Executive Summary

INTRODUCTION

This *Environmental Assessment* has been prepared by R.W. Corkery & Co. Pty. Limited to accompany an application for project approval by Alkane Resources Ltd ("the Proponent") to develop and operate the Tomingley Gold Project ("the Project"). The Project would comprise four open cut mines, an underground mine, a processing plant, three waste rock emplacements and a residue storage facility, as well as ancillary activities and associated infrastructure, including construction of a water supply pipeline.

All areas of proposed disturbance associated with the Project are contained within the "Project Site" which comprises two areas identified on **Figure A**.

1. The Mine Site - comprising an area of approximately 776ha that would incorporate all areas of proposed Project-related disturbance associated with the mining, processing, waste rock management and related activities. The Mine Site is located immediately south of the village of Tomingley and 15km to the north of Peak Hill.
2. The Tomingley Narromine Water Pipeline - comprising a corridor approximately 46km long and 5m wide within road and rail reserves between the Mine Site and the "Woodlands" property approximately 7km east of Narromine.

The Project is classified as a "Major Project" in accordance with Paragraph 5, Schedule 1 of *State Environmental Planning Policy (Major Development) 2005* and consequently the Minister for Planning is the approval authority. As a Major Project, it will be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

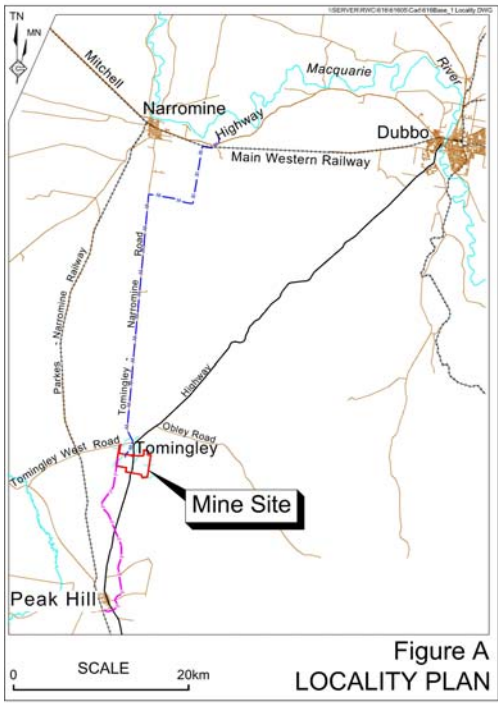


Figure A
LOCALITY PLAN

This *Environmental Assessment* has been prepared in accordance with the requirements of Section 75H of Part 3A of the EP&A Act.

This summary introduces the Proponent, provides relevant background to the Project, and presents an overview of the Project design, operational safeguards and predicted Project-related impacts on the surrounding environment.

THE PROPONENT

The Proponent, Alkane Resources Ltd, is an Australian, publicly listed mining and exploration company which has been in existence since 1969 and has approximately 5 400 shareholders. The Company has a long term involvement and ongoing commitment to the Central West of New South Wales and has substantial investment in the people and resources of the region. Alkane Resources Ltd developed and operated the Peak Hill Gold Mine on the outskirts of Peak Hill from 1996 to 2005 and has now largely rehabilitated that mine site.

BACKGROUND

There has been a long history of mining and exploration for gold in the local area.

Gold was first discovered and mined from the Tomingley Goldfield in the 1880s. A number of underground mining operations were operated here and in the McPhail area, immediately south of the Mine Site through the 19th and 20th centuries. The last economic 'mining' activities of the Tomingley / McPhail area was completed in the late 1990s and involved the re-treatment of tailings from the McPhail Mine.

In 2001, the Proponent commenced exploration and identified first the Wyoming One deposit (2001), followed by the Wyoming Three deposit in 2002, the Caloma deposit in 2006 and the Caloma Two deposit in 2010.

The measured resource within the Mine Site is approximately 4.9Mt @ 2.03g/t with further indicated resources of 1.4Mt @ 2.06g/t and inferred resources of 4.0Mt @ 1.5g/t. Based on these identified resources the Proponent concluded that the Project represents a viable development.

PROJECT DESCRIPTION

The Project would include the following components (**Figure B**).

- Establishment of infrastructure required for the Project, including a water supply pipeline between the Mine Site and the "Woodlands" property 7km east of Narromine, an underpass beneath the Newell Highway, and vegetated amenity bunds.
- Extraction of waste rock and ore material from four open cut areas, namely: Wyoming One, Wyoming Three, Caloma and Caloma Two.
- Extraction of waste rock and ore material from an underground extension of Wyoming One Open Cut.
- Construction of three waste rock emplacements.
- Construction and use of various haul roads and a run-of-mine (ROM) pad.
- Construction and use of a Processing Plant and Office Area, incorporating a crushing and grinding circuit, a standard carbon-in-leach (CIL) processing plant, site offices and associated infrastructure.
- Construction and use of a residue storage facility (RSF).
- Construction and use of ancillary infrastructure, including the Main Site Access Road and intersection with Tomingley West Road.
- Construction and maintenance of soil stockpiles.
- Construction of various surface water management structures to control surface water flows.
- Construction and use of dewatering ponds to store water accumulating in and pumped from the open cuts.

Disturbance associated with the mining and associated activities would be progressively rehabilitated to create a geotechnically stable final landform, suitable for a final land use of nature conservation, agriculture, tourism and/or light industry.

The following provides an outline of the proposed Project operations.

Site Establishment and Construction

In order for mining, processing and product transportation to be undertaken, the following infrastructure and other site features would first be established.

- Construction of a water supply line between the Mine Site and a licensed production bore (or bores) located on a private property near.

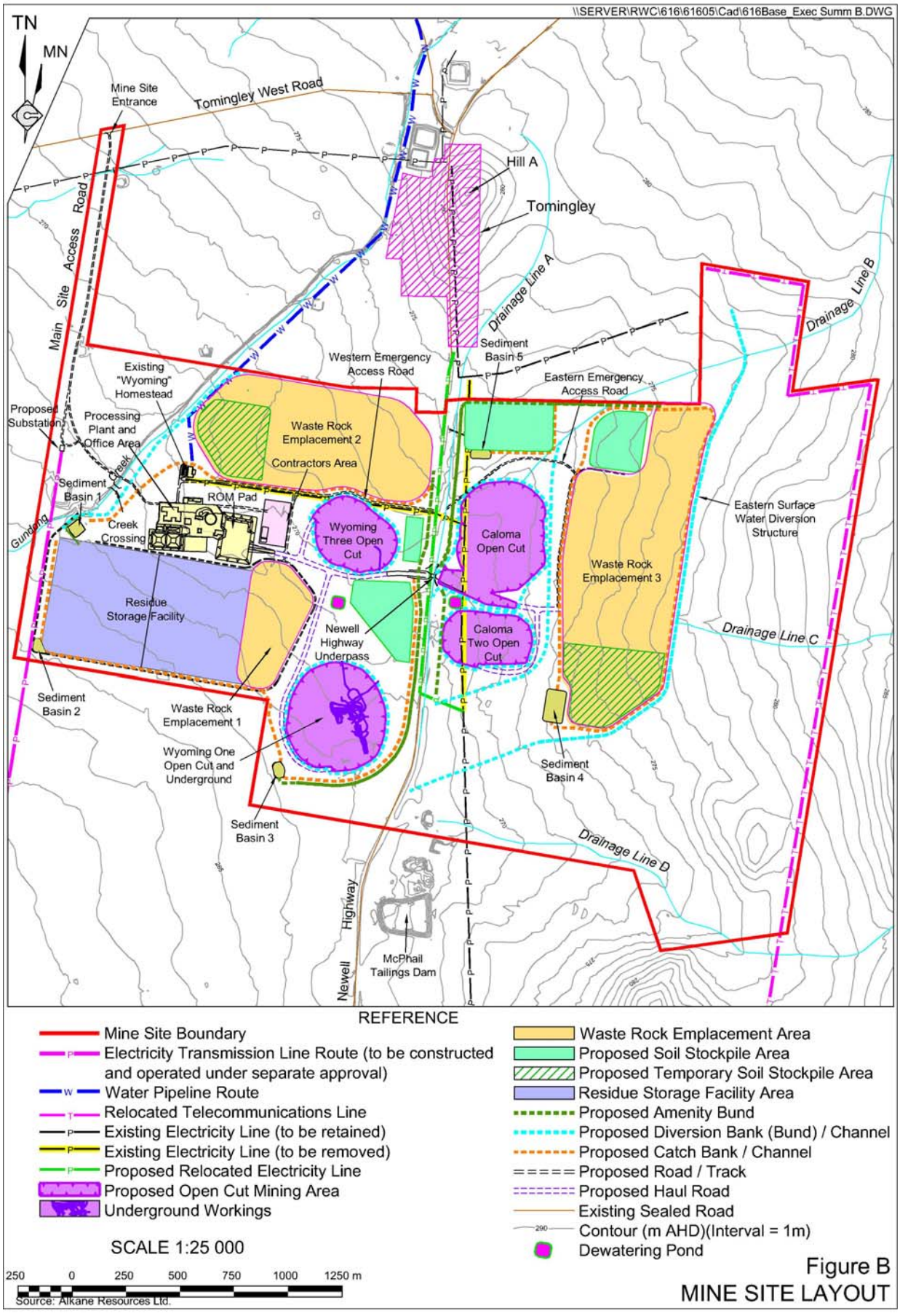


Figure B
MINE SITE LAYOUT

- Construction of a 66kV electricity transmission line and distribution network.
- Construction of an underpass beneath the Newell Highway.
- Construction of an access road to the Mine Site ("Main Site Access Road") and intersection with the public road network.
- Construction of a range of amenity bunds and surface water diversion structures.
- Construction of a range of water management and retention structures within the Project Site.

Complete site establishment, i.e. complete construction of all Mine Site infrastructure and facilities, is anticipated to take 12 months although it is noted that mining and processing would be undertaken concurrently for a period towards the end of the site establishment phase.

Site Preparation

During vegetation clearing operations, larger vegetation would be removed using a bulldozer with its blade positioned just above the surface. Groundcover vegetation would then be removed with the topsoil to maximise the retention of the seed bank and nutrients within the soil, as well as to minimise opportunities for erosion and dust lift-off between removal of the larger vegetation and soil stripping.

With the exception of areas of sodic soil, all available topsoil material would be recovered from areas to be disturbed using bulldozers and/or scrapers. Enough subsoil would also be recovered to provide for rehabilitation of the progressively created final landform. The soil would either be transferred directly to other areas of the Mine Site for respreading, e.g. the outer face of the RSF embankment, or placed in stockpiles of up to 5m in height (3m subsoil covered by 2m topsoil).

Mining Operations

Figure B presents the layout of the proposed open cuts and underground mine.

Open Cut Mining

- ***Grade Control Drilling***. This drilling would be undertaken ahead of planned mining to more precisely define the boundary between ore, low grade ore and waste material. All grade control samples would be transported to an off-site laboratory for analysis.
- ***Extraction of Friable Material***. Friable material would either be lightly fragmented using drill and blast methods and extracted using an excavator, or alternatively, ripped and pushed up using a bulldozer. Extracted material would be loaded into haul trucks for transportation to the ROM pad, a low grade stockpile, waste rock emplacement or bund. The Proponent anticipates that friable material will be present from the base of the subsoil to a depth of between 5m and 60m below the surface.
- ***Drill and Blast Operations***. Blast holes would be drilled, using up to three hydraulic drill rigs equipped with dust and noise suppression equipment, into the material that cannot be excavated using a bulldozer or excavator alone. Following completion of each blast, boundaries between ore and waste rock material would, if required, be identified and marked. Fragmented material would then be loaded into trucks by hydraulic excavator and transported to one of the waste rock emplacements, or the ROM pad. All drill and blast operations would be supervised by a suitably qualified and experienced blasting engineer or shot-firer.

Underground Mining

Figure C presents an overview of the proposed underground development. The Proponent would establish a portal in the lower section of the Wyoming One Open Cut and develop a decline to permit access to those sections of the Wyoming One ore body that cannot be economically extracted using open cut mining methods.

- ***Portal Construction and Underground Infrastructure Development***. The wall above the portal entrance would be stabilised using a combination of rock bolts, cable bolts and shotcrete. Additional roof and wall support, including rock bolts, spiling bars, cable bolts and/or shotcrete, may be required in the near surface sections of the decline.

  Once the portal is established, infrastructure and services required for underground operations would be installed.

- ***Underground Workings Development and Construction***. The decline, development headings and ore drives would be developed using drill and blast techniques. A jumbo, or underground drill rig, would drill a pattern of holes, these holes would be loaded with pre-packaged bulk explosives and detonators, and the in situ material fragmented.

  Fragmented material would be extracted using an underground loader or load-haul-dump (LHD) unit. The LHD unit would be used to load underground haul trucks or transport the fragmented material to a loading bay for later reclamation.

- ***Underground Stoping Operations***. Underground mining of ore material would be undertaken using a long hole open stoping mining method.

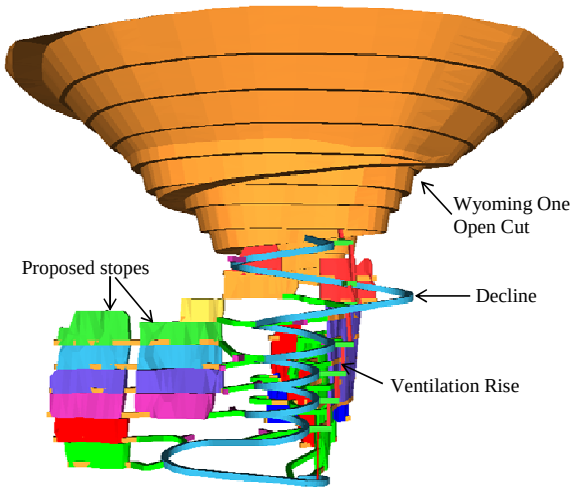


Figure C
MINING METHOD

- Development drives would be established at approximately 20m vertical intervals within the ore zone. A series of holes would then be drilled in rings from each drive, sequentially loaded with explosives and the ore material blasted. The fragmented material would then be removed from the stope or open void using a LHD unit. Between stopes, pillars (vertical) and sills (horizontal) of unmined material would be left to provide support and prevent ground collapse.

- ***Stope Backfilling Operations***. In order to ensure stability of sections of the proposed underground mine once mining operations have been completed in those sections, mined-out stopes would be backfilled using waste rock material sourced preferentially from concurrent underground development.

Processing Operations

The gold bearing ore would be crushed, ground, concentrated, leached and recovered to produce gold doré (a semi-purified gold bar). The processing operations would require the use of cyanide to leach the gold from the ore.

Following the removal of the gold from the crushed and ground ore, a slurry by-product (or residue) would remain for disposal.

Residue Management

The residue would be concentrated and pumped to a thickener where the cyanide concentration would be reduced through addition and removal of water. The slurry would then be pumped to the residue storage facility (RSF) to be constructed to the immediate south of the Processing Plant and Office Area (see **Figure B**). The RSF would comprise two cells of approximately 21ha each with a common embankment and following provides the indicative design criteria for the RSF.

1. Maximum area of disturbance - approximately 42ha.
2. Maximum embankment height – approximately 15m above the natural surface.
3. Slope of outer face of the embankment – approximately 1:3 (V:H).

The floor, walls and internal face of the embankment would achieve a permeability of 1 x 10^{-9}m/s through the lining of the internal surfaces with compacted clay sourced from the Mine Site.

A central decant tower would be provided within each cell allowing for the return of water to the processing circuit. This would be constructed of pre-cast pipe sections which would be progressively stacked on top of each other, with rock placed around, as the RSF is progressively raised.

Transportation

All vehicles would normally access the Mine Site via the Tomingley West Road and the Main Site Access Road. During periods of heavy or sustained rainfall, Tomingley West Road may become covered by water and to ensure continuity of access to the Mine Site, the Proponent would upgrade and maintain the existing access track to the "Wyoming" homestead, from the Newell Highway, as the Western Emergency Access Road. In addition, an Eastern Emergency Access Road would be constructed and maintained from the Mine Site on the eastern side of the Mine Site to the Newell Highway.

The average traffic levels that would be generated during the construction and operational phases of the Project are as follows.

Project Phase	Light Vehicles	Heavy Vehicles	Total Vehicles
Construction	180	20	200
Operations	136	8	144

Project Life and Hours of Operation

The Proponent anticipates that the life of the Project would be 10 to 12 years. Operating 7 days per week, the proposed hours of operation would indicatively be as follows.

Activity	Proposed Hours of Operation
Vegetation clearing and topsoil stripping	Daylight hours
Construction operations	24 hours per day
Open cut mining operations	24 hours per day
Underground mining operations	24 hours per day
Blasting operations	9:00am to 5:00pm (Monday to Saturday)
Maintenance operations	24 hours per day
Processing operations	24 hours per day
Rehabilitation operations	7:00am to 10.00pm

Employment

The Proponent estimates that the Project would provide approximately 100 full-time equivalent positions during site establishment phase and up to 90 full-time equivalent positions during the operational phase.

Site Rehabilitation and Decommissioning

The Proponent would adopt a progressive approach to the rehabilitation of disturbed areas within the Mine Site to ensure that, where practicable, areas where mining-related activities are completed are quickly

shaped and revegetated to provide a stable landform. The progressive formation of the post-mining landform and the establishment of a vegetative cover would also minimise the potential Project-related visual amenity and air quality impacts.

The post-mining landform would include the following components.

- Three shaped and covered waste rock emplacements with undulating upper surfaces, outer faces with maximum slopes of approximately 18º (1V:3H). The final landform of Waste Rock Emplacement 1 would merge with a shaped and covered RSF.
- Four appropriately bunded, fenced and signed open cuts.
- The vegetated amenity bunds and surface water infrastructure, including sediment basins would be retained.

The final land use of the Mine Site would incorporate native vegetation conservation, sustainable agriculture and possibly other land uses which could take advantage of the retained infrastructure. Central to the final land use would be the protection, enhancement and conservation of remnant native vegetation as part of a biodiversity offset strategy developed for the Project.

ISSUE IDENTIFICATION AND PRIORITISATION

In order to undertake a comprehensive *Environmental Assessment* of the Project, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community. These issues (and potential impacts) were identified through a program of community and government consultation, preliminary environmental studies and literature review. This was followed by an analysis of the risk posed by each potential impact in order to prioritise the assessment of the identified environmental issues within the *Environmental Assessment*.

Consultation

Consultation with the local community involved:

- individual discussions with the landowners / residents of Tomingley and surrounding areas; and
- two community meetings.

The Proponent and its consultants also regularly consulted with various government agencies and authorities throughout the planning phase of the Project.

Issue Prioritisation

Considering the environmental issues raised throughout the consultation process, an analysis of environmental risk for each potential environmental issue in the absence of any mitigation measures was then completed. Through a review of the allocated risk ratings and the frequency with which each issue was identified, the relative priority of each issue was determined. The following order of priority of environmental issues has been determined.

1. Noise
2. Surface water
3. Groundwater
4. Biodiversity
5. Aboriginal heritage
6. Non-Aboriginal heritage
7. Visual amenity
8. Air quality
9. Blasting
10. Traffic
11. Soil and land capability
12. Hazards
13. Socio-economic climate

ENVIRONMENTAL SAFEGUARDS AND IMPACTS

The components and features of the existing environment within and surrounding the Project Site have been studied in detail and the Project designed to avoid or minimise impacts on that environment. A brief overview of the main components of the surrounding environment, the proposed safeguards and the assessed level of impact are set out below.

Noise

The sources of noise around the Project Site are typical of a rural environment, e.g. farming activities, insect noise, livestock, wind through vegetation and vehicles on local roads, with significant contribution during the day time by traffic on the Newell Highway.

Noise monitoring undertaken in April 2009 confirmed background noise levels (L_{A90}[1]) ranging from <30dB(A) up to 40dB(A), depending on the proximity of the residence to the Newell Highway and time of day.

Following a review of the background noise levels, the residences were grouped based on proximity to the Mine Site and existing noise sources. The criteria for noise generated by the Project were than established as follows.

- site establishment and mine operations – background noise level + 5dB(A) ($L_{Aeq(15min)}$).
- night-time sleep disturbance – background noise level + 15dB(A) ($L_{Amax)}$.
- road traffic noise - 60dB(A) (daytime) and 55dB(A) (night-tine) ($L_{Aeq(1hr)}$).

Following initial noise modelling, it was identified that noise levels received at many residences could exceed the nominated noise criteria. The Proponent considered various options for mitigating noise generated by the Mine Site, and has committed to implementing the following.

- Frequency modulated reversing alarms would be installed on all mobile equipment.
- Land preparation operations, including vegetation clearing and soil stripping, would be undertaken during the daytime only.
- When noise enhancing conditions prevail, waste rock placement on Waste Rock Emplacements 2 and 3 would be undertaken behind a 15m high acoustic bund constructed along the northern margin of the emplacement.
- The noisier equipment, including bulldozers, excavators and haul trucks, would be preferentially operated in the southern section of the Mine Site, as close as possible to the acoustic bunds on Waste Rock Emplacements 2 and 3 and in the deepest sections of the open cuts during the evening and night.
- The front-end loader on the ROM Pad would be operated behind stockpiled ore or purpose-built earth bunds.
- The dominant noise sources of the processing operations would be enclosed to achieve a sound power level reduction of at least 8dB.
- Equipment would be progressively relocated or stood down as noise levels received at residences surrounding the Mine Site increase.

Noise modelling, incorporating these mitigation measures, demonstrates that with limited exception, noise levels would comply with the intrusiveness criteria during the day time and evening periods. Elevated noise levels up to 4dB above the intrusiveness criteria are predicted (during

[1] The noise level which is exceeded for 90% of the time at a given location.

the day time) at only three residences during the initial 3 month construction period.

Exceedances of the intrusiveness criteria during the night time have been reduced, both in the size of the exceedance and frequency of occurrence, as far as reasonably and feasibly possible. Critically, the scale of exceedance has been reduced to no more than 2dB, a difference unlikely to be noticeable to most people, at most residences. Furthermore, the period of time when exceedances are predicted is generally restricted to a period from the end of the 1st year to the beginning of the 3rd year of the Project.

Compliance with sleep disturbance and road traffic noise criteria is predicted by the modelling.

To ensure noise levels do not exceed the modelled predictions, the Proponent would implement real-time noise monitoring at the potentially most affected location(s). This monitoring would provide an accurate real-time record of the noise levels being received and identify when restrictions or modifications to operations are required.

The Proponent has committed to implementing further noise mitigation controls at residences, on request of the resident, where the measured noise levels exceed criteria by more than 2dB.

Surface Water

The Mine Site is located within the catchment of Gundong Creek, bordered to the north by Fiddlers and Tomingley Creeks and to the south by Bulldog Creek, within the wider Bogan River catchment.

Gundong Creek has a significant catchment upslope of the Mine Site, although flows are highly variable and intermittent. Significant rainfall events in the upstream catchment can generate over-bank flows in Gundong Creek in the vicinity of the Mine Site, particularly over the western section of the Mine Site.

The Proponent has provided for the construction and maintenance of surface water management structures on the Mine Site, including catch banks, culverts and sediment basins, to ensure that:

- changes to the hydrology of all Mine Site catchments are avoided to minimise reduction in environmental flows and availability to downstream water users;
- Mine Site operations, in particular residue management, have a neutral or beneficial impact on surface water quality when compared to the existing (i.e. pre-development) conditions in the receiving waters;
- the capture and use of surface water remains within the Proponent's harvestable rights;
- any changes to peak flows, flow volumes or water quality do not have a detrimental effect on downstream ecology or the stability of drainage lines; and
- Runoff is maintained within the original catchments of the Mine Site.

Considering the construction and maintenance of the proposed surface water management structures, modelling was undertaken to predict the impact of the Mine Site operations on the quality and quantity of water exiting the Mine Site. The modelling results predicted that mean annual loads of all pollutants would decrease during the life of the Project. A small reduction in flows (0.5%) was predicted, however, a reduction of this order is unlikely to impact on the function of the natural system downstream of the Mine Site.

Modelling of potential impacts on local flooding conditions identified that a very minor increase in 1 in 100 ARI flood levels (38mm) may occur to the north of the Mine

Site as a result of the Project. The spatial extent of any change to flood levels would remain almost exclusively on the Mine Site. Modelling also confirmed that the Eastern Surface Water Diversion Structure (see **Figure B**) would be capable of diverting flows generated by a 1 in 100 year ARI flood around the Caloma Open Cut and WRE 3.

Groundwater

A review of groundwater bore records and targeted assessment has determined that groundwater is available in the following aquifers within and surrounding the Mine Site.

- **Shallow Alluvium.** Occurring less than 20m deep and associated with drainage lines surrounding the Mine Site, e.g. the alluvium surrounding Gundong Creek. These aquifers are likely to be recharged locally, primarily from surface water infiltration and water quality is of relatively good quality.
- **Deep Alluvium**. Occurring more than 10km to the northwest and west of the Mine Site and up to 100m below ground level.
- **Fractured Rock**. There are likely to be several fractured rock aquifer systems located within 20km of the Mine Site.

The Project is unlikely to have any adverse impact on the groundwater contained within the shallow alluvium of Gundong Creek as no groundwater has been encountered in any of the exploration holes drilled within the Mine Site. Furthermore, the alluvium of the Mine Site and surrounding areas is located within well-defined and unconnected palaeochannels. Therefore, even if groundwater was drained from alluvium adjacent to the open cuts the effects of this dewatering would only propagate to the paeleochannel boundary.

Modelling undertaken to quantify the likely impact on the deeper fractured rock aquifers predict drawdown would be limited to a maximum of between 2.3 and 5.6km from the Wyoming One underground workings. Based on the understanding that the rock mass below the Mine Site is tight, drawdown is expected to be at the lower end of this range.

The level of drawdown predicted is unlikely to have an adverse impact on local groundwater or groundwater users as:

- there are no registered users of groundwater from deep fractured rock aquifers located within 10km of the Mine Site; and
- groundwater within the fractured rock aquifer(s) surrounding the Mine Site is highly saline and therefore has limited potential for beneficial re-use; and
- there are no known groundwater dependent ecosystems within the range of influence of the mining operations.

Water levels within the open cut would rise following cessation of mining operations. The final water level within the open cuts is expected to be between 193m and 207m AHD, i.e. 3m to 17m below the pre-mining groundwater level of 210m AHD.

Ecology

An ecological assessment completed for the Project identified that the majority of the Mine Site contains cleared land dominated by exotic pastures and farmland. Approximately 155.6ha of remnant native vegetation remains within this largely cleared landscape, with approximately 21.6ha to be cleared for the Project. The cleared vegetation comprises:

- 2.7ha of Inland Grey Box – Poplar Box – White Cypress Pine tall woodland scattered across the Mine Site (which meets the classification of the NSW and Commonwealth listed Inland Grey Box Woodland EEC);

- 0.9ha of Fuzzy Box – Inland Grey Box community in the vicinity of the Wyoming One Open Cut (which meets the classification of the NSW listed Fuzzy Box on Alluvials EEC); and
- 18.0ha of Belah / Black Oak Western Rosewood, Wilga Woodland community in the vicinity of the Caloma Two Open Cut and Waste Rock Emplacement 3.

No threatened flora was identified within the Project Site. Of the 134 species of fauna identified within the Project Site, two species listed as threatened under the TSC Act (Grey-crowned babbler and Superb parrot), one listed under the EPBC Act (Rainbow bee-eater) and three species listed as having 'preliminary determinations as threatened' under the TSC Act (Little eagle, Spotted harrier and White-browed woodswallow) were identified.

An assessment of significance was completed for the EEC's and threatened fauna identified, as well as other threatened species and communities considered as being potentially impacted by the Project. In each case, and after consideration of the many commitments made by the Proponent with respect to impact avoidance, minimisation and mitigation, the assessment determined that the Project would not have a significant impact such that viable local populations of these species and communities, or any other listed species or communities, are likely to be placed at risk of extinction.

The assessment of significance also considered the implementation of the proposed Tomingley Gold Project Biodiversity Offset Strategy (TGP BOS). The TGP BOS incorporates the following principal elements (see **Figure D**).

- Protect and conserve 78.5ha of remnant native flora on the Mine Site and immediate surrounds.
- Protect and enhance a further 61.0ha of land adjoining these remnants.
- Retain and vegetate drainage features and sediment basins in the final landform to act as fauna habitat.
- Rehabilitate and manage the final landform to further extend areas of native vegetation in the landform.

Importantly, the implementation of the TGP BOS would ensure that the Project meets the "No Net Loss" biodiversity benchmark nominated by the Office of Environment and Heritage.

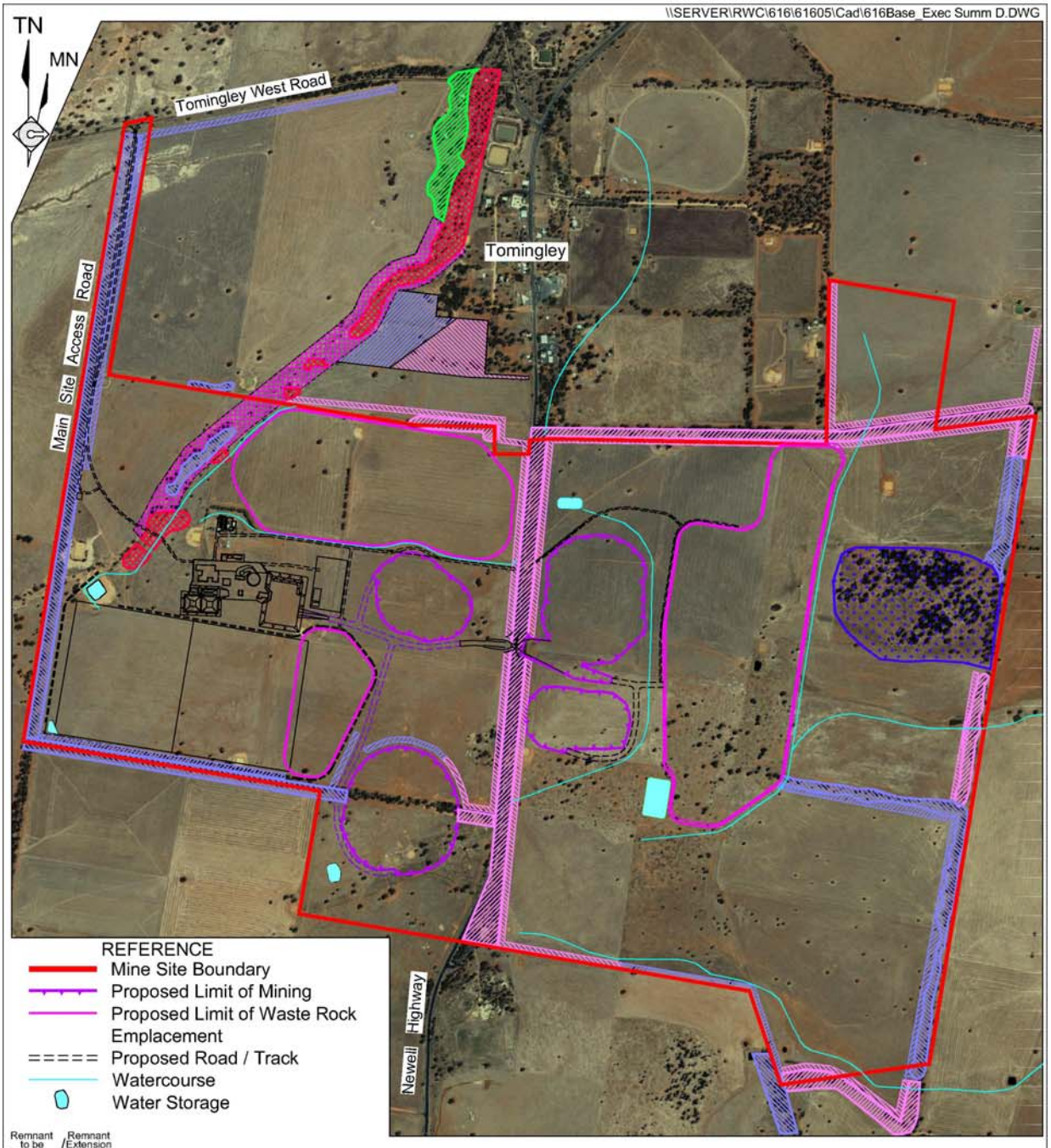
Aboriginal Heritage

The Project has the potential to impact on Aboriginal sites as a consequence of surface disturbing activities. Following consultation with registered Aboriginal community stakeholders, a field survey to identify the type and distribution of Aboriginal sites was undertaken.

In total, 57 Aboriginal sites were identified, including:

- 51 modified trees (40 scarred trees, 9 possibly scarred trees, 1 resource gathering tree and 1 carved tree);
- three open artefact sites (one with a potential archaeological deposit (PAD));
- two isolated finds; and
- one ceremonial / dreaming site.

Of these sites, a modified (possible carved) tree identified on the Mine Site was considered as having high cultural significance to the local Aboriginal community. Impact to this site, and second scarred tree, would be unavoidable given the location of these within the footprint of the open cuts. Specific management measures involving further investigation to determine whether one of these trees is a carved tree, additional site investigation surrounding the tree if determined to be a carved tree, excavation and removal of the trees to a specified keeping place, have been proposed, discussed and accepted in principle by the local Aboriginal community.



	Community					
	1	2	3	4	5	6
Area to be Disturbed (ha)	2.7	0	0.9	0	18.0	0.7
Remnant to be Conserved (ha)	21.1	13.1	5.1	4.9	34.3	0
Remnant Extension (Protection & Ameliorative Planting) (ha)	21.5	13.5	26.0	0	0	0

Figure D
BIODIVERSITY OFFSET STRATEGY

A further four sites on the Mine Site, two scarred trees and two open scatters, occur in close proximity to proposed Mine Site activities and would be identified as sensitive sites and protected from inadvertent damage.

One open scatter and PAD was identified on the alignment of the water pipeline. The Proponent subsequently completed test excavations along the alignment of the water pipeline through the PAD, recovering a total of 121 artefacts, predominantly small, unmodified flakes, a by-product of stone tool manufacture.

Specific management measures have been proposed for construction of the water pipeline through the PAD, and assuming the implementation of these and acknowledging the low scientific significance of the PAD (due to low artefact density, shallow deposit with a high likelihood of prior disturbance), impacts on this site are assessed as acceptable.

The Proponent has also committed to preparing and implementing, in consultation with the local Aboriginal community, a Cultural Heritage Management Plan. A copy of a draft Cultural Heritage Management Plan has been provided to the registered Aboriginal stakeholders for the Project, with no objections to the nominated management measures and operational safeguards received.

Non-Aboriginal Heritage

A non-Aboriginal survey was undertaken concurrently with the Aboriginal heritage field survey. A total of eight items of non-Aboriginal heritage significance were identified during the non-Aboriginal heritage survey, six within the Mine Site and two along the alignment of the water pipeline route. Only two of these sites require removal as a result of the Project, the remaining would be protected in situ or removed for safekeeping.

An assessment of historic significance was completed, with none of sites being identified as of high significance. This assessment of historic significance notwithstanding, the Proponent has committed to completing an assessment and archaeological investigation of the remains of a dwelling and associated material associated with one of the sites, and preparing an archival photographic record of the agricultural machinery which makes up the other site.

On the basis of the limited historic significance of the sites to be disturbed, and considering the management and mitigation measures that would be implemented, it is assessed that the Project would not result in significant impacts to the non-Aboriginal heritage record in the vicinity of the Project.

Visual Amenity

The existing visual amenity surrounding the Project Site is typical of rural areas in the central west of NSW, with the outlook from most rural residences and other vantage points including remnant native vegetation, land used for agriculture, roads or other infrastructure.

The following measures to be implemented to minimise potential visual amenity-related impacts would include:

- Construction of a vegetated amenity bund adjacent to the eastern and western boundary of the Newell Highway.
- Progressive rehabilitation of the waste rock emplacements using locally occurring native species.
- Progressive reshaping and rehabilitation of areas no longer required for mining related purposes.
- Placement and use of night time lighting which is directed away from surrounding vantage points and minimises glow affects.

The visual amenity in the vicinity of the Mine Site would be altered through the addition of three waste rock emplacements and the RSF. However, the impacts of that change to the existing visual amenity would be minimised as far as practicable through the implementation of the nominated mitigation measures.

Air Quality

Dust generating activities associated with the Project have been identified and quantified through dispersion modelling. The modelling results indicate that the potential impact on air quality at surrounding residences would be minor and would not exceed the recommended annual air quality goals.

For the life of the Project, it has been estimated that approximately 0.38Mt CO_2-e would be released annually, corresponding to an approximate annual contribution of <0.035% against baseline 2008 NSW greenhouse gas emissions.

Blasting

Modelling of the likely air overpressure and ground vibration resultant from mine-related blasting was completed for the Project. The results of this modelling indicate that through the implementation of appropriate blast design and controls, compliance with the relevant criteria for both air overpressure and ground vibration (both for residential locations and the proposed Newell Highway underpass) would be achieved.

Transportation

The Proponent proposes to construct a new intersection between the Main Site Access Road and Tomingley West Road. The Proponent has also proposed to provide for road upgrades on Tomingley West Road.

A comparison of measured traffic volumes with the predicted traffic levels illustrates the following.

- The Project would result in an increase in traffic levels of between 3.2% and 5.1% on the Newell Highway (a negligible increase well within the capacity of this major transport route).
- The Project would result in an increase in traffic levels of between 7.2% and 16.5% on the Tomingley - Narromine Road (overall traffic volume of less than 600 vehicles per day).
- The Project would increase traffic on Tomingley West Road, however, overall traffic volumes would remain less than 300 vehicles per day.

Overall, the Project would not generate major increases in local or regional traffic and consequently the impact on the local road network and traffic would be low.

Soils and Land Capability

Based on the results of preliminary survey, the observed soil profiles and laboratory analyses, six soil units were identified within the Mine Site.

The use of appropriate soil stripping, handling and stockpiling procedures, together with appropriate erosion controls would result in a minimal impact to soils within the Project Site.

A soils assessment also concluded that the final landform should be able to achieve land stability similar to the existing landform.

Socio-economic Setting

The Project would provide several economic benefits to the local and regional socio-economic setting, including the following.

- Direct full-time employment for approximately 100 full-time equivalent positions during the site establishment and up to 90 full-time equivalent positions during the operational phase of the Project.

- Preference when engaging new employees would be given, where practicable, to candidates who live within the local area over candidates with equivalent experience and qualifications based elsewhere and ensure that the mining and other contractors do so as well.
- The employment of the local Aboriginal community in the workforce would be encouraged.
- Participation of locally based employees and contractors in appropriate training or education programs would be encouraged and supported.
- Support to community organisations, groups and events would be provided, as appropriate.
- Excess water from the water supply bores and pipeline would be made available to Narromine Shire Council for supply to the residents of Tomingley.

Increased employment opportunities associated with the Project would have additional flow-on benefits including:

- the provision of new employment would provide an impetus to other local businesses; and
- the injection of approximately $28.6 million per year into the local and regional economy, with an additional approximately $20.4 million into the State and Federal economies.

The design of the final landform has also taken into account possible future land uses for the Mine Site. Through consideration of current land uses in the local area, infrastructure that would be available and a requirement to offset impacts to local biodiversity, the Proponent has provided a conceptual landform which provides for the extension and linkage of remnant native vegetation, continuation of sustainable agriculture and possible introduction of some other land uses which could take advantage of the power and water supply to the site. By designing the final landform in this way, the Proponent is providing for the continued contribution of this land to the socio-economic setting.

It is further noted that the Proponent remains accountable for managing the Project in a manner that complies with the nominated environmental criteria and meets reasonable community expectations. A comprehensive monitoring program would be established to demonstrate compliance with environmental criteria, and liaison with both official and unofficial community representation would continue to address community concerns as they arise.

PROJECT EVALUATION AND JUSTIFICATION

The Tomingley Gold Project has been evaluated and justified principally through consideration of its potential impacts on the environment and potential benefits to the local and wider community.

In evaluating the Project it is concluded that, with the implementation of the proposed operational controls, safeguards and/or mitigation measures, the residual risk posed by each possible environmental incident or impact are reduced from original levels. With limited exceptions, the residual risk was classified as either moderate or low, and therefore acceptable. Further, the design of the Project has addressed each of the sustainable development principles, and on balance, it is concluded that the Project achieves a sustainable outcome for the local and wider environment.

The Project and associated activities have been assessed in terms of a wide range of biophysical, social and economic issues. Potential residual impacts can be justified in terms of the positive economic and social benefits to the Narromine, Parkes and Dubbo local government areas, NSW and Australia, the market opportunities for gold exports and the principles of ecologically sustainable development.

CONCLUSION

The Project has been, to the extent feasible, designed to address all issues raised by the local community and all levels of government, as well as the principles of ecologically sustainable development.

The Proponent has identified the need for the Mine Site to continue to contribute to the socio-economic setting of the local area and allows for a combination of biodiversity conservation, sustainable agriculture and possibly some other land use which could take advantage of the power and water supply to the site.

In light of the conclusions included throughout the *Environmental Assessment*, it is assessed that the Project could be constructed and operated in a manner that would satisfy all relevant statutory goals and criteria, environmental objectives and reasonable community expectations.

The *Environmental Assessment* supported by the range of specialist consultant studies has established that if the Project proceeds, it would:

1. satisfy ecologically sustainable development principles;
2. operate with risks to the local environment minimised to the greatest extent practicable through Project design and implementation of a range of environmental controls and safeguards;
3. have a minimal and manageable adverse impact on the biophysical environment;
4. have a substantial positive impact on the local and wider regional and NSW socio-economic environment;
5. contribute to the continued economic activity of the local area; and
6. provide a site suitable for future agricultural activities incorporating areas for long term nature conservation.

Key Project Components and Statistics

Key Project Components	
Project Summary	Develop a gold mine site consisting of four open cuts and one underground mine which includes: • Extraction and processing of up to 1.5 million tonnes of gold-bearing ore per year. • Establish four open cut mines, one underground mine, a processing plant, three waste rock placements, run-of-mine pad, residue storage facility as well as ancillary activities and associated infrastructure including construction • Limited truck transportation on the local road network (for the delivery of equipment and consumables). • Rehabilitation of the disturbed areas.
Key Statistics	
Project Site Area	776ha (total area of disturbance of approximately 300ha including 21.6ha of native vegetation)
Total Resource	10.3 million tonnes
Main Products	Gold dore
Mining Rate	Up to 1.5 million tonnes of ore per year.
Project Life	10 years.
Extraction Methods	Open cut: • Weathered materials ripped and pushed using a bulldozer and extracted with an excavator and off-road trucks. • Competent materials lightly fragmented by blasting and extracted with an excavator and off-road trucks. Underground operations: • Long hole open hole stoping methods.
Processing	Mined ore would be processed through the on-site Processing Plant and would comprise components of crushing, grinding, cyanide leaching operations and gold recovery.
Stockpiles	Excavated soils (excluding sodic soils) to be stockpiled and used in rehabilitation activities. Cleared groundcover vegetation to be stockpiled on-site and reused as vegetated areas in rehabilitation stages.
Final Landform and End Land Use	Progressive rehabilitation to create a shaped and geotechnically stable final landform suitable for end land use of sustainable agriculture, nature conservation and/or appropriate light industry.
Biodiversity Offset	Conservation of 78.5ha of remnant native flora and enhancement and protection of a further 61.0ha of low condition land adjoining the remnants to be conserved.
Revegetation	Progressive approach to the rehabilitation of disturbed areas within the Mine Site
Employment	Approximately 100 full-time equivalent positions during site establishment phase and up to 90 full-time equivalent positions during the operational phase.
Capital Investment Value	$65.6 million[1]
Hours of Operation	• Construction operations, open cut mining operations, underground mining operations, maintenance operations and rehabilitation operations – 24 hours per day. • Vegetation clearing and topsoil stripping – Daylight hours. • Blasting operations – 9:00am to 5:00pm (Monday to Saturday) • Rehabilitation Operations – 7:00am to 10:00pm
Note 1: Revised from estimated Capital Investment Value quoted in the application for project approval (23 July 2009) (see **Appendix 1**) following consideration of the Department of Planning Circular PS 10-008 "*New Definition of Capital Investment Value*").	

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