accessible greater scenic opportunities are available in other parts of the surrounding region.

Wider area – The wider area in which the Stockman Project is located is defined by the Tambo River catchment which terminates at Lake King. The environmental assets and sensitivities of this wider area include:

- ***Environmental*** – Lake King forms part of the Gippsland Lakes RAMSAR wetland site.
- ***Water use*** - The Tambo River is also the primary potable water supply for the township of Swifts Creek and is a source of water for agriculture.
- ***Aesthetics/Community*** – The aesthetic values of the terrain through which the Tambo River passes and the recreational opportunities provided by the Gippsland Lakes provide tourism opportunities for both the local and wider community.

9. Land availability and control

Is the proposal on, or partly on, Crown land?

☐ No ☒ Yes If yes, please provide details.

The proposed mining and processing activities would occur within State Forest, and within the confines of the areas known as E.L. 5045 and E.L. 5198. It is anticipated that parts of E.L.s 5045 and 5198 would be converted to mining lease(s) as part of the development strategy for both deposits.

Ancillary developments, including the potential leach pads and SX/EW plant and water dams, personnel accommodation, office location, transport routes and potential infrastructure corridors are located on a mixture of private, shire and state owned and managed land.

Current land tenure (provide plan, if practicable):

E.L. 5045 was granted to Jabiru (100%) on 20th June 2007. The licence exists over Crown Land administered by the Department of Sustainability and Environment (DSE) and Parks Victoria administers the adjacent Alpine National Park. The Marble Gully - Mt. Tamboritha Nature Conservation Reserve is located ca. 1.1 km to the west of the western boundary of E.L. 5045. The land in which the Wilga and Currawong deposits are located is State Forest.

E.L. 5198 was granted to Jabiru on 24th March, 2009 after a portion of the moratorium area over the existing rehabilitated plant site and adjacent to the decommissioned Benambra TSF was lifted. E.L. 5198 is completely surrounded by E.L. 5045.

An application for a mining lease (MINA5095) over portions of E.L.5045 &E.L. 5198 has been made by Jabiru and is currently being assessed.

The freehold land purchased by Jabiru (Figure 3.3) provides vegetation off-sets and a potential location for the site of leach pads and SX/EW processing plant if this option is proceeded with, plus areas for establishing water storages

Figure 9.1 shows the distribution of Crown Land both within and surrounding the Stockman Project (E.L. 5045 & E.L.5198) where areas displayed as green are managed by the Crown.

Intended land tenure (tenure over or access to project land):

The project land is accessible to Jabiru for the proposed use through the granting of E.L. 5045 & E.L.5198. The project land would be managed by Jabiru, in consultation with the relevant State agencies (DSE and DPI), for the duration of the operations onsite. Parks Vic would be kept informed of relevant aspects of the operation by Jabiru as the eastern boundary of E. L. 5045 forms the western boundary of the Alpine National Park.

The area covered by the anticipated mining lease over the two deposits and the remaining portions of E.L. 5045 & E.L.5198 would remain under the control of the State upon decommissioning of the site by Jabiru. No proposal to obtain permanent tenure to the land would be made.

Other interests in affected land (e.g. easements, native title claims):

In relation to Native Title:

- Subdivision M of the *Native Title Act* 1993 did not apply to the granting of E.L. 5045 (Buckland 2007).
- No procedural rights, as defined by the *Native Title Act* 1993, apply to E.L. 5198 (Halligan 2009a).
- Procedural rights have been determined to apply to the mining lease application MIN5523A. (Halligan 2009b).

There are no known easements, grazing licences or other rights of access to the area of E.L. 5045 & E.L.5198, apart from the gazetted roads, which traverse the area from north to south.

10. Required approvals

State and Commonwealth approvals required for project components (if known):

The following approvals are anticipated to be required for operation of the proposed development. This list is not exhaustive, and represents the key approvals only. Any specific approvals for components of the overall development would be identified and applied for as appropriate.

- Department of Environment, Water, Heritage and the Arts (DEWHA)
  - Referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for a decision on whether the project is a 'controlled action'.
- Department of Planning and Community Development (DPCD)
  - Referral under the *Environment Effects Act 1978* for a decision on whether an Environmental Effects Statement (EES) is required.
- Department of Primary Industries (DPI)
  - Granting of a Mining Lease and approval of a work plan in accordance with the *Mineral Resources (Sustainable Development) Act 1990* (MRSD)
- Department of Sustainability and Environment (DSE)
  - Depending on the location of the water and power infrastructure, some or all of the following Acts may require approvals to be gained: *Forest Act* 1958, *Crown Land (Reserve) Act* 1978, *Land Act* 1958, *National Parks Act* 1975
  - Compliance with Victoria's 'Native Vegetation Management Framework' (including an Offset Management Plan)
  - Permits to handle wildlife under the *Wildlife Act (1975)* may be required.
  - If found onsite, and in areas not possible for avoidance, approvals may need to be sought for Consent to Destroy any listed species under the *Flora and Fauna Guarantee Act (1988)*.
- Aboriginal Affairs Victoria (AAV)
  - Approval of a Cultural Heritage Management Plan under the *Aboriginal Heritage Act 2006* for mine site-related ground disturbance activities and the installation of off-site linear infrastructure
- Environment Protection Agency (EPA)
  - Approvals would need to be sought in the form of EPA Licences for any discharge of waste from the proposed Stockman Project in accordance with the *Environment Protection Act 1970* and associated policies.
- Work Safe Victoria (WSV)
  - Statutory approvals in relation to various activities and use of plant and equipment, in accordance with the *Occupational Health and Safety Act, 1990* and associated Regulations, including those specifically related to mining and exploration-related activities (Part 5.3 Mines). In addition to mining related activities, the *Occupational Health and Safety Act 1990* also addresses issues relating to lead (Part 4.4) that may also be applicable to the Stockman Project, should a lead concentrate be produced.
- East Gippsland Shire Council (EGSC)
  - If an EES is required, the approval for use and development of the mine site would be considered through the MRSD work plan process, rather than under the *Planning and Environment Act 1987*. If an EES is not required, a planning permit would be required for mine site.
  - Planning permits under the East Gippsland Planning Scheme would be required for any construction-related activities located on Shire Controlled land.
- East Gippsland and North East Catchment Management Authorities (EGCMA & NECMA)
  - A 'Works on Waterways' permit or written authorisation from the relevant CMA is required to undertake works or activities in, on or over a designated waterway as per the *Water Act 1989*.
- Water Authorities (East Gippsland Water and Goulburn – Murray Water)
  - All groundwater bores, water pipelines, surface water storages and water allocations required by Jabiru would require licensing under the *Water Act 1989*.

Have any applications for approval been lodged?

☒ No ☒ Yes If yes, please provide details.

Applications to various approval authorities have been made to date for works relating to areas where exploration is proposed and which also include the areas where mine-site development works are proposed. These applications include:

- An application for a Mining Lease (MINA5095), and
- A referral under the Commonwealth EPBC Act is being prepared concurrently to this EES referral.

Approval agency consultation (agencies with whom the proposal has been discussed):

The principal approval agencies consulted to date are:

- DPI for Works Plans related to exploration activities and anticipated development;
- DSE for reviewing and permitting previously prepared documentation and permit applications, both for approved Works Plans, and vegetation removal and offset plans, and
- The East Gippsland Shire Council have been consulted in regards permit requirements for a range of ancillary works on Shire managed lands through out the region surrounding the Stockman Project.

Other agencies consulted:

- Environment Protection Authority Victoria (EPA);and
- The East Gippsland Shire Council have been consulted in regards permit requirements for a range of ancillary works on Shire managed lands throughout the region
- Department of the Environment, Water, Heritage and the Arts (DEWHA);
- Heritage Victoria;
- Catchment Management Authorities;
- Parks Victoria;
- Regional and local water authorities;
- Aboriginal Affairs Victoria;
- Vic Roads, and
- Regional Development Victoria (Department of Industry, Innovation and Regional Development).

PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

11. Potentially significant environmental effects

Overview of potentially significant environmental effects (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties):

The potential significant environmental effects that may arise from implementation of this project and their likely management strategies are expected to include:

Flora and fauna impacts:

- ***Vegetation removal*** - Removal of native vegetation at the processing plant, potential leach pad and SX/EW plant site and TSF sites is unavoidable given the location of a substantial portion of the project in State Forest, however the overall impact would be reduced as far as practical by appropriate siting of infrastructure and obtaining appropriate vegetation offsets. It is anticipated that the vegetation to be removed will total of 31.9 ha. and consists of:
    - 15.1 ha of Heathy Dry Forest (Least Concern), and
    - 16.8 ha of Montane Damp Forest (Least Concern)

  This area of proposed vegetation removal does not include 1.4 ha. removed during Phase 1 and 7.5 ha during Phase 2 exploration activities.
- ***Edge effects*** - Caused through fragmentation of habitat would be managed as far as practical, through not constructing new tracks and siting development away from significant areas.
- ***Risks to downstream environment*** - The project poses risks to the downstream aquatic environment due to potential impacts on water quality. These risks will be managed by a combination of high level engineering design that incorporates a range of primary and secondary safeguards, the implementation of effective operational procedures and controls, and the adherence to stringent performance standards. See also acid mine drainage and surface water quality below.

Acid mine drainage (AMD):

- ***Management practices*** - It is intended that the TSF to be constructed would meet or exceed currently accepted standards for installation and operation. In addition, it is proposed that a wetlands similar to that located at the decommissioned Benambra TSF will be constructed downstream as an additional risk management strategy
- ***Mine dewatering*** – Water derived from mine dewatering activities will be impounded on the surface at the processing site in a suitably lined dam for re-use in mining activities or in the processing facility.
- ***Temporary above ground storage of sulphidic materials*** – The ROM and associated rock storage areas will be constructed with an impervious base of either clay or geomembrane, which would limit the ability of AMD products to leach into the soil profile.

Import of phytophthera and weeds:

- ***Vehicle hygiene*** - The protocols implemented as part of the current Exploration activities will be continued for the duration of the projects' life. Weed infestation is and has been a long-term problem in the general location of the project well before the original mine was developed.

Surface water quality and hydrology:

- ***Reduction of water flow into the Tambo River*** - The temporary nature of the project will result in a reduction of flow into Straight Creek or Teapot Creek as a result of TSF construction for the period that the project is operational. The extent of this reduction has not yet been determined.
- ***Increases in sediment loads*** - Uncontrolled runoff from areas where infrastructure is developed has the potential to lead to increased suspended sediment concentrations and the deposition of sediment in the Tambo River or tributary's. This would be managed through the implementation of the proposed SWMP; in particular the appropriate siting of roads and culverts across drainage lines, plus the creation of temporary impoundments in construction areas.

- ***Potential release of contaminants*** – In addition to AMD, described above, the use of process chemicals and other hazardous materials poses a potential risk to surface water quality. Such risks will be minimised by the engineering and operational controls described previously and the implementation of the SWMP designed to prevent the uncontrolled release of site waters. The project is expected to be a net consumer of water.

Ground water:

- ***Dewatering of groundwater as a result of mining activities*** - Experience during the mining of the Wilga orebody showed that the groundwater present was principally confined to joints and fractures, with no defined aquifers present, and since the cessation of underground activities, the old workings have partially flooded. There is no visual evidence that this mining induced fluctuation in the waterta ble has impacted on vegeta tion quality. This evid ence suggests that there will be no long-t erm im pacts on the groundwater present from t he proposed activities.
- ***Deep bore fields*** – The development of deep bore fields in the vicinity of Benambra would be managed under the requirements of the *Water Act 1989*, which requires that all potential impacts on other water users be fully evaluated prior to the development of any bores proceeding.

Social /amenity:

- ***Increase of truck numbers (air and water quality / noise impacts)*** – These changes may include:
    - Interaction of concentrate trucks with normal traffic;
    - Spillage of concentrate en-route due to traffic accidents;
    - Increases in ambient noise from increases to, or changes in timing and volume of transport patterns on the Great Alpine Road;
    - Air quality changes with increased traffic numbers;
    - Air or water quality changes due to the release of dust during transport of concentrate, and
    - Potential risk of explosive or polluting incidents from the transport of chemicals and petroleum products.

  Potential impacts from increases to truck traffic would be minimised through appropriate traffic management plans, load specifications and driver training. The development of these controls would be carried out in conjunction with VicRoads.
- ***Blast vibration*** – There are no neighbours in the immediate vicinity of the project, therefore blast induced vibration would not be a significant issue.
- ***Air emissions (Processing plant)*** - There are no neighbours in the immediate vicinity of the project, therefore air emissions if they were to occur would not be a significant issue. However, the nature of the processes used to treat the ore are unlikely to produce emissions to air other than the potential for dust during crushing activities or the use of gravel roads during summer. The management of potential dust emissions would be achieved through the installation of water sprays or surface binders.
- ***Visual impacts*** - There are no neighbours in the immediate vicinity of the project, therefore there would not be significant visual impacts from the construction or operation of the plant.
- ***Expansion of social and community facilities*** – It is anticipated that expansion of the permanent population of Omeo and the presence of a drive-in drive-out workforce in the vicinity of Benambra would require increases to medical, schooling and possibly police support services.
- ***Accommodation requirements*** -The anticipated construction of 10 – 15 houses in Omeo and an accommodation village in the vicinity of Benambra would require that township power, water and sewage services are expanded or upgraded and land made available for subdivision within the township boundaries. These services are the responsibility of the EGSC and do not form part of this referral.

Waste disposal:

- ***Hydrocarbon***s – Waste oil and other hydrocarbon-based products generated through day to day activities on site would be stored appropriately prior to collection by contractors for recycling.
- ***Scrap Ste***el – Construction materials surplus to requirement would be stockpiled and then recycled.
- ***Domestic Waste*** – Effluent from toilets and showers and the like would be treated on site to a suitable standard and then re-used as part of the process water supply. An appropriately licensed contractor would remove solid waste, which cannot be recycled, from site.

Specific impacts with regard to the installation of power and waterlines are yet to be identified.

12. Native vegetation, flora and fauna

Native vegetation

Is any native vegetation likely to be cleared or otherwise affected by the project?

☐ NYD ☐ No ☒ Yes If yes, answer the following questions and attach details.

What investigation of native vegetation in the project area has been done? (briefly describe)

Numerous reports on the native vegetation present in relation to the general area now covered by the Stockman Project were undertaken prior to the adoption of '*Victoria's Native Vegetation Management – A Framework for Action*' (DNRE 2002) (see references). While these reports identify the floral communities, species and threatened species and communities present, they did not adequately quantify vegetation quality for use in calculation of offset requirements as now required by the current Victorian native vegetation legislation.

Vegetations surveys to meet the requirements of '*Victoria's Native Vegetation Management – A Framework for Action*' (DNRE 2002) have been undertaken for the proposed mine site development area as part of the activities carried out prior to commencing exploration activities and are detailed in Appendix 1 (Ethos NRM 2007a, 2007b, 2008b). Similarly, a vegetation survey of the areas likely to be cleared for the construction of mine and processing plant infrastructure has also been undertaken (Appendix 1, Ethos 2009a, b).

Mechanisms for assessing vegetation off-set requirements along potential power and water infrastructure routes are being developed by Ethos NRM in conjunction with the DSE.

What is the maximum area of native vegetation that may need to be cleared?

☐ NYD Estimated area ……200ha…….(hectares)

It is estimated that approximately 200ha may be cleared over the entire life of the proposed project (approximately 9-13 years from development to decommissioning), depending on the location of the infrastructure located off-site.

The above estimate includes the likely footprint of site-based infrastructure (ca. 60 - 140ha.) plus clearing works that may be required to either widen existing infrastructure easements or clearing associated with the establishment of new infrastructure routes. Detailed studies have yet to be undertaken on the nature, scale and location of this infrastructure.

How much of this clearing would be authorised under a Forest Management Plan or Fire Protection Plan?

☐ N/A ……10 – 15%……. ca. percent (if applicable)

It is expected that approximately 10 – 15% of the vegetation to be cleared for the Stockman Project would be undertaken as a fire management regime for protection of infrastructure, assets and personnel.

The clearing of vegetation in specific areas and aspects in relation to infrastructure onsite would be in accordance with provisions outlined in the East Gippsland Planning Scheme.

Discussions would be held with the DSE and the Country Fire Authority (CFA) in regards to appropriate wildfire protection and management protocols, and to what degree vegetation removal may need to be undertaken in accordance with a fire prevention notice under either:

- Section 65 of the *Forests Act* 1958;
- Section 41 of the *Country Fire Authority A*ct 1958, or
- Section 8 of the *Local Government Act* 1989.

Which Ecological Vegetation Classes may be affected? (if not authorised as above)

☒ NYD ☒ Preliminary/detailed assessment completed. If assessed, please list.

The EVC's present within the mine site area for each of the three bioregions, as mapped by the DSE Biodiversity Online Mapping tools that have the potential to be directly or indirectly affected are shown in Table 12.1.

Table 12.1 – EVC's Identified by the DSE Within or Adjacent to High Impact Areas

Bioregion	East Gippsland Uplands	Conservation Status	Victorian Alps	Conservation Status	Highlands – Northern Fall	Conservation Status
Heathy Dry Forest (HDF)	✓	Least Concern	✓	Least Concern	✓	Least Concern
Montane Herb Rich Woodland (MHRW)	✓	Least Concern	✓	Least Concern	✓	Least Concern
Herb Rich Foothill Forest (HRFF)	✓	Least Concern				
Montane Dry Woodland (MDW)	✓	Least Concern	✓	Least Concern	✓	Least Concern
Rocky Outcrop Shrubland (ROS)	✓	Rare			✓	Rare
Wet Forest (WF)	✓	Least Concern	✓	Least Concern		
Montane Riparian Thicket (MRT)	✓	Least Concern	✓	Least Concern		
Montane Riparian Woodland (MRW)	✓	Endangered				
Montane Dry Forest (MDF)	✓	Least Concern				
Cleared/ Severely Disturbed (CSD)	✓	Least Concern				

Ground truthing of the EVC's shown in Table 12.1 has been undertaken by Ethos NRM (Ethos, 2007b), which has resulted in some reclassification/further information regarding the EVC's previously mapped by DSE:

- There is a gross over representation of the Rocky Outcrop Shrubland (EVC 28, Rare) within the project area;
- Montane Riparian Woodland (EVC 40, Endangered) is more accurately described as Damp Forest – East Gippsland Uplands – EVC 29 (Least Concern);
- Areas of Wet Forest (EVC 30, Least Concern) are more accurately described as Montane Damp Forest (EVC 38, Least Concern);
- The EVC's of Montane Riparian Woodland and Wet Forest were not found to be present within the footprint of the proposed development, and
- Two new EVC's: Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic (East Gippsland Uplands, EVC 73, Rare) and Shrubby Dry Forest (Highlands – Northern Fall, EVC 21, Least Concern) are also present (Table 12.2).

Note - The results obtained from the ground truthing process had not been incorporated into the DSE's on-line mapping tools at the time that this Referral was compiled. To date all vegetation removed as part of the exploration activities has been of Medium Conservation Significance, the impacts and offset requirements of which are detailed in Ethos (2007a, 2009a, 2009b).

Areas of vegetation investigated and assessed by Ethos NRM for the proposed vegetation removal required by the Stockman Project is also of Medium Conservation Significance. Within the Stockman Project as a whole there are areas of High to Very High Conservation Significance, however these areas have been avoided to date.

EVC determination of supporting infrastructure routes - Preliminary desktop assessments have been made of the potential infrastructure route between Dartmouth and the Stockman mine site (Appendix 1e). No EVC assessments have been made of the remaining two potential routes.

Table 12.2 – Additional EVC's within or adjacent to High Impact Areas

Bioregion	East Gippsland Uplands	Conservation Status	Victorian Alps	Conservation Status	Highlands – Northern Fall	Conservation Status
Rocky Outcrop Shrubland/ Rocky Outcrop Herbland Mosaic	✓	Rare				
Shrubby Dry Forest					✓	Least Concern
Damp Forest			✓	Least Concern		

Have potential vegetation offsets been identified as yet?

☐ NYD ☒ Yes If yes, please briefly describe.

Offset requirements calculated to date are detailed in the reports prepared by Ethos NRM (Ethos NRM 2007a, 2007b, Appendix 1) and incorporate areas affected by both exploration and proposed mine-site development activities. At present, offset requirements for vegetation lost through exploration work within the area have been met via commitments to rehabilitate and revegetate areas of impact (as allowed in *'Victoria's Native Vegetation Management – A Framework for Action'* (DNRE 2002) and through the purchase of a separate offsite parcel of land.

The use of a suitable Crown Land property currently managed by the DSE has been suggested as potential vegetation offset management option for Jabiru for any future vegetation removal. (Note - This proposal had not been formalised at the time of preparation of this Referral). Adoption of this approach would ensure that an area of contiguous land management is available for use as an offset, leading to a better outcome than might be achieved through utilising multiple, smaller and disconnected offset sites.

The DSE has also provided verbal advice regarding their preference for Jabiru to utilise Bush Broker for identifying and securing suitable vegetation off-sets.

Vegetation off-sets for the site of the potential leach pads and SX/EW plant site had not been determined prior to the preparation of this Referral.

Other information/comments? (e.g. accuracy of information)
NYD = not yet determined

Flora and fauna

What investigations of flora and fauna in the project area have been done?

(provide overview here and attach details of method and results of any surveys for the project & describe their accuracy)

There are in excess of 50 reports prepared prior the Jabirus' acquisition of the project area, which detail studies and recommendations for the monitoring and management requirements of flora, invertebrate, macro-invertebrate aquatic and terrestrial fauna of the area covering and surrounding the Stockman Project. These documents have been compiled and are stored electronically by Jabiru (*'Jabiru Data Catalogue')*.

The observations and conclusions drawn by these earlier studies have been reviewed as part of data review and field work commissioned by Jabiru to investigate flora and fauna issues for potential impacts arising from proposed Stockman Project activities. These documents have also been considered when developing current monitoring programs for water quality sampling, and developing baseline information for aquatic fauna, the results of which would enable rapid recognition of changes in aquatic biota beyond changes considered natural for the upper Tambo River catchment. These baseline studies overlap areas previously studied as part of the EPA's river health program EPA (2002).

Current Fauna Investigations

Targeted surveys for fauna species within the Stockman Project have been undertaken as part of the base line surveying program. These surveys were conducted during late Summer-early Autumn (February-March.

The EVC types covered in the recent fauna survey (Wildlife Unlimited, 2009) of the Stockman Project area were:

- Heathy Dry Forest;
- Montane Herb-rich Woodland;
- Herb-rich Foothill Forest;
- Montane Dry Woodland;
- Rocky Outcrop Shrubland;
- Wet Forest, and
- Riparian Thicket.

The survey effort over these EVC's is shown in Table 12.3 (Appendix 8).

Table 12.3 – Fauna Survey Effort and Type

Method	Survey Effort	No of Sites
Elliot trapping	30 traps x 3 nights	12
Cage trapping	5 traps x 3 nights	2
Funnel trapping	6 traps x 3 nights	2
Harp trapping	1 – 2 nights	10
Anabat	1 night	9
Habitat search – feed trees, hollows, digs	120 minutes X 4	4
Habitat search – latrines, den sites	120 minutes x 3	2
Habitat search – tunnels	60 minutes x 4	2
Diurnal bird census	20 minutes X 16	14
Diurnal reptile search	30 minutes x 16	14
Nocturnal stream search	100 minutes x 3	3
Spotlight	30 minutes x 11	8
Nocturnal call playback	20 minutes x 7	7
Predator scat	30 minutes x 32	15+

Have any threatened or migratory species or listed communities been recorded from the local area?

☐ NYD ☐ No ☒ Yes If yes, please:

- List species/communities recorded in recent surveys and/or past observations.
- Indicate which of these have been recorded from the project site or nearby.

Fauna – A review of EPBC predicted species, the Atlas of Victorian Wildlife and the DSE's Advisory List of Threatened Fauna (including aquatic fauna) has identified 24 significant species that have been recorded or may potentially inhabit the mine site and general surrounding region.(Wildlife Unlimited, 2009). Table 12.4 indicates that there are 11 EPBC and 19 FFG listed species which have potential habitat in the Stockman Project area. There are a further five threatened fauna species included on the DSE Advisory List. The presence of appropriate habitat on site and the potential for development to impact on each species is also shown in Table 12.4. Three of the 24 significant species that have been recorded or may potentially inhabit the project site were found during recent targeted surveys (Wildlife Unlimited, 2009).

Table 12.4 – Threatened Fauna Species with Potential Habitat at the Stockman Project

Scientific / Common Name	EPBC Code	Vic Cons	FFG Code	Presence of Habitat	Potential for Impact	Found Onsite
Litoria spenceri Spotted Tree Frog	E	CE	L	Limited habitat is present along the Tambo River adjacent to the study area.	P	
Litoria littlejohni Littlejohn's Tree Frog	V	DD	L	Marginal habitat is present within the study area along the creek lines and Tambo River	P	
Heleioporus australiacus Giant Burrowing Frog	V	V	L	Recorded in 1986 along the Tambo River. Suitable habitat represented in the forest types present. Potential breeding sites along Tambo River and small creeks within the site.	P	1986
Litoria verreauxii alpina Alpine Tree Frog	V	CE	L	Marginal habitat present, however affected by fire and drought.	P	
Eulamprus kosciuskoi Alpine Water Skink		CE	L	Potential habitat in Sphagnum patches, however degraded by past human activity, heavy grazing and the prolonged drought.	U	1986
Varanus varius Lace Monitor		V		Recorded from Montane Herb-rich Woodland and likely to be widespread.	L	2009
Lathamus discolor Swift Parrot	E	E	L	Foraging habitat available – autumn, winter and spring flowering eucalypts.	P	
Rostratula australis Australian Painted Snipe	V	CE	L	No suitable habitat	U	
Ninox strenua Powerful Owl		V	L	Potential breeding habitat in the gullies and areas with large trees (such as Currawong Hill to the Drillers Dam). Likely to use as part of large home range if not solely reliant on the site. Prey species present.	P	
Tyto novaehollandiae novaehollandia Masked Owl		E	L			
Ninox connivens connivens Barking Owl		E	L			
Tyto tenebricosa tenebricosa Sooty Owl			L			
Cinclosoma punctatum Spotted Quail-thrush		NT		Recorded in 2009 & past surveys. Suitable habitat is present across the study area.	P	2009
Dasyurus maculatus maculatus Spotted-tailed Quoll	E	E	L	The habitat at the site is suitable, both in the areas of mature forest and rocky outcrops.	U	
Petrogale penicillata Brush-tailed Rock-wallaby	E	CE	L	Unlikely	U	
Potorous longipes Long-footed potoroo	E	E	L	Habitat present along creek lines and gullies.	P	
Pseudomys fumeus Smoky Mouse	E	CE	L	Habitat requirements poorly known, potentially suitable habitat present across the site.	P	
Mastacomys fuscus Broad-toothed Rat		DD		Recorded in 2009 and past surveys. Habitat present along creek lines and gullies	P	2009
Cercartetus nanus Eastern Pygmy-possum		NT		Recorded in past surveys, suitable habitat present.	L	1986
Myotis macropus Southern Myotis		NT		Foraging habitat available.	U	
Miniopterus schreibersii oceanensis Eastern Bent-wing Bat			CD	Foraging habitat available.	U	
Rhinolophus megaphyllus megaphyllus Eastern Horseshoe Bat		V	L	Foraging habitat available.	U	
Sminthopsis leucopus White-footed Dunnart		NT	L	Potential habitat present.	P	
Prototroctes maraena Australian Grayling	V		L	Potential habitat present	P	

Note: V = Vulnerable, E = Endangered, U = Unlikely, P = Possible, L = Likely

Flora – Desktop searches of the DSE database for flora species likely to be present within a 5km radius of the mine site were undertaken by Ethos NRM and found that twenty-two rare or threatened flora species were recorded (Table 12.5). The majority of these recordings occurred prior to the mining operations undertaken in the 1980's and 1990's. Three of these listed species have been identified onsite by Ethos NRM, with a further (Table 12.6) three species of note, not previously listed for the site, identified during field surveys undertaken by Ethos NRM (Ethos NRM 2007b, 2009a&b).

Only one of the DSE listed flora species (Purple Eyebright) is listed under EPBC and FFG, although this species was not found onsite (Ethos NRM 2007b, 2009a&b).

Table 12.5 – Threatened Flora Species Likely Present within 5km of the Stockman Project

Scientific Name	Common Name	EPBC Code	VIC Conserv.	FFG Code	Found Onsite
Trachymene humilis	Alpine Trachymene		r		
Myriophyllum alpinum	Alpine Water-milfoil		r		
Poa sieberiana var.	Blue-leaf Tussock-grass		k		
Pterostylis oreophila	Blue-tongue Greenhood		e		
Australopyrum retrofractum	Comb Wheat-grass		r		
Koeleria macrantha	Crested Hair-grass		r		
Juncus phaeanthus	Dark-flower Rush		r		
Polygala japonica	Dwarf Milkwort		v		
Poa clivicola	Fine-leaf Snow-grass		r		
Carex capillacea	Hair Sedge		r		
Leptorhynchos elongatus	Lanky Buttons		e		2007-08
Stylidium montanum	Montane Swamp Triggerplant		r		
Banksia canei	Mountain Banksia		r		2007-08
Pimelea pauciflora	Poison Rice-flower		r		2007-08
Euphrasia collina subsp.	Purple Eyebright	E	e	L	
Juncus falcatus	Sickle-leaf Rush		r		
Pomaderris phylicifolia	Slender Pomaderris		r		
Austrofestuca eriopoda	Snow Fescue		r		
Prostanthera phylicifolia	Spiked Mint-bush		r		
Scleranthus fasciculatus	Spreading Knawel		r		
Ophioglossum reticulatum	Stalked Adder's-tongue		r		
Olearia iodochroa	Violet Daisy-bush		r		

Status in Victoria (State)
r = Rare in Victoria but not considered otherwise threatened (the status elsewhere in Australia not being considered). This category does not necessarily imply that the plants are substantially threatened, but merely that there are relatively few known stands.
e = Endangered in Victoria: rare and at risk of disappearing from the wild state if present land use and other causal factors continue to operate. The plant's status elsewhere in Australia is not considered in this category.
v = Vulnerable in Victoria: rare, not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land use which would threaten the survival of the plant in the wild; or taxa where total populations are so low that recovery form a local natural disturbance such as drought, landslip or fire is doubtful. The plant's status elsewhere in Australia is not considered in this category.
k = Poorly known and suspected, but not definitely known, to belong to any of categories x, e, v or r within Victoria. At present accurate field distribution information is inadequate.

EPBC Listed
E – Listed under *Environmental Protection and Biodiversity Conservation Act* 1999

FFG Listed
L = Listed under the *Flora and Fauna Guarantee Act 1988*.
A = An action statement has been prepared for the management of this species

Table 12.6 – Additional Threatened Flora Species Identified Onsite at the Stockman Project

Scientific Name	Common Name	EPBC Code	VIC Conserv.	FFG Code
Grevillea rosmarinifolia ssp. rosmarinifolia	Rosemary Grevillea		r	
Grevillea victorae ssp. navilis	Kosciusko Grevillea		k	
Ranunculus victoriensis	Victorian Buttercup		r	

Status in Victoria (State)
r = Rare in Victoria but not considered otherwise threatened (the status elsewhere in Australia not being considered). This category does not necessarily imply that the plants are substantially threatened, but merely that there are relatively few known stands.

k = Poorly known and suspected, but not definitely known, to belong to any of categories x, e, v or r within Victoria. At present accurate field distribution information is inadequate

Kosciusko Grevillea (*Grevillea victorae spp. navilis*) has not been provided a State classification as yet; however given the lack of species information known in regards to lifeform, habitat requirements, and the nature of its presently limited known distribution, it is appropriate to afford the species the same 'Rare' classification as the other Grevillea found onsite (Rosemary Grevillea).

An EPBC Act Protected Matters search identified three flora species (*Euphrasia collina subsp. muelleri* Purple Eyebright; *Prasophyllum frenchii* Maroon Leek-orchid; *Thesium australe* Austral Toadflax) as either the species or species habitat being likely to occur within 5km of the Stockman Project. None of these flora species have been found onsite during recent surveys by Ethos NRM.

Electricity and Water Infrastructure Routes Threatened or Listed Communities - Preliminary desktop investigations (Appendix 1e, Tables 12.7 & 12.8) based on datasets obtained from the DSE, EPBC and other geographic GIS datasets in relation to the potential Dartmouth to Stockman power and water infrastructure route has identified that:

- There is only one threatened flora species located at one site that has been identified within a 100m buffer of the proposed infrastructure footprint, however twenty threatened flora species (a total of 30 site records) are located within a 1km wide zone along the length of the proposed route;
- Ten of the threatened flora species records exist in areas previously surveyed by Ethos NRM for other development stages of the Stockman Project;
- There are only two threatened fauna species (located at three sites) identified within the 100m buffer of proposed footprint, with six threatened fauna species (12 site records) located within a 1km zone along the length of the proposed pipeline, and
- A total of 18 different EVC's have been identified along the length of the proposed pipeline, across 3 bioregions (Ethos, 2009a), with the following distribution of conservation status:
    - 10 are *Least Concern* (86.53% of area),
    - 3 are *Depleted* (10.23% of area),
    - 2 are *Vulnerable* (1.89% of area), and
    - 3 are *Endangered* (1.35% of area.

Table 12.7 – Significant Flora Species Within 1km of Dartmouth to Stockman Project Infrastructure Route

Scientific Name	Common Name	VROT	EPBC Code	FFG Code	Recorded <100m Buffer
Trachymene humilis	Alpine Trachymene	r			
Myriophyllum alpinum	Alpine Water-milfoil	r			
Discaria pubescens	Australian Anchor Plant	r		L	
Pterostylis oreophila	Blue-tongue Greenhood	e			
Senecio distalilobatus	Distal-lobe Fireweed	r			
Nymphoides montana	Entire Marshwort	r			Yes
Carex capillacea	Hair Sedge	r			
Caladenia hildae	Honey Hood-orchid	r			
Leptorhynchos elongatus	Lanky Buttons	e			
Scirpus polystachyus	Large-head Club-sedge	r			
Stylidium montanum	Montane Swamp Triggerplant	r			
Banksia canei	Mountain Banksia	r			
Nymphoides geminata	Open Marshwort	r			
Pimelea pauciflora	Poison Rice-flower	r			
Juncus falcatus	Sickle-leaf Rush	r			
Pomaderris phylicifolia subsp. ericoides	Slender Pomaderris	r			
Austrofestuca eriopoda	Snow Fescue	r			
Scleranthus fasciculatus	Spreading Knawel	r			
Ophioglossum reticulatum	Stalked Adder's-tongue	r			
Grevillea rosmarinifolia ssp. rosmarinifolia	Rosemary Grevillea	r			

Note: - Abbreviations shown beneath Table 12.8

Table 12.8 – Significant Fauna Species Within 1km of Dartmouth to Stockman Project Infrastructure Route

Scientific Name	Common Name	VROT	EPBC Code	FFG Code	Recorded <100m Buffer
Litoria verreauxii alpina	Alpine Tree Frog	CR	VU	L	
Pseudophryne dendyi	Dendy's Toadlet	DD			Yes
Cercartetus nanus	Eastern Pygmy-possum	NT			
Pseudemoia rawlinsoni	Glossy Grass Skink	NT			
Galaxias olidus	Mountain Galaxias			L	Yes
Ninox strenua	Powerful Owl	VU		L	

Note: - VROT = Victorian Rare or Threatened species, EPBC = Environment Protection and Biodiversity Conservation Act listed species (National), FFG = Flora and Fauna Guarantee Act listed species (Victorian)

r = rare in Victoria, e = endangered in Victoria, **CR** = critically endangered , **DD** = data deficient, **NT** = near threatened, **VU** = vulnerable, L = listed

The statu s o f flora and fauna in the vicinity of th e remai ning potential infrastru cture ro utes o r the possible leach pads and SX/EW site had not been established prior to the preparation of the Referral.

If known, what threatening processes affecting these species or communities may be exacerbated by the project? (e.g. loss or fragmentation of habitats) Please describe briefly.

The thre atening pro cesses whi ch hav e the potential to occu r in or asso ciated with the Stockm an Project area are:

- Degradation of native riparian vegetation along rivers and streams;
- Habitat fragmentation through the development of infrastructure such as roads and tracks;
- Increase in sediment input into rivers and streams due to human development activities;
- Invasion of native vegetation by 'environmental weeds;
- Predation of native wildlife by introduced speci*es*.

The m anagement of these threatening processes will be via t he same mech anisms successfully employed during the expl oration activities over the project a rea. Therefore, it i s anti cipated that, with appropriate management of the mine site an d a ctivities su ch as tho se already imple mented for exploration-related activities, the im pacts arising from these p otential threatening processes would be minimal if realised.

Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?

☒ NYD ☒ No ☒ Yes If yes, please:

- List these species/communities.

Indicate which spe cies or communities could be subject to a major or extensive impact (including the loss of a g enetically imp ortant po pulation of a sp ecies liste d or nominate d for listin g). Comment o n likelihood of effects and associated uncertainties, if practicable.

Proposed Stockman Mine Site and Environs - A s earch us ing the EPBC Ac t Protected Matters search tool was undertaken for th e area in the vici nity of the prop osed Stockman mine the results of which are shown in App endix 4. T he se arch i dentified nine th reatened fa una species and th ree threatened flora spe cies as either bei ng present, or having suitabl e habitat bein g likely to occur within 5km of the Stockman Project mine site. To date, none of these listed flora species have been identified within the Stockman Project area.

Detailed fauna studies, undertaken as part of the b aseline surveying for this project, have highlighted species with potential to be affected by the project (Table 12.4). However the site does not represent the best 5 0% habitat for these species, as th ese habitat types are well represented el sewhere in Victoria and locali sed, intense disturbance of the area an d fra gmentation b y road s a nd tracks ha s occurred (Wildlife Unlimited, 2009).

Proposed Supporting Infrastructure Routes **-** Limited work (detailed above) has been undertaken on EPBC-related matters on one of the pr oposed off-site infrastruct ure routes. A n assessment for the

presence of EPBC-listed flora or fauna along the other potential routes had not commenced at the time that this Referral was prepared.

Is mitigation of potential effects on indigenous flora and fauna proposed?

☒ NYD ☒ No ☒ Yes If yes, please briefly describe.

Flora - Vegetation required to be removed as part of the development requirements for the project would be offset through the offset requirements as per '*Victoria's Native Vegetation Management – A Framework for Action*' (DNRE 2002), which are outlined in the reports prepared by Ethos NRM (Ethos NRM 2007a,b and 2009a,b).

Weed control programmes and vehicle hygiene protocols have been implemented as part of normal operating procedures during the exploration phase of this project and would continue to operate during the operation phase.

Fauna - Mitigation of potential impacts on fauna would be achieved, as far as practical by:

- Strategically siting the main infrastructure so as to avoid the loss of significant habitat, and/or
- Minimising the extent of habitat fragmentation, and
- Avoiding key microhabitat values such as large old trees or those which are hollow bearing.

Other information/comments? (e.g. accuracy of information)
NYD

13. Water Environments

Will the project require significant volumes of fresh water (e.g. > 1 Gl/yr)?

☐ NYD ☐ No ☒ Yes If yes, indicate approximate volume and likely source.

It is estimated that the net water requirement for the proposed development would be up to 1.5 GL/annum, however there is no infrastructure in the vicinity of the project area or regionally that is capable of transporting the required volume of water. Of the sources of supply listed in Table 4.1, only large, deep, ground water resources or water purchased on the open market (permanent or temporary allocations) have the potential to provide cost effective sources.

As a short term measure, water for exploration purposes can be and is being purchased through the normal market mechanisms and being trucked to site, however as the Stockman Project develops, and water demand increases, there would be requirements to develop a more permanent water delivery infrastructure. The nature and location of such infrastructure is under investigation (Section 4). Therefore only the latter two potential sources would be investigated further:

- ***Purchasing Water Allocations*** – The purchase of water allocations from the Murray – Goulburn irrigation and water supply system is a potential source of supply if the logistical issues with transporting the water can be overcome. In addition, the mechanics of this may need to be discussed with the appropriate agencies.

  Land purchased for potential infrastructure sites to the north of the project area may have the capacity for surface water storages to be developed. This option remains to be investigated further.

- ***Groundwater*** – There is no known groundwater of any significance in the immediate vicinity of either Wilga or Currawong, however the plains and valleys surrounding Omeo, Benambra and Swifts Creek host small, surficial aquifers which supply farming and grazing activities.

  At present deep, large capacity aquifers are unknown in the district and a programme aimed at establishing the presence of 'deep' water is being investigated as part of the Scoping/Pre-Feasibility Study work (Lane 2007; Seeley & Lane 2008a, Appendix 5).

Will the project discharge waste water or runoff to water environments?

☒ NYD ☐ No ☐ Yes If yes, specify types of discharges and which environments.

There is the potential for surface water runoff and snow melt events to reach waterways and minor tributaries within the project area. These flow events would be managed in such a manner that mobilisation of sediments and transport into waterways is minimised.

It is proposed that all water brought onto site for project consumption, and that generated onsite through mining processes would be contained and managed entirely onsite. No uncontrolled discharge from the site of these waters into the surrounding drainage and waterways is proposed, however naturally occurring flows may be released if they can be managed to achieve a water purity standard comparable to or exceeding that prior to entry onto the site.

Are any waterways, wetlands, estuaries or marine environments likely to be affected?

☐ NYD ☐ No ☒ Yes If yes, specify which water environments, answer the following questions and attach any relevant details.

Proposed Stockman Mine Site and Environs - There is the potential for impacts on the level of natural inflows into the Tambo River given that in flows to the project site may be managed prior to reaching the Tambo River. Although detailed water movement and modelling has not been undertaken to date, this impact is expected to be low, given the relatively limited part of the Tambo River catchment area that the Stockman Project occupies.

The construction of a Tailings Storage Facility (TSF) would require an area of up to 50ha to provide an adequate volume to service the proposed Stockman Project and studies are being undertaken into the most appropriate location for such a facility. Options being considered are to build the TSF on Straight Creek, downstream of the decommissioned Benambra TSF or adjacent to the Teapot Creek Track.

Straight Creek Tailings Storage Facility:

Construction of a TSF on Straight Creek would impact on the waterway through utilising the natural flow to provide a wet cover to the tailings and as a source of processing water if there is any surplus to this requirement. Outflows from this TSF would be managed via a spillway, in a similar manner to the existing Drillers Dam, and organic settling pond as is the case with the decommissioned Benambra TSF (Figure 3.2). Once the likely composition of any discharge and the potential volumes are known, the appropriate licences will be sought for this action.

Teapot Creek Track Tailings Storage Facility:

The proposed Teapot Creek TSF would impact on stream flows by temporarily alienating the corresponding area of the catchment covered by the facility for the duration of its operation. When the TSF is completed after processing ceases and it is sealed and rehabilitated, water collecting on this surface which is not adsorbed by the soil cover would be directed back in to the adjacent unnamed stream.

Potential leach pads and SX/EW processing infrastructure

If the processing option of producing SX/EW products is adopted, this would result in the temporary alienation of a small area of the upper reaches of the Mitta Mitta river catchment through the development of sealed pads and containment dams.

No other impacts on water environments are anticipated.

Proposed Supporting Infrastructure Routes - The potential routes for the supporting infrastructure for the Project would cross a number of waterways, however the potential impacts of this infrastructure on the likely crossing points has not been determined at the time of preparing this Referral.

It is anticipated that the potential risks that may arise on these routes would be managed through implementing *inter alia*:

- Avoidance of sensitive or high risk areas if appropriate management techniques are unable to be devised;
- Minimise the ground disturbance impact in the corridors associated with this infrastructure, e.g. by blind drilling beneath areas of concern if practical, and
- Utilise the same risk assessment principals and procedures employed at the main Stockman Project site to manage the risks identified.

Are any of these water environments likely to support threatened or migratory species?

☒ NYD ☒ No ☒ Yes If yes, specify which water environments.

Proposed Stockman Mine Site and Environs - There are three species of native fish and three species of amphibian listed as potentially being present within the area of the Stockman Project mine site area, or within waterways potentially impacted by mining activities. These species are listed in Table 13.2.

Of the six threatened fauna species potentially present in the Stockman Project mine site area, only two have been recorded in or near the area:

1. *Prototroctes maraena* - Fish population surveying undertaken between 1988 and 1995 at nine sites on up to five occasions (Campbell, 1987 and Hortle, 1991, 1995, 1996) in the vicinity of the Project area resulted in the observation of a single specimen of *Prototroctes maraena* at a site near Bindi in 1991 (Kinhill, 1992). The nearest sighting prior to this was recorded near Swifts Creek.
2. *Heleioporus australiacus* - A single specimen was recorded in 1986 by Belcher (1986) 1.6km downstream of the Wilga Weir.

It is anticipated that invertebrate sampling would commence in 2010, in conjunction with the ongoing macro-invertebrate sampling along the Tambo River. If threatened species are determined to be present, management strategies and protection plans would to be prepared to ensure appropriate responses can be put in place.

Table 13.2 – Potential Threatened Species in Stockman Water Environment

Scientific Name	Common Name	EPBC Code	FFG Code	Potential Presence Onsite
Heleioporus australiacus	Giant Burrowing Frog	VU	L	M
Litoria littlejohni	Littlejohn's Tree Frog, Heath Frog	VU	L	L
Litoria spenceri	Spotted Tree Frog	EN	L	L
Maccullochella peelii peelii	Murray Cod, Cod, Goodoo	VU	L	L
Macquaria australasica	Macquarie Perch	EN	L	L
Prototroctes maraena	Australian Grayling	VU	L	M

Note: - CR = Critically endangered, DD = Data deficient, L = Listed, V/VU = Vulnerable, E/EN = Endangered, L = Low, M = Moderate, H = High

Proposed Supporting Infrastructure Routes - No work had been undertaken on threatened or migratory species that may be associated with waterways along the proposed routes of the supporting infrastructure at the time this Referral was prepared.

Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?

☐ NYD ☐ No ☒ Yes If yes, please specify.

The Tambo River ultimately flows into Lake King in the Gippsland Lakes which are a Ramsar Convention listed wetland, located approximately 130km downstream from the Project area. At this point in time, based on Jabiru's proposed SWMP, only the unmanaged release of sediments or chemical pollutants are potential threats identified that may impact on the Tambo River or the Gippsland Lakes.

Could the project affect streamflows?

☐ NYD ☐ No ☒ Yes If yes, briefly describe implications for streamflows.

The construction of a TSF on Straight Creek would temporarily disrupt the stream flow in this area until a wet cover is achieved. Similarly, a TSF constructed in the upper reaches of a catchment on the Teapot Creek track would also temporarily disrupt stream flows until a dry cover is established at the end of its operational life and water collected from rain and snow melt are allowed to escape via an appropriate outflow channel and wetlands.

The potential development of surface water storages would disrupt stream flows in the area of the catchment involved. The potential impacts of this infrastructure on stream flows remains to be investigated.

The impact of flow volumes related to these activities has not been determined. A definitive response to this question cannot be made at this time as project water sources, and potential impacts to waterways and aquatic systems are still being investigated.

Could regional groundwater resources be affected by the project?

☐ NYD ☐ No ☒ Yes If yes, describe in what way.

Regional groundwater resources are a potential source for supply of project water demands as identified at the start of this section of this referral document.

At a local scale, there is no aquifer present in the near surface of the Currawong mineralisation, with any water present being confined to cracks and fractures in the wall rocks. An aquifer was intersected during the mining of the Wilga orebody which is related to a weathered portion of the sulphides present near surface.

Lane Piper has undertaken studies into the suitability of groundwater sources for project water demand supply, and these studies are ongoing. Preliminary results from Lane Piper's investigations in relation to potential evaluation bore holes are presented in Appendix 5.

The nature of any potential impacts on regional groundwater resources would be quantified as further investigations are carried out.

Could environmental values (beneficial uses) of water environments be affected?

☒ NYD ☐ No ☐ Yes If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies)

Given Jabiru's proposed SWMP (Section 3), the potential release of pollutants and the resultant direct or indirect impacts on waterways within the area of E.L. 5045 & E.L. 5198, is considered unlikely. Therefore the environmental values (beneficial uses) of water environments within, surrounding or downstream of the Stockman Project would not be impacted or affected.

Could aquatic, estuarine or marine ecosystems be affected by the project?

☒ NYD ☐ No ☐ Yes If yes, describe in what way.

Miller (1990) and Byrne (2000) reported that the tailings produced from the milling of Wilga ore have a high Net Acid Producing Potential (NAPP) with significant Acid Reducing Potential. In addition, where the tailings are exposed to the air, the naturally occurring ferroan dolomite present would neutralise acid generated from sulphide oxidation for a lag period of approximately 100 days after which acid may be released.

Based on these observations, it would be necessary to ensure that any waste rock used in the surfacing of tracks and roads, or on any part of the Stockman Project site where sediment mobilisation or water runoff cannot be directly controlled, does not have the potential to undergo sulphide oxidation.

Managed appropriately, this particular issue is considered to be an insignificant risk.

Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?

☒ No ☒ Yes If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.

There is the potential for the health or biodiversity of aquatic, estuarine or marine ecosystems to be affected if NAPP material comes into prolonged contact with a waterway; however with the appropriate management systems in place, this is a manageable issue and consequently, the potential for this action to affect these ecosystems is considered unlikely.

Is mitigation of potential effects on water environments proposed?

☒ NYD ☒ No ☒ Yes If yes, please briefly describe.

Mitigation of potential impacts would be managed *inter alia* through:

- The implementation of the proposed SWMP;
- Minimising the infrastructure footprint as far as practical without impacting on safe and efficient work practices;
- Avoiding, as far as is practical, working on or near the banks of waterways, and
- Avoidance of disturbance in areas identified as being prone to erosion.

Other information/comments? (e.g. accuracy of information)

Literature relating to previous environmental studies has been collated by Jabiru into a database (*'Jabiru Data Catalogue')*. The work carried out prior to the commencement of the Denehurst operation is summarised in 'The Benambra Project Wilga and Currawong Environmental Effects Statement' (Kinhill 1987a, b) and the work which formed the basis of the Austminex Feasibility Study is summarised in Austminex (2001).

In addition to mining-related activities, studies have also been undertaken in relation (*inter alia*) to:

- Water geochemistry in the region of the Wilga Spring (Chessman 1989; Hart et. al. 1992);
- Catchment water quality and biological assessments (Hart 1993; Hortle 1991, 1995, 1996; Kinhill 1987a & b, 1991, 1992);
- Groundwater monitoring and stream flows (Golders 1998; Williams 1992b);
- Aquatic environment (Campbell 1987; Campe t. al 1988,1989; Centre for Stream Ecology 1989; Dames & Moore, 2000);
- Development of an environmental management plan for the rehabilitated TSF (DPI 2007) and reviews of the post-closure environment of the site (Byrne 2000), and
- Historical soil sampling and base metals analysis.

Key findings of this previous work are:

- The water quality in Tambo River is generally high; however, it is known to undergo wide seasonal fluctuations in the vicinity of the Wilga mine developed by Denehurst, due to variable water levels and the localised impact of naturally occurring base metals pollution derived from outcropping gossans into the river system;
- Fish kills downstream from Wilga are a feature of prolonged droughts when water levels are low and the pH drops;
- The stream bed of the Tambo was choked with debris and ash following the region-wide fires in 2003;
- Prolonged drought is and has been a periodic feature of this region;
- The existing TSF was constructed as an Australian National Committee on Large Dams (ANCOLD) referable structure which requires regular monitoring of key indicators such as seepage and settlement, plus safety inspections. The issue of run-off control was addressed post-closure by the DPI's remedial construction works where the wall was raised and a spillway constructed;
- Mine water was used in the processing of ore and it is believed that no mine water was discharged to the environment during the life of the original mining operation. However, the DNRE undertook an emergency release of approximately 42,000kL of water in July and August, 1999, to prevent overtopping of the TSF dam;
- Substantial rehabilitation works were undertaken by the Victorian Government over the original mill site and TSF which involved removing all equipment and foundations at the mill and levelling the tailings dam, plus enlarging the containment wall, and
- The DPI has a comprehensive Environmental Management Plan in place for both the old mill site and the TSF

14. Landscape and Soils

Landscape

Has a preliminary landscape assessment been prepared?

☒ No ☐ Yes If yes, please attach.

Is the project to be located either within or near an area that is:

- **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**

  ☐ NYD ☐ No ☒ Yes If yes, provide plan showing footprint relative to overlay.

The main mine site area includes ESO 16 (see Section 7). The LSO's or ESO's relating to proposed infrastructure routes had not been determined at the time this referral was prepared.

- **Identified as of regional or State significance in a reputable study of landscape values?**

  ☐ NYD ☒ No ☐ Yes If yes, please specify.

- **Within or adjoining land reserved under the *National Parks Act 1975* ?**

  ☐ NYD ☐ No ☒ Yes If yes, please specify.

The eastern boundary of E.L. 5045 abuts the Alpine National Park. The proposed Dartmouth and Kiewa water and power infrastructure routes would pass through the Alpine National Park.

- **Within or adjoining other public land used for conservation or recreational purposes ?**

  ☐ NYD ☐ No ☒ Yes If yes, please specify.

E.L. 5045 and E.L. 5198, and land to the west and south of E.L. 5045 are zoned as Public Conservation Resource Zone (PCRZ as per the East Gippsland Shire Planning Scheme).

Is any clearing vegetation or alteration of landforms likely to affect landscape values?

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

Is there a potential for effects on landscape values of regional or State importance? ☐

NYD ☒ No ☐ Yes Please briefly explain response.

Is mitigation of potential landscape effects proposed?

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

Other information/comments? (e.g. accuracy of information)

Note: A preliminary landscape assessment is a specific requirement for a referral of a wind energy facility. This should provide a description of:

- The landscape character of the site and surrounding areas including landform, vegetation types and coverage, water features, any other notable features and current land use;
- The location of nearby dwellings, townships, recreation areas, major roads, above-ground utilities, tourist routes and walking tracks;
- Views to the site and to the proposed location of wind turbines from key vantage points (including views showing existing nearby dwellings and views from major roads, walking tracks and tourist routes) sufficient to give a sense of the overall site in its setting.

Soils

Is there a potential for effects on land stability, acid sulphate soils or highly erodible soils?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Land Stability/Highly Erodible Soils

Soils present at the mine site are generally skeletal and prone to creep and erosion if exposed and not secured. Mitigation would include:

- Limiting exposure;
- Limiting access by vehicles and people to such areas;
- Prompt revegetation if there is an impact, and
- Limiting/managing surface water run-off into and onto these areas.

Acid Sulphate Soil

There are no known, naturally occurring acid sulphate soils with in the Stockman Project mine area however studies by Miller (1990) and Byrne (2000) show that the tailings stored on-site as a result of previous mining activities at Wilga have a very high Nett Acid Producing Potential (NAPP) with significant Acid Reducing Potential (ARP). In addition, where the tailings are exposed to the air, the naturally occurring ferroan dolomite present would neutralise acid generated from sulphide oxidation for a lag period of approximately 100 days after which acid may be released

Are there geotechnical hazards that may either affect the project or be affected by it?

☒ NYD ☒ No ☒ Yes If yes, please briefly describe.

The steep terrain within much of E.L. 5045 has the potential to restrict access to parts of the surface due to the inability to create and manage access tracks safely.

Other than the above terrain issues, there are no other known landforms or geotechnical hazards specific to the Stockman Project area, however the identified risks attached to the proposed underground mining are:

- ***Stability of underground openings*** – Risks associated with managing the support and integrity of underground openings would be achieved through the application of proven, sound practices relating to appropriate design of openings and the implementation of ground support regimes tailored to suit the size of the opening and the ground conditions likely to be encountered. Support mechanisms such as bolting, cabling, backfilling or shotcrete would be employed as appropriate, and
- ***Stability of excavated walls*** - Surface excavations such as road cuttings and underground mine entries (boxcut and portal) require their long term stability to be managed through the implementation of standard design and excavation criteria, supplemented by support mechanisms such as bolting, cabling or shotcrete.

In both cases, the implementation of current industry best management practices, and the requirements developed by the DPI for mining operations would alleviate or minimise risks where they may occur.

The nature or presence of any geotechnically unstable sites along the proposed infrastructure routes had not been established at the time this Referral was prepared.

Other information/comments? (e.g. accuracy of information)

N/A

15. Social Environments

Is the project likely to generate significant volumes of road traffic, during construction or operation?

☒ NYD ☒ No ☒ Yes If yes, provide estimate of traffic volume(s) if practicable.

The level of potential traffic increases on the roads throughout the area is unknown at present as a detailed traffic impact study has not been undertaken. Preliminary estimates of increases in traffic on the surrounding road networks during the duration of the construction of the mine, mill and camp infrastructure are:

- An estimated increase in light vehicles trips of approximately 10 - 15 per day;
- Two return trips of a 50 person bus travelling between Omeo, Benambra and the mine site;
- A short term increase in heavy haulage vehicles to an estimated 3 to 5 per week during the construction period which is anticipated to last 18 months;

During operation of the mine, the anticipated increases to traffic volumes would be:

- An increase in light vehicles usage of approximately 5 - 10 per day;
- Two return trips of a 50 person bus travelling between Omeo, Benambra and the mine site, twice daily, and
- Approximately 20 - 25 round trips of trucks transporting concentrate, fuel (diesel or gas) and mine consumables between the mill site and Bairnsdale per day, along the Great Alpine Road, operating Monday to Saturday inclusive.

Current Knowledge and Previous Reports **-** The agencies responsible for the maintenance and upkeep of roads and tracks in the vicinity of the project are detailed in Table 15.1.

Table 15.1 - Agencies Responsible for Roads in the vicinity of the Stockman Project

Segment	Coordinating Authority	Seal Type
Benambra -Omeo	Vic Roads	Asphalt
Omeo – Bruthen - Bairnsdale	Vic Roads	Asphalt
Limestone Rd.	East Gippsland Shire	Asphalt
Limestone Rd – McCallum's Rd. (to Mine Gates)	East Gippsland Shire	Gravel/Sand
Teapot Creek Track	DSE	Sand
McCallum's Rd. to Currawong mill site.	DSE	Gravel/Sand
Wilga Rd (Currawong mill site to Wilga mine).	DSE	Gravel/Sand
McDougall's Spur Track	DSE	Gravel/Sand
Nunniong – Nunnett Roads	DSE	Gravel/Sand
Timbarra to Buchan South	East Gippsland Shire	Asphalt
Buchan South to Bruthen	East Gippsland Shire	Asphalt

All segments of road listed in Table 15.1 north of Omeo in general and Benambra in particular are potentially subject to ice and snow conditions during winter. Parts of the Nunniong – Nunnett – Timbarra roads are at elevations of 1,000 to 1,500m ASL and are subject to seasonal closure for four months of the year to prevent vehicle damage occurring and are likely to be snow covered for part of this time.

Alternative Routes - Three potential routes for transporting equipment and mining concentrate from the mine site to port or a railhead have been evaluated (Frodsham 2008; Appendix 6), i.e.:

1. The Great Alpine Road (the route the original mining operation used) to Bruthen and then to the railhead at Bairnsdale and then via rail to a Victorian port. If the railhead at Bairnsdale was not suitable, the next nearest is at Morwell, another 133km to the west;
2. To the east and then south via Nunniong Road and subsequent connections to Buchan South and then on to Bruthen (Eastern Route), or
3. To the north; through Omeo and Bright via Mt. Hotham, and then onto the Hume Highway to travel south towards Melbourne and Geelong.

The third option has not been investigated further given that it:

a) Is snow bound during winter;
b) Has extensive steep gradients either side of the alpine divide, and
c) Passes through a major tourist resort located within the Alpine National Park.

The option of road transport from Bairnsdale (or Bruthen) to a NSW port has not been considered as the Port of Eden is not believed capable of meeting Jabiru's anticipated export requirements.

Condition, Operational Issues and Upgrading Costs - The physical characteristics and operational issues relating to utilising either the Great Alpine Road or the Nunniong – Nunnett – Timbarra Road (Eastern Route) options for transporting concentrate were assessed by Frodsham (2008, Appendix 6). In summary, the principal issues highlighted relate to the gradient, physical nature, widths and likely costs to upgrade the Eastern Route whereas the current status and condition of the Great Alpine Road route is such that, apart from permitting issues, little work is required.

Transport Route Selection - Based on the findings of the Frodsham (2008) study and the issues raised in the Strength, Weaknesses, Opportunities and Threat (SWOT) analysis of Table 15.2, the Great Alpine Road route is a more favourable than the Eastern Route particularly in relation to costs.

Table 15.2 – SWOT Analysis of Transport Route Options

Route	Strengths/Opportunities	Weaknesses/Threats
Great Alpine Road	• Sealed for majority of route. • Ready access to emergency services. • No (or little) funding of maintenance of sealed portion anticipated.	• Potential for Intermittent, seasonal road closure. • High traffic numbers, increasing during various tourist seasons. • Interaction with school buses and emergency service vehicles. • Extensive community consultation required. • Proximity to Tambo River. • Restricted hours of operation, e.g. potentially only 6am – 6pm depending on community requirements.
'Eastern'	• Towns and hamlets avoided. • Low traffic volumes. • 10 – 15km shorter than the Great Alpine Road.	• Upgrading is required to meet B-Double operating requirements. • Seasonal closure, leading to restricted months of operation. • Likely high and ongoing maintenance if road is not upgraded. • Poor access to radio and telephone networks. • Poor access to emergency services.

The Great Alpine Road route option would require further assessment of the following issues:

- The potential impact on communities;
- Establishment of a maintenance cycle, costs and responsibility for gravel segments of the route in conjunction with the EGSC and the DSE, and
- Development of traffic management plan(s) in consultation with Vic Roads

Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?

☒ NYD ☒ No ☒ Yes If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected.

The remoteness of the project area and the limited number of residential dwellings surrounding it limits the potential effects on the amenity of residents from the activities of the Stockman Project (see Section 11).

Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?

☒ NYD ☒ No ☒ Yes If yes, briefly describe the hazards and possible implications.

The proposed activity may have the potential for effects on the health and safety of residents from proposed increases to transport movements throughout the region, subject to finalisation of proposed transportation routes. These exposures may include:

- Air quality changes with increased traffic numbers;
- Air or water quality changes due to the release of dust during transport of concentrate;
- Risk of explosive or polluting incidents from the transport of chemicals and petroleum products, and
- Increases in ambient noise from increases to or changes in timing and volume of transport activity throughout the region.

Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?

☐ NYD ☒ No ☐ Yes If yes, briefly describe potential effects.

Are non-residential land use activities likely to be displaced as a result of the project?

☐ NYD ☒ No ☐ Yes If yes, briefly describe the likely effects.

Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?

☐ NYD ☐ No ☒ Yes If yes, briefly describe the potential effects.

Specific impacts that this proposed development may have on the physical infrastructure of Omeo and Benambra relate to:

- The availability of land for construction of a limited number of staff houses;
- The availability and suitability of land, power, water and sewage infrastructure to support the establishment of motel style accommodation for the remaining portion of the work force which is not permanently resident in the district;
- A change in population numbers;
- A diversification of values, and
- The ability of medical and schooling facilities to cope with increased demand.

Is mitigation of potential social effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Jabiru would prepare site operational guidelines that ensure any social impacts that may be identified arising from the proposed project would be addressed. This would include aspects such as:

- Spill management plans;
- Traffic management plans;
- Limiting hours of transport operation to minimise disturbance during evening and night hours;
- Provide feedback to the community on Company activities through information booths setup at public events (such as the annual Omeo Show and the Swifts Creek Races). The booths provide an opportunity for the public to directly engage with company employees;
- Distribution of a newsletter outlining the Company's activities in the district;
- Continue providing mechanisms for public complaints to be received by Jabiru and a set policy for investigation of, and response to, complainants in the manner implemented for the exploration phase of this project;
- Making available to the community employment opportunities, either directly or indirectly to aid in supporting local community economic stability. This is a continuation of the employment policy implemented during the exploration phase of the project in which local people with the appropriate skills have been employed in support of field activities;
- Direct involvement of company employees in out of hours activities such as membership of the Country Fire Authority, Ambulance Victoria and the primary school Council, and
- In kind contributions to community based organisations or projects. Such contributions would be based on providing the best benefit to the widest cross section of community in each instance. An example of this is Jabiru's contribution of $5,000 to assist with the fitting out of a fire brigade vehicle.

Other information/comments? (e.g. accuracy of information)

Cultural heritage

Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?

☐ No If no, list any organisations that it is proposed to consult.
☒ Yes If yes, list the organisations so far consulted.

At the time of preparation of the Voluntary Cultural Heritage Management Plan (CHMP) for E.L. 5045, there was no Registered Aboriginal Party (RAP) for the area. As such, Environmental Resource Management Australia (ERM) undertook consultation with the Secretary of Aboriginal Affairs Victoria (AAV). AAV advised ERM that although there were no RAP's in place for the activity area, that they should consult with any Aboriginal organisations who had submitted an application to become a RAP with the Aboriginal Heritage Council.

There are two Aboriginal groups that claim a cultural heritage interest in the area; Nindi-Ngujarn Ngarigo Monero Aboriginal Corporation and the Yaimathang (Jaitmathang). In the absence of a RAP at the time, that the first CHMP was prepared, these groups were contacted and representatives invited to attend field surveys. Subsequent to the preparation of this CHMP, the Gunaikurnai Land and Waters Aboriginal Corporation were appointed Registered Aboriginal Party for the area immediately to the south of the main activity area. This area overlaps onto the south-western corner of E.L. 5045. (DPI 2008, http://www1.dvc.vic.gov.au/aav/heritage/registered/index.html).

The Gunaikurnai, Yaimathang (Jaitmathang) and the Dhudhoroa Waywurru Nations Aboriginal Corporation have applications for RAP status over portions of the remainder of the area.

What investigations of cultural heritage in the project area have been done?
(attach details of method and results of any surveys for the project & describe their accuracy)

Past investigations and examination of locally identified cultural heritage sites for the mine site area are shown in Table 15.3.

Table 15.3 - Archaeological Reports pertaining to the Activity area (after ERM 2008)

Author	Date	Location in relation to current activity area	Description of Works	Results
du Cros, H.	1987	Area surveyed lies immediately to the west of the southern aspect of the current activity area and extends 5 kms to Souter's Block.	An archaeological survey of two mine sites and associated developments near Benambra, Victoria.	11 sites (181 artefacts) associated with river flats and open valley plains were identified. These sites were a mix of scatters and isolated finds composed of stone artefacts. Recommended archaeological test pitting in development areas.
Lance, A.	1988	Area surveyed includes the current activity area, but was restricted to access roads and proposed construction sites for mine facilities.	Further archaeological studies of a mining development, near Benambra, Victoria.	One site identified (artefact scatter with four artefacts comprising of two quartz flakes, one quartz core and one meta-sedimentary flake). Found on a low ridge beside McLean Creek, a tributary creek of the Tambo River.
McNiven, I.	1996	Mt. Pendergast survey area is 12.5 kms north east of the current activity area. Gibson's Folly survey area is within the current activity area.	Telstra radio tower sites (northeast Victoria). Mt. Pendergast and Gibsons Folly: Archaeological Survey and Cultural Heritage Assessment.	One isolated find in the middle of the road leading up to the Mt. Pendergast tower site. No finds were identified at the Gibson's Folly tower site.

Examination of maps available through the Aboriginal Affairs website detailing Areas of Cultural Heritage Sensitivity in Victoria as defined under the *Aboriginal Heritage Act 2006* and specified in Division 3 of Part 2, *Aboriginal Heritage Regulations 2007* shows that the areas of proposed high-impact activities fall in part within a 200 m wide zone along the Tambo River and its tributary drainage network which are areas of potential cultural sensitivity. The overlapping nature of the proposed works into previously undisturbed area requires that a Cultural Heritage Management Plan (CHMP) be prepared.

Prior to Jabiru being granted the lease for E.L. 5045, previous exploration and mining activities in the areas proposed for high impact activities by the Stockman Project has resulted in significant surface disturbance in all areas where it is planned to drill or undertake remedial earthworks. Studies undertaken by previous operators had located a number of archaeological sites of minor significance outside of the current work plan area and although the area concerned has been substantially disturbed, voluntary Cultural Heritage Management Plans have been prepared for Jabiru by Environmental and Resources Management Australia (ERM 2008, Appendix 7).

ERM undertook desktop studies and field surveys in consultation with appropriate cultural heritage advisors and indigenous representatives and has determined that there are no oral histories relating to, or archaeological sites present, in the work plan area.

Is any Aboriginal cultural heritage known from the project area?

☒ NYD ☒ No ☒ Yes If yes, briefly describe:

- Any sites listed on the AAV Site Register
- Sites or areas of sensitivity recorded in recent surveys from the project site or nearby
- Sites or areas of sensitivity identified by representatives of Indigenous organisations

The Site Registry of Aboriginal Affairs Victoria has recorded a total of 26 Aboriginal archaeological sites within an area of 5km surrounding the mine site. No Aboriginal archaeological sites have been located within 2km of the proposed mining activity areas. Most of the sites previously recorded are located at Souter's Block to the west of the activity areas and to the north near the source of the Tambo River.

The low number of sites within 2km of the mining activity area may reflect a lack of previous heritage studies being carried out in the area rather than a lack of sites, as most of the previous heritage studies have been focused to the west and north of the Tambo River.

Half the previously recorded Aboriginal archaeological sites are flaked stone artefact scatters with the other half being isolated finds. Some of these isolated finds may in fact be part of the same site complex, but without further analysis this remains unresolved. One site, Bindi Station (AAV 8423-0014), is recorded as being an 'earth feature', however the site card makes no reference to this, instead describing an artefact scatter.

In addition to the artefact scatters, a small number of quarries and one burial have been recorded for the surrounding district (50km radius), but have not been included in the report prepared by ERM (ERM 2008). A summary of previously identified sites in the locality is shown in Table 15.4.

The presence or nature of aboriginal cultural heritage sites located in the vicinity of the proposed infrastructure routes has not been established at the time of preparation of this Referral.

Local Council **-** The Heritage Overlay of the East Gippsland Shire Council Planning Scheme and shows that no items of Aboriginal significance have been identified within the project area.

Table 15.4 - Aboriginal Heritage Sites Identified in the Vicinity of the Stockman Project

Site No.	Site Name	Site Type	Landform	Within Activity Area
8423-0014	Bindi Station	Artefact Scatter	Side or Base of Hill	No
8423-0028	Nunniong Road 4	Isolated Find	Mountain	No
8424-0002	Tambo River 1	Artefact Scatter	Valley Bottom	No
8424-0003	De Greaves Track	Artefact Scatter	Side or Base of Hill	No
8424-0004	Tambo River 2	Isolated Find	Low Lying Ground	No
8424-0005	Souter Block 1	Artefact Scatter	Cleared Flat	No
8424-0006	Souter Block 2	Artefact Scatter	Cleared Flat	No
8424-0007	Souter Block 3	Artefact Scatter	Cleared Flat	No
8424-0008	Souter Block 4	Artefact Scatter	Cleared Flat	No
8424-0009	Souter Block 5	Artefact Scatter	Cleared Flat	No
8424-0010	Souter Block 6	Isolated Find	Cleared Flat	No
8424-0011	Souter Block 7	Artefact Scatter	Cleared Flat	No
8424-0012	Souter Block 8	Artefact Scatter	Cleared Flat	No
8424-0013	McLean Creek	Artefact Scatter	Side or Base of Rise	No
8424-0027	Nunniong Road 1	Isolated Find	Mountain	No
8424-0028	Nunniong Road 2	Isolated Find	Mountain	No
8424-0029	Nunniong Road 3	Artefact Scatter	Mountain	No
8424-0065	Native Cat Track 4	Isolated Find	Ridge Side	No
8424-0066	Native Cat Track 5	Isolated Find	Ridge Side	No
8424-0067	Native Cat Track 6	Isolated Find	Flat	No
8424-0068	Native Cat Track 7	Isolated Find	Flat	No
8424-0072	Limestone Creek B 1	Artefact Scatter	Side or Base of Hill	No
8424-0073	Limestone Creek B 2	Isolated Find	Base of Ridge	No
8424-0074	Limestone Creek B 3	Isolated Find	Base of Ridge	No
8424-0075	Limestone Creek B 4	Isolated Find	Base of Ridge	No
8424-0076	Limestone Creek B 5	Isolated Find	Base of Ridge	No

Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area?

☐ NYD ☒ No ☐ Yes If yes, please list.

No sites of cultural heritage significance are listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area.

Local Council - The Heritage Overlay of the East Gippsland Shire Council Planning Scheme has been examined and no items of heritage significance were identified within the activity areas.

Previously Identified Historical Sites - Table 15.5 provides a summary of all the listed historical sites that have been recorded in the locality. It also indicates whether any of the sites are located within the current activity area.

Ancillary Infrastructure - The potential routes for the infrastructure required to provide power and water for the mine and also the site of the potential leach pads and SX/EW plant have not been assessed in relation to sites or areas of cultural significance at the time this Referral was prepared. It is anticipated that a similar process to that devised for assessing flora and flora impacts would be put in place once a decision on route(s) is made.

Table 15.5 – Historical Sites Identified in the Vicinity of the Stockman Project

Site No.	Listing	Site Name	Site Type	Within Activity Area
H8424-0001	Heritage Inventory	Omeo Station 1	Stone Hut possibly dating from first settlement of the region	No
H8424-0002a	Victorian Heritage Register	De Greaves Creek Gold Mining Site	A 4-head battery and waterwheel with evidence of a water race.	No
H8424-0003[a]	Victorian Heritage Register	New Chum Battery	A 4-head battery and waterwheel with evidence of a water race.	No

[a] Note that site numbers H8424-0002a and H8424-0003 refer to the same site which has been duplicated on the Register.

Is mitigation of potential cultural heritage effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

A Cultural Heritage Management Plan has been prepared and approved for the current exploration activities in E.L. 5045 and E.L. 5198.

A further Cultural Heritage Management Plan would be required for the project if the proposal and ancillary aspects are approved, which would contain similar management strategies for management of impacts or effects on sites of cultural significance.

Other information/comments? (e.g. accuracy of information)

16. Energy, wastes & greenhouse gas emissions

What are the main sources of energy that the project facility would consume/generate?

- ✕ Electricity network. If possible, estimate power requirement/output.
- ✕ Natural gas network. If possible, estimate gas requirement/output.
- ✕ Generated on-site. If possible, estimate power capacity/output.

Calculations undertaken in the preparation of the Stockman Project Scoping Study indicate a peak daily power consumption requirement of between 10 and 15 mW. Electrical power would be sourced from one of three sources:

1. Compressed or liquefied natural gas trucked to site in pods for on-site generation of electricity;
2. Diesel fired generators, or
3. Via a new grid, however a connection to the regional electricity grid would only be considered if it can be proven to be economically viable and that quality and continuity of supply can be established.

- ✕ Other. Please describe.

Please add any relevant additional information.

What are the main forms of waste that would be generated by the project facility?

- ✕ Wastewater. Describe briefly.

Waste products would be managed in a similar manner to the way site water is managed (Section 3) in that any product that comes onsite, whether it be transported in or by any other non-intentional means, either stays on-site or is disposed of in an appropriate manner. This policy applies to soil, water or any other substance.

If a situation arises whereby any waste product needs to be released into the environment, it would be managed in such a way as to ensure released products would meet the appropriate requirements/parameters in place at the time. The principle guides for such requirements/parameters are the State Environment Planning Policies (SEPP).

Sewage from site facilities would be managed in a closed system, with regular pump out by licensed contractors and disposed of as per EPA requirements for handling and disposal of effluent wastes.

- ✕ Solid chemical wastes. Describe briefly.

The chemicals that would be used in the process are those typically used in the flotation processing of sulphide minerals. The amounts of the chemicals required ranges from grams to several kilograms per tonne (e.g. lime) of processed material.

The list of the principal chemicals and their delivery method likely to be used in this process is:

- Lime - Hydrated powder lime would be delivered in 40 tonne trucks and unloaded into a 100 tonne lime silo;
- Sodium Meta Bisulphite (SMBS) - to be delivered in bulka bags;
- Copper Sulphate - to be delivered in bulka bags;
- Finn Fix - to be delivered in bulka bags;
- AP 3894A - to be delivered as a mixed reagent in a $1m^3$ tote;
- AP 4037A - to be delivered as a mixed reagent in a $1m^3$ tote;
- MIBC frother - to be delivered as a mixed reagent in a $1m^3$ tote, and
- SIBX - to be delivered in bulka bags.

A metallurgical extraction route for the gold present in Stockman ores has not been established, however depending on its mode of occurrence and physical characteristics, this may be achieved through either mechanical means or the use of sodium cyanide or thiourea. The safe handling, storage and transport of sodium cyanide is governed by the *Occupational Health and Safety Regulations 2007, Dangerous Goods Act 1985, Dangerous Goods (Storage and Handling) Regulations 2000* and the *Australian Dangerous Goods (ADG) Code.*

The mode and mechanism of transport for this material is yet to be determined, but is likely to be by one of several proven reliable methods, e.g. by Intermediate Bulk Containers (IBC's) containing bulka bags consisting of an inner heat sealed polyethylene bag inside of a woven polypropylene bag stored within a plywood box.

If sodium cyanide was employed in the extraction of gold from the ore process stream, any residual amounts present in the tailings stream would undergo an accepted industry standard destruction process to enable the regulatory limits for residual Weak Acid Dissociable Cyanide *(CN_{WAD})* to be achieved.

CN_{WAD} includes those cyanide species liberated at moderate pH of 4.5 such as HCN(aq) and CN^-, the majority of Cu, Cd, Ni, Zn, Ag complexes and others with similar low dissociation constants.

× Excavated material. Describe briefly.

The development of mine openings would generate unmineralised rock, some of which would be free of sulphide minerals with no potential for the generation of acidic material and would be used for road toppings, aggregate for concrete construction, compaction base for works areas and other uses as appropriate. Rock which has an acid forming potential would be disposed of into suitable clay or geomembrane-lined repositories or returned underground as part of the void filling process.

× Other. Describe briefly.

Tailings **-** The products generated from the processing facility would include all the non-economic material mined (principally pyrite, plus silicate and carbonate minerals) in the form of a slurry. This would be fed to a plant that filters out the ultra fine particles which in turn are then pumped to the TSF and the water recovered for re-use. The coarser particles from this process are mixed into a paste with cement and pumped underground to provide support for the openings. It is anticipated that approximately 40-60% of the tailings can be placed back underground depending on the proportion of coarse material that is able to be recovered.

Hydrocarbons **–** Waste oil and other hydrocarbon-based products generated through day to day activities on site would be stored appropriately prior to collection by contractors for recycling.

Scrap Steel **–** Construction materials surplus to requirement would be stockpiled and then recycled.

Domestic Waste **–** Effluent from toilets and showers and the like would be treated on site to a suitable standard and then re-used as part of the process water supply. Solid waste which cannot be recycled would be removed from site by an appropriately licensed contractor.

Please provide relevant further information, including proposed management of wastes.

It is anticipated the potential for contamination from sulphide or acid drainage (derived from weathered sulphidic rock), oil and mud, or reagents spills can be managed through incorporation of the following industry standard controls:

- Bunding of all hydrocarbons, chemicals and other substances potentially harmful to the environment within a suitably constructed area. These bunded areas would include a means of recovering spilled material and removing water occurring from rainfall. Refuelling areas would include concrete aprons to prevent uncontrolled discharge of hydrocarbons. All bunded areas would be equipped with appropriate spill kits to enable rapid response to spills and personnel would be trained in the use of this equipment;
- All pipelines carrying process water, tailings or any other substance potentially harmful to the environment would be located within V drains to enable containment of spills, which would be complimented by regular visual inspections;
- Potentially Acid Forming materials would be disposed of underground as part of the paste fill process or encapsulated in Non Acid Forming rock where appropriate surface landforms are available;
- Dirty water dams would be constructed to enable separation of solids from inflow water from either mine dewatering or surface run-off passing through mining or process areas. Water directly derived from mining processes or wash down bays would be returned to the water circuit for these processes after settling and separation of any entrained hydrocarbons, and
- The dirty water dam(s) would have sufficient capacity to cater for expected seasonal variations, plus abnormal rain events.

The manner and form in which these controls are implemented will be determined once the nature of each risk is assessed.

What level of greenhouse gas emissions is expected to result directly from operation of the project facility?

× Less than 50,000 tonnes of CO_2 equivalent per annum
× Between 50,000 and 100,000 tonnes of CO_2 equivalent per annum
× Between 100,000 and 200,000 tonnes of CO_2 equivalent per annum
× More than 200,000 tonnes of CO_2 equivalent per annum

Please add any relevant additional information, including any identified mitigation options.

Calculations for the level of greenhouse gas (GHG) emissions are based on preliminary quantity estimates for GHG emitting components of the project, made during the preparation of the Stockman

Project Scoping Study report. The quanta of emissions sources have been utilised in the calculations described in the Australian Government Department of Climate Change publication *"National Greenhouse Accounts (NGA) Factors"* (DCC 2008) which are summarised in Table 16.1.

Table 16.1 – Estimate of Stockman Project Annual Emission Sources

LIQUID FUELS (For generation of electricity, stationary plant, and ancillary operations)

Activity	Subgroup	Source	Quantity (kilolitres / annum)	Scope 1 ($t CO_2$-e)	Scope 3 ($t CO_2$-e)	Total per source (/annum) ($t CO_2$-e)	Total (/annum) ($t CO_2$-e)
Fuel Combustion Emissions	Energy Generation Processing Administration	Diesel (Automotive Diesel Oil)	10,500	28,168	2,148	30,316.	38,978 (Rounded).
	Direct Mining Operations	Diesel (Automotive Diesel Oil)	3,000	8,048	614	8,662.	

For calculating Scope 1 (direct) and Scope 3 (indirect) emissions, (in tonnes of Carbon Dioxide Equivalents) for the use of liquid fuels, the following calculation has been applied:

GHG emissions ($t CO_2$-e) = Q x EC x EF_{oxij} /1000, where:

Q is the quantity of fuel in tonnes or thousands of litres (sourced from inventory or supplier invoices or production records),

EC is the energy content of fuel in GJ/tonne or GJ/kL in Column A, Table 1

EF_{oxij} is the relevant emission factor. Table 1 of the *"National Greenhouse Accounts (NGA) Factors"* reports the emission factor for scope 1 (the direct/point source EF for fuel combustion emissions) (column B), the emission factor for scope 3 (the indirect EF for fuel extraction emissions) (column C) and the full fuel cycle emission factor (Column D) in kg CO2-equivalent (CO2-e) per GJ. The full fuel cycle emission factor is the sum of the emission factors for scope 1 and scope 3.

Division by 1000 converts kg to tonnes

TRANSPORT FUELS (For mining operations and ore transport to processing facilities and beyond)

Activity	Subgroup	Source	Quantity (kilolitres / annum)	Scope 1 ($t CO_2$-e)	Scope 3 ($t CO_2$-e)	Total per source (/annum) ($t CO_2$-e)	Total (/annum) ($t CO_2$-e)
Transport Fuels	Vehicle Use Onsite	Diesel (Automotive Diesel Oil)	3,500	9,450	700	10,150	30,450 (Rounded)
	Ore Transport Offsite	Diesel (Automotive Diesel Oil)	7,000	18,900	1,400	20,300	

For calculating Scope 1 (direct) and Scope 3 (indirect) emissions, (in tonnes of Carbon Dioxide Equivalents) for the use of transport fuels, the following calculation has been applied:

GHG emissions (t CO2-e) = Q (kL) x EFoxij, where:

Q is the quantity of fuel in thousands of litres or GJ (sourced from inventory or supplier invoices or production records).

EFoxij is the relevant emission factor. Emission factors for combustion of transport fuels are reported in Table 3 in both kg CO2-e per GJ and tonnes of CO2-e per kL. These comprise scope 1 (point source/fuel combustion) emission factors (Columns B or C), scope 3 (indirect/fuel extraction) emission factors (columns D or E) and the full fuel cycle emission factors (Columns F or G), all including CO2 and non-CO2 gases.

Division by 1000 converts kg to tonnes.

EXPLOSIVES (For use during standard extractive industry operations)

Activity	Subgroup	Source	Quantity (tonnes / annum)	Emission Factor tonne CO_2/tonne product	Total per source (/annum) ($t CO_2$-e)	Total (/annum) ($t CO_2$-e)
Explosives	Mining Operations	ANFO	3.5	0.2	0.6	153 (Rounded)
	Mining Operations	Emulsion	895	0.2	152	

For calculating emissions (in tonnes of Carbon Dioxide) for the use of explosives, the following calculation has been applied:

GHG emissions ($t CO_2$) = Q x EF_{oxij}, where:

Q is the quantity of explosives in tonnes (sourced from inventory or supplier invoices or production records),

EF_{oxij} is the relevant emission factor. Table 4 of the *"National Greenhouse Accounts (NGA) Factors"* reports the emission factor for scope 1 (the direct tonnes of CO_2 per tonne of explosive product).

STOCKMAN PROJECT TOTALS (Based on calculated estimates for consumption of CO_2 equivalent sources)	**Stockman Project Total (/annum) ($t CO_2$-e)**	**69,581 (Rounded)**

17. Other environmental issues

Are there any other environmental issues arising from the proposed project?

☒ No ☐ Yes If yes, briefly describe.

All issues anticipated arising from the proposed Stockman Project have been addressed in previous sections of this report.

The pre-existing TSF (Lake St. Barbara) is excluded from Jabiru's tenure and the management of issues relating to this rehabilitated infrastructure area are the responsibility of the DPI.

18. Environmental management

What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above)

☒ Siting: Please describe briefly

Described in Section 2.

☒ Design: Please describe briefly

Described in Section 3.

☒ Environmental management: Please describe briefly.

Described in Sections 3, 7, 10, 12, 13, 15, and 16.

☒ Other: Please describe briefly

Add any relevant additional information.

19. Other activities

Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?

☒ NYD ☐ No ☐ Yes If yes, briefly describe.

The Omeo, Swifts Creek and Benambra Districts have had a lengthy history of exploration and mining activities. These enterprises have been limited in scale, and without having been further investigated in regards to cumulative impacts and influences on resources and community expectations, cannot be quantified at this time.

20. Investigation program

Study program

Have any environmental studies not referred to above been conducted for the project?

☐ No ☒ Yes If yes, please list here and attach if relevant.

There is an extensive history of studies undertaken by a range of State agencies and departments, private consultants and site operators over the area now covered by E.L. 5045 & E.L. 5198. These previous studies have addressed issues such as the economic and operating feasibility of mining operations on the site, detailed specific environmental investigations, monitoring and ongoing management and site rehabilitation.

Where these documents are believed to contribute to the detail and issues contained in this referral document, they have been utilised and referenced. Jabiru has however, undertaken new scientific and economic analysis to ensure that information relevant to an environmental assessment is both up to date, and is performed in a manner suitable for the current requirements of relevant legislation and guidelines.

The previous studies for the site have been digitally stored for on going reference by Jabiru in a database (*'Jabiru Data Catalogue'*). This database has been submitted to the DPOI as part of the annual tenement reporting conditions for E.L. 5045.

Has a program for future environmental studies been developed?

☐ No ☒ Yes If yes, briefly describe.

Jabiru have implemented a series of ongoing base line survey which include:

- Weed species site incursion monitoring;
- Seed collection protocols;
- Bi-annual macro-invertebrate surveys;
- Vegetation surveys for exploration works and possible processing plant locations;
- Terrestrial fauna surveys, and
- Monthly water and sediment quality analysis.

The baseline studies already commenced would continue as part of the normal operational protocols of the proposed mine. These studies would be extended to specific areas along the proposed infrastructure routes if initial route surveying shows this to be appropriate.

In addition, the following studies may be required:

- **Ecological systems assessment:** to describe the biodiversity, ecological communities, species and ecological values of the project area and downstream environment and assess the potential impacts of the project on these values.
- **Geochemical characterisation of mine materials and tailings:** to identify potential environmental risks, such as acid mine drainage, associated with the excavation, handling, storage and processing of mined materials.
- **Water balance and supply assessment:** to determine the water consumption and water supply and management requirements of the proposed mining and processing activities.
- **Surface water assessment:** to characterise the existing quality and hydrology of local and downstream surface waters and assess potential project-related impacts, including impacts on beneficial uses. Assessment to include impacts associated with the escape of eroded sediment and risks from other potential contaminants.
- **Groundwater assessment:** to assess the potential impacts of the project on groundwater resources and beneficial uses including the effects of mine dewatering.
- **Cultural heritage assessment (Aboriginal and non-Aboriginal):** to identify sites of archaeological and/or cultural significance and assess the potential impacts on these as a result of the project.
- **Social assessment:** to assess the potential impacts of the project on the communities of the area, including identification of direct and indirect impacts.
- **Economic assessment:** to assess the likely local, regional and state economic impacts of the project, including the identification of direct and indirect impacts.
- **Air quality assessment:** to assess the potential impacts of project-related dust generation and air emissions on the community and sensitive uses.
- **Noise and blasting assessment:** to characterise background noise levels and assess the potential impacts of project-related noise emissions on residential and other sensitive uses and local fauna. The impacts of vibration due to underground blasting activities on local amenity and fauna will also be assessed.

- **Landscape and visual assessment:** to assess the potential impacts of the project on the landscape and the visual amenity at local vantage points.
- **Infrastructure and services network:** to assess the capacity of the existing infrastructure and services networks and determine the requirements for additional or upgraded infrastructure and services as a result of the project.
- **Roads, traffic and transport assessment:** to describe intended transport corridors and options and assess the effects on road safety and road network function of any road upgrades and project-related road use.
- **Energy and greenhouse gas assessment:** to assess the energy supply and consumption requirements of the project and estimate project-related greenhouse gas emissions.
- **Hazard assessment and management:** identify management procedures and performance standards to maximise public safety and minimise environmental risks associated with project-related hazards (such as fire risks, and risks due to the use of hazardous materials).
- **Rehabilitation and closure planning:** develop a site rehabilitation and closure concept, including final land uses and proposed activities for progressive rehabilitation and final closure.
- **Cumulative Impact Assessment:** to assess the combined impacts of the Stockman Project and other proposed projects or existing activities within the impact area.

The above studies would also consider potential impacts during the construction, operations and decommissioning phases of the proposed project, as appropriate.

Consultation program

Has a consultation program conducted to date for the project?

☐ No ☒ Yes If yes, outline the consultation activities and the stakeholder groups or organisations consulted.

Consultation activities carried out to date include face to face meetings and discussions with individuals or groups and formal presentations to government departments, including:

- Department of Environment, Heritage, Water and the Arts (Commonwealth)
- Department of Primary Industries;
- Department of Sustainability and Environment;
- Aboriginal Affairs Victoria;
- Southern Rural Water;
- Parks Victoria;
- East Gippsland Shire Council;
- V ic Roads;
- Murr ay-Goulburn Water Authority;
- East Gippsland Water;
- Regional Development Victoria;
- Wo rkSafe;
- East & Gippsland Catchment Management Authority;
- Environmental Protection Agency;
- C ountry Fire Authority;
- Landholders on the potential traffic route in the vicinity of Benambra and
- Omeo Region Business & Tourism Association Inc.

In addition, information booths have been placed at recent Omeo Shows (November, 2007, 2008 and 2009) and the Tambo Valley Races (March, 2007) to provide the general public with updates on the project. An office has also been established in Omeo and is manned by permanent staff.

Has a program for future consultation been developed?

☐ NYD ☐ No ☒ Yes If yes, briefly describe.

The consultation program developed for the project in relation to exploration activities would continue with formal briefing meetings with government departments, presentations to community groups, and the distribution of a regular activities newsletter in the district and the holding of information booths at both the annual Omeo Show and Tambo Valley Races.

Authorised person for proponent:

I, Gary Ernest Comb (full name),

Managing Director, Jabiru Metals Limited…(position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

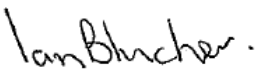
Signature 

Date 13th May 2010

Person who prepared this referral:

I, Ian David Blucher……(full name),

Stockman Feasibility Study Manager…… (position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature 

Date 13th May 2010

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Figures

Appendix 1 - Vegetation Investigation Reports Undertaken 2007 - 2009

Appendix 1a - Vegetation Assessment and Offset Plan Wilga and Currawong Phase 1

Appendix 1b - Preliminary Vegetation Assessment Plan Wilga and Currawong Phase 2

Appendix 1c - Vegetation Assessment and Net Gain Calculations Stockman Project: Wilga and Currawong Infrastructure and Processing Facilities

Appendix 1d - Vegetation Assessment and Net Gain Calculations Wilga and Currawong Infrastructure and Processing Facilities Addendum

Appendix 1e - Stockman Project: Vegetation Assessment Sampling Protocol for Linear Infrastructure

Appendix 2 - Upper Tambo River Macroinvertebrate Surveys

Appendix 2a - Monitoring of the Upper Tambo River - Macroinvertebrate Health February 2008
Appendix 2b - Monitoring of the Upper Tambo River - Macroinvertebrate Health August 2009
Appendix 2c - Monitoring of the Upper Tambo River from 2008 - 2010 A Review of Macroinvertebrate Health

Appendix 3 - Upper Tambo River Water and Sediment Quality Investigations

Appendix 3a - Water and Sediment Quality February 2008
Appendix 3b - Water and Sediment Quality April 2008
Appendix 3c - Water and Sediment Quality May 2008
Appendix 3d - Water and Sediment Quality June 2008
Appendix 3e - Water and Sediment Quality July 2008
Appendix 3f- Water and Sediment Quality August 2008
Appendix 3g - Water and Sediment Quality September 2008
Appendix 3h - Water and Sediment Quality October 2008
Appendix 3i - Water and Sediment Quality December 2008
Appendix 3j - Water and Sediment Quality February 2009
Appendix 3k - Water and Sediment Quality March 2009
Appendix 3l - Water and Sediment Quality April 2009
Appendix 3m- Water and Sediment Quality May 2009
Appendix 3n - Water and Sediment Quality June 2009
Appendix 3o - Water and Sediment Quality July 2009
Appendix 3p - Water and Sediment Quality August 2009
Appendix 3q - Water and Sediment Quality September 2009
Appendix 3r - Water and Sediment Quality October 2009
Appendix 3s - Water and Sediment Quality November 2009
Appendix 3t - Water and Sediment Quality December 2009
Appendix 3u - Water and Sediment Quality January 2010
Appendix 3v - Water and Sediment Quality February 2010
Appendix 3w - Water and Sediment Quality March 2010
Appendix 3x - Water and Sediment Quality April 2010

Appendix 4 - EPBC Act Protected Matters Search Results

Appendix 5 - Regional Groundwater Investigations

Appendix 5a Stockman Project Groundwater Supply Feasibility Study Progress Report Phase 1

Appendix 5b Stockman Project Groundwater Supply Feasibility Study Progress Report Phase 2

Appendix 5c Stockman Project Potential Groundwater Bore Locations - A Report on Potential Ecological Constraints

Appendix 6 - Assessment of Alternative Transport Routes

Appendix 7 - Stockman Project Exploration Cultural Heritage Management Plans

Appendix 7a Stockman Project Exploration Cultural Heritage Management Plan

Appendix 7b Stockman Project Exploratory Drilling Benambra Mine Cultural Heritage Management Plan

Appendix 8 - Fauna Survey

Appendix 9 Alternate Tailings Storage Facilities

Appendix 10 Power, Water and Road Infrastructure Zoning