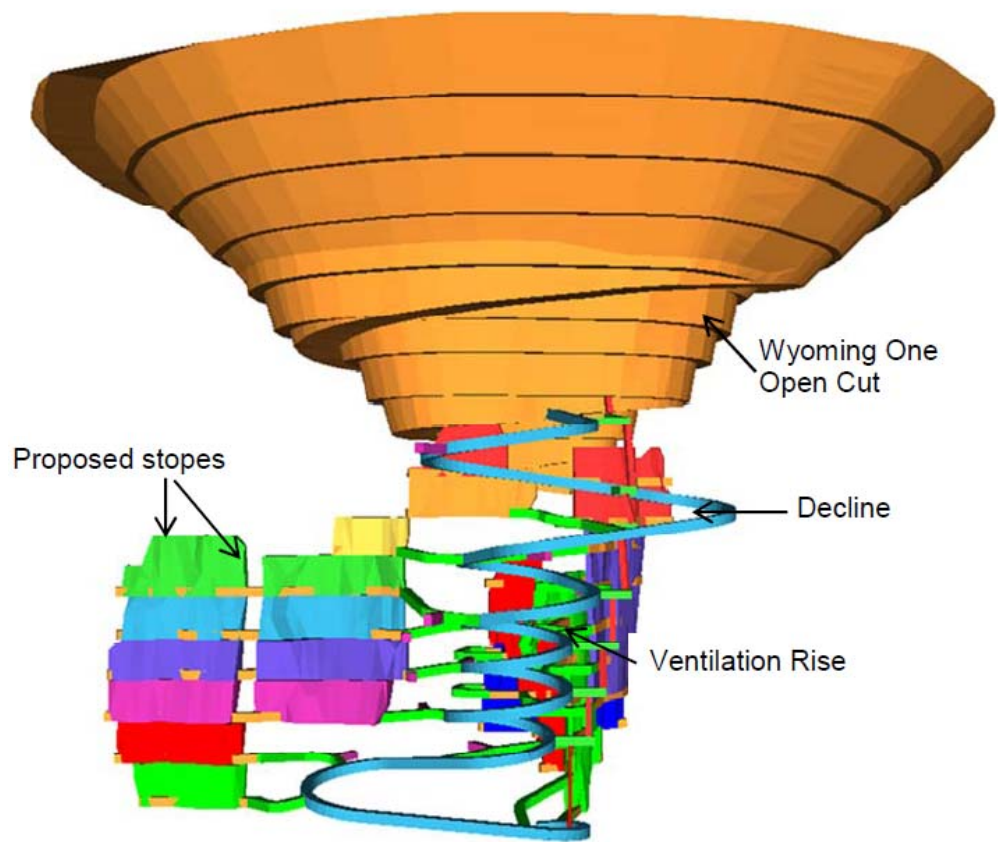


**MAJOR PROJECT ASSESSMENT:
Tomingley Gold Project
(MP 09_0155)**



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

July 2012

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Cover image: Proposed underground mine development, *Tomingley Gold Project: Environmental Assessment*
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EXECUTIVE SUMMARY

Alkane Resources Ltd (Alkane) proposes to develop and operate the Tomingley Gold Project, located immediately south of the township of Tomingley, approximately 50 kilometres southwest of Dubbo.

The project involves the extraction of up to 1.5 million tonnes of gold ore per annum, over a project life of 10 years. The project consists of 3 open cut pits, one underground mine, a processing plant, 3 waste rock emplacements and a residue (tailings) storage facility. The project also includes associated infrastructure, including the construction of a water supply pipeline between Narromine and Tomingley and a haulage road underpass beneath the Newell Highway.

The proposal constitutes a 'major project' under Part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act), as it is development for the purpose of mining with a capital investment value of more than \$30 million, and consequently requires the Minister's approval. However, under the Minister's delegation the Deputy Director-General, Development Assessment and Systems Performance, may determine the project application.

The Department exhibited the Environmental Assessment (EA) for the project between 17 November and 19 December 2011. The Department received a total of 8 submissions on the project, including 7 from public authorities and one from a special interest group. All public authority submitters are now satisfied with the project, and do not object to its approval. Key issues raised in submissions included surface water and groundwater impacts, management of hazardous materials (including cyanide), ecological impacts, traffic impacts (including road upgrade requirements), air quality impacts and noise impacts.

The Department has carried out a detailed assessment of the merits of the project, in accordance with the requirements of the EP&A Act. This assessment has found that, despite the residents of Tomingley being in relatively close proximity to the proposed mine, the operation of the project could be managed such that it would not result in unacceptable noise, dust, blasting, traffic or visual amenity impacts. Proposed measures to manage these impacts include:

- the construction and maintenance of vegetated amenity bunding and vegetation screens;
- proactive management of potential noise, blasting and air quality impacts, including real-time monitoring, community engagement and restricting activities during adverse meteorological conditions; and
- adaptive management of the project to ensure ongoing compliance of mining operations with project-specific noise, blasting and air quality criteria.

Although the project is likely to result in the localised drawdown of saline groundwater, the Department is satisfied that the project would not significantly impact any groundwater user in the region given the aquifer's salinity, the absence of extractive use and the low likelihood of connection to the alluvial aquifer of Gundong Creek.

With the implementation of appropriate storage design and surface water control measures, including a comprehensive water management plan, the Department is satisfied that the potential water quality and flooding impacts of the project can be adequately managed to within acceptable levels.

The project would require the removal of 22.4 hectares (ha) of remnant native vegetation, which would be offset by the conservation and enhancement of remaining vegetation on the site. Alkane also proposes to rehabilitate the site to enhance existing native vegetation and facilitate the active and passive regeneration of woodland around the site.

The Department has recommended a range of conditions to ensure that these impacts are suitably mitigated, managed and/ or offset. These conditions include requirements for Alkane to:

- continue baseline groundwater monitoring to refine and update, as relevant, the proposed approach to the mitigation and management of potential groundwater impacts prior to interception of the groundwater table;
- enter into a Planning Agreement with Narromine Shire Council for upgrades to Tomingley West Road, road maintenance contributions, contributions towards a community fund and contributions towards enhancing Council's environmental management expertise;
- develop and implement a significant biodiversity offset to ensure the project maintains and potentially improves the biodiversity values of the region in the medium to long term;
- conserve the proposed biodiversity offset area in perpetuity;

- progressively rehabilitate the site, and continue to investigate opportunities to backfill mine voids, particularly the Wyoming Three void, as part of the site rehabilitation;
- monitor and regularly report on its environmental performance; and
- commission independent audits of operations, to ensure compliance with conditions of approval and continued implementation of best practices on the site.

The Department's assessment also found that the project would provide economic and social benefits for both the region and NSW, being:

- employment for up to 100 employees during site establishment and 85 to 90 employees during mining operations;
- a capital investment of \$65.6 million; and
- royalties and payroll taxes for the State Government.

On balance, the Department believes that the project's benefits sufficiently outweigh its residual costs and that it is in the public interest. The project should therefore be approved subject to strict conditions.

1. BACKGROUND

Alkane Resources Limited (Alkane) proposes to develop the Tomingley Gold Project, an underground and open cut gold mining operation in Tomingley, approximately 50 kilometres (km) southwest of Dubbo in the Central West of NSW (see **Figure 1**).

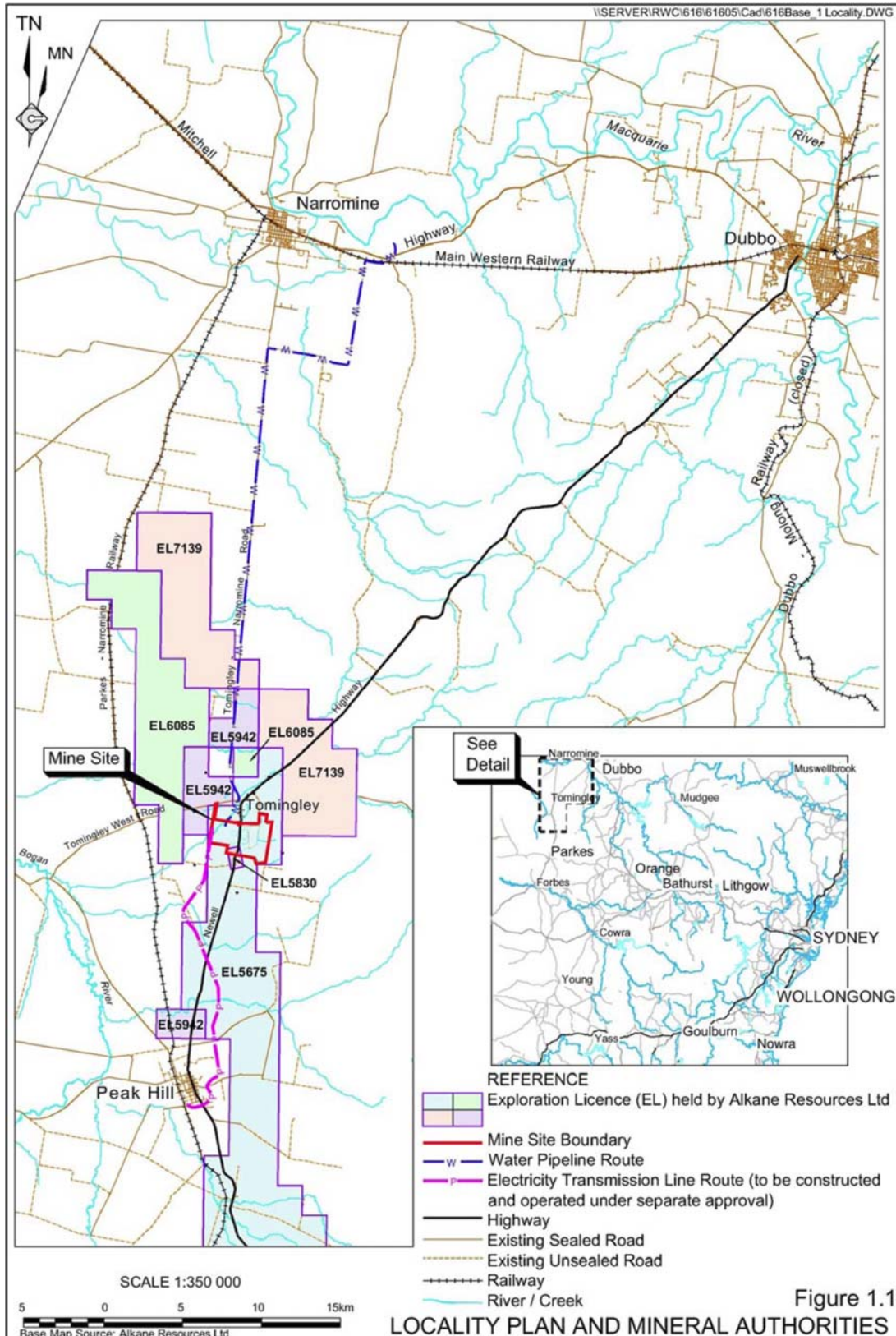


Figure 1: Regional Context

1.1 Project Setting

The proposed mine site is situated immediately south of the village of Tomingley, approximately 15 km north of Peak Hill in the Narromine local government area. The project site is located to the northwest of Herveys Range, in the Bogan River catchment on the western slopes of the Great Dividing Range, an area characterised by generally flat plains with an elevation between 220 metres (m) AHD and 400 m AHD. The mine site is bisected by the Newell Highway, which connects Parkes and Dubbo.

The land uses within and surrounding the mine site and pipeline corridor comprise a mixture of residential and rural residential properties, agricultural, transportation and recreational lands, as well as former mining operations. The project site is surrounded by mostly private properties, with a small section of the site's southern border adjacent to Crown land. The mine site itself is located on three private parcels of land owned by J Pearse, G & C Pugh and M McNiven.

The proposed water supply pipeline would extend for approximately 46 km between the mine site and the 'Woodlands' property (Lot 18 DP 755119), which is located approximately 7 km east of Narromine. The pipeline is located generally within existing road and rail reserves, apart from three small sections. These sections include a part of the private 'Woodlands' property, a parcel of land controlled by Australian Rail Track Corporation (where the pipeline would pass under the Main Western Railway Line), and a section of land on the southern portion of the route between Tomingley Road West and the site, for which Alkane currently holds an option to purchase.

2. PROPOSED PROJECT

Alkane proposes to develop a new open cut and underground gold mine at Tomingley, known as the Tomingley Gold Project. The key components of the project are summarised in **Table 1** and depicted in **Figures 2** and **3**. The project is described in detail in Alkane's Environmental Assessment (EA), which is attached as **Appendix A**.

Table 1: Major Components of the Tomingley Gold Project

Aspect	Summary
Project Summary	<p>Construction and operation of a new open cut and underground gold mine, including:</p> <ul style="list-style-type: none"> • development of 3 open cut pits¹ and an underground mine and associated infrastructure; • extracting and processing up to 1.5 million tonnes of ore per annum (Mtpa) to produce gold doré; • construction and operation of ancillary infrastructure including a 46 km water supply pipeline, on-site 66 kV–11 kV substation and a haulage road underpass beneath the Newell Highway; and • progressive rehabilitation of the site. <p>¹ The proposal as exhibited included four open cut pits but one of these, Caloma Two open cut, was removed from the scope of the project by Alkane following lodgement of its Response to Submissions.</p>
Project Area	776 ha
Disturbance Area	300 ha, including 22.4 ha of native vegetation
Mining and Reserves	<p>Extraction of approximately 10.3 Mt of ore using a combination of open cut and underground mining methods.</p> <ul style="list-style-type: none"> • 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 – long hole and open hole stoping methods.
Processing and Facilities	Up to 1.53 Mtpa of ore would be processed through the on-site processing plant, including crushing, grinding, cyanide leaching and gold recovery to produce gold doré. Processing would occur from the second year of mining operations up to the final year of mining (predicted to be Year nine)
Project Life	10 years

Aspect	Summary
<i>Proposed surface infrastructure</i>	<p>The project would require construction of:</p> <ul style="list-style-type: none"> • a processing plant and office area which would include an integrated run-of-mine (ROM) primary ore pad, crushing and grinding circuit, cyanide leaching and gold recovery using carbon-in-leach, site offices, workshop, laydown area, ablutions facilities, car parking, and associated infrastructure; • a residue (ie tailings) storage facility (RSF); • amenity bunding and 3 waste rock emplacements; • a water supply pipeline and associated water reticulation system; • a site access road and intersection to allow site access from Tomingley West Road; • internal haul roads and a haulage road underpass beneath the Newell Highway; • electricity infrastructure, including a 66 kilovolt (kV) to 11 kV substation and transformer; and • ancillary infrastructure, including soil stockpiles, core yards, internal roads and tracks and surface water management structures (comprising diversion structures, sediment basins and mine dewatering ponds).
<i>Water Demand and Supply</i>	<p>The maximum predicted project-related water requirement is 938 million litres per year (ML/year) comprising water required for processing operations (878 ML/year) and dust suppression (60 ML/year). This water would be sourced from:</p> <ul style="list-style-type: none"> • a licensed production bore (or bores) on the 'Woodlands' property approximately 40 km north of the mine; • 'harvestable rights' surface water captured by the site diversion structures; and • groundwater inflow into underground operations. <p>Water would be conveyed from the bores on the 'Woodlands' property to the mine via a new 46 km long water pipeline, which would be up to 315 millimetres (mm) in diameter and buried up to 1 m below the ground surface.</p> <p>Alkane anticipates that the project would require less than 1,000 ML/year to be drawn from the 'Woodlands' bore(s) for operational purposes, and there is the potential for some surplus water to be provided to Tomingley village for stock and domestic use.</p>
<i>Tailings Management</i>	<p>Approximately 3.9 million cubic metres (m³) of tailings would be produced during the life of the project. The tailings would be directed to the RSF, which would cover an area of approximately 49 ha, south of the processing plant.</p>
<i>Waste Rock Management</i>	<p>Approximately 45 Mt of waste rock would be generated over the life of the project. The vast majority of this would be used in construction of surface infrastructure or placed in a temporary waste rock emplacement (with a maximum designed volume of approximately 26 million m³). The remainder would be used to backfill underground stopes and potentially the Wyoming Three open cut void, following further detailed resource definition.</p>
<i>Transport</i>	<p>The project would use three road transport routes:</p> <ul style="list-style-type: none"> • to/from Narromine via Tomingley-Narromine Road and Tomingley West Road; • to/from Dubbo via the Newell Highway, Tomingley-Narromine Road and Tomingley West Road; and • to/from Peak Hill and Parkes via the Newell Highway, Tomingley-Narromine Road and Tomingley West Road. <p>During construction, there would be approximately 180 light vehicle movements and 20 heavy vehicle movements per day. During operations, daily traffic movements associated with the project would include approximately 136 light vehicle movements and 8 heavy vehicle movements associated with the delivery of consumables.</p>
<i>Employment</i>	<p>100 employees (construction and site establishment), 90 employees (mining operations).</p>
<i>Hours of Operation</i>	<ul style="list-style-type: none"> • Vegetation clearing and stripping of topsoil – daylight hours; • construction, open cut mining operations, underground mining operations, maintenance operations – 24 hours, 7 days per week; • blasting operations – 9:00am to 5:00pm (Monday to Saturday); and • rehabilitation operations – 7:00am to 10:00pm.
<i>Biodiversity Offset</i>	<p>The project would result in the removal of 22.4 ha of remnant native vegetation including 3.7 ha of EEC. To compensate for this loss, Alkane has committed to offsetting a 66.6 ha area of the site. The Biodiversity Offset Strategy would also involve enhancement of an additional 61 ha, including rehabilitation, ameliorative planting, stabilisation of eroding creek banks, and management of weeds and feral animals.</p>
<i>Final Landform and End Land Use</i>	<p>Progressive rehabilitation to create a shaped and geotechnically stable final landform suitable for an end land use of sustainable agriculture, nature conservation and/or appropriate light industry.</p>
<i>Capital Investment Value</i>	<p>\$65.6 million</p>

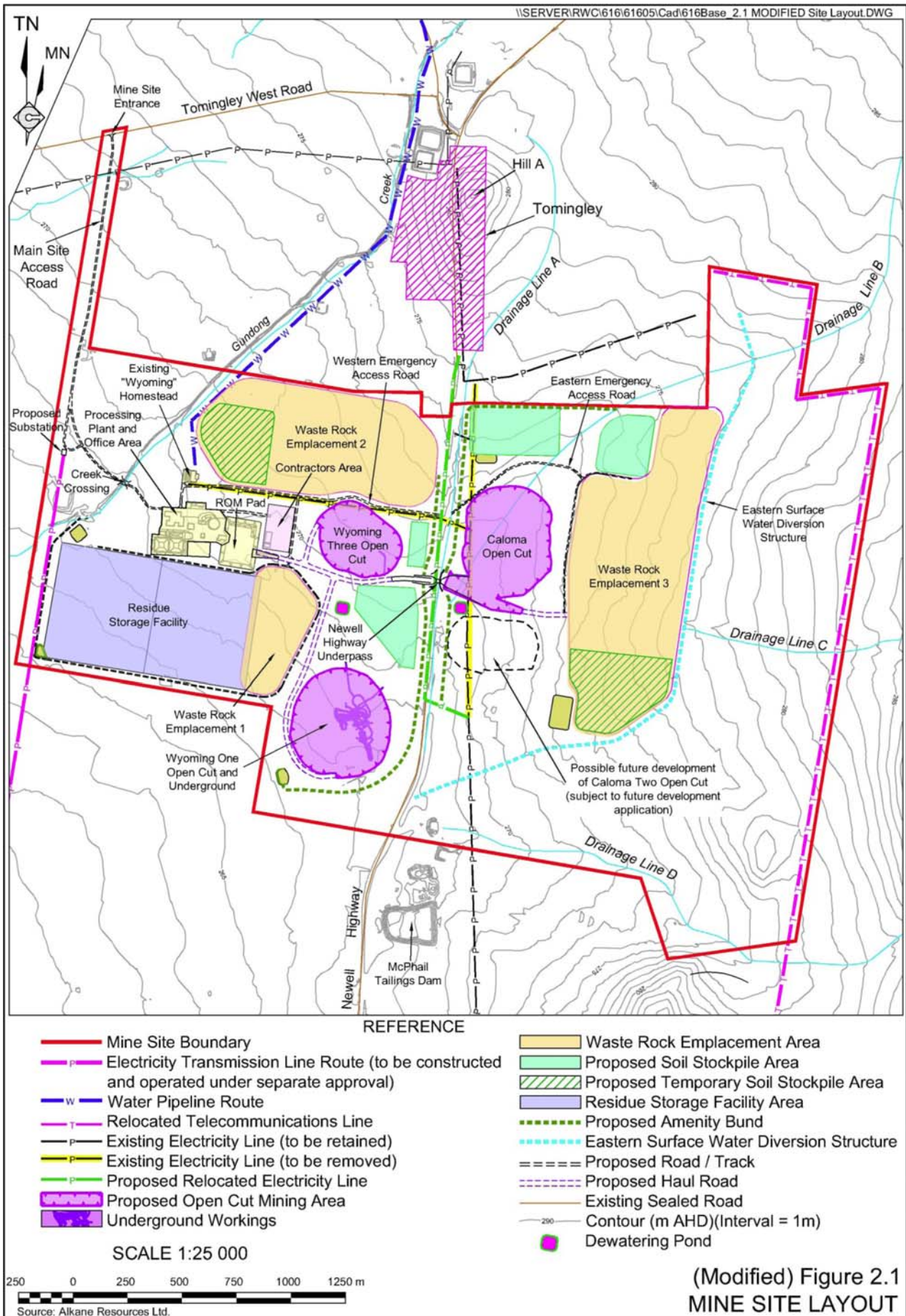


Figure 2: Project Layout

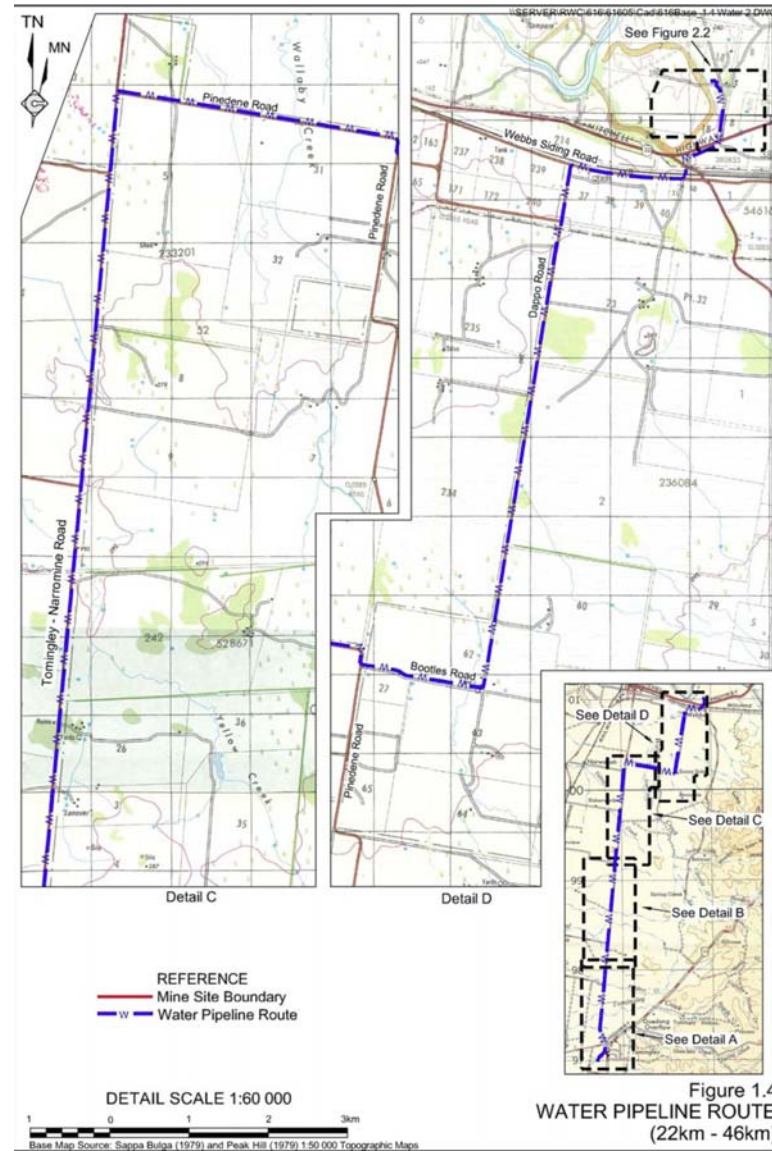
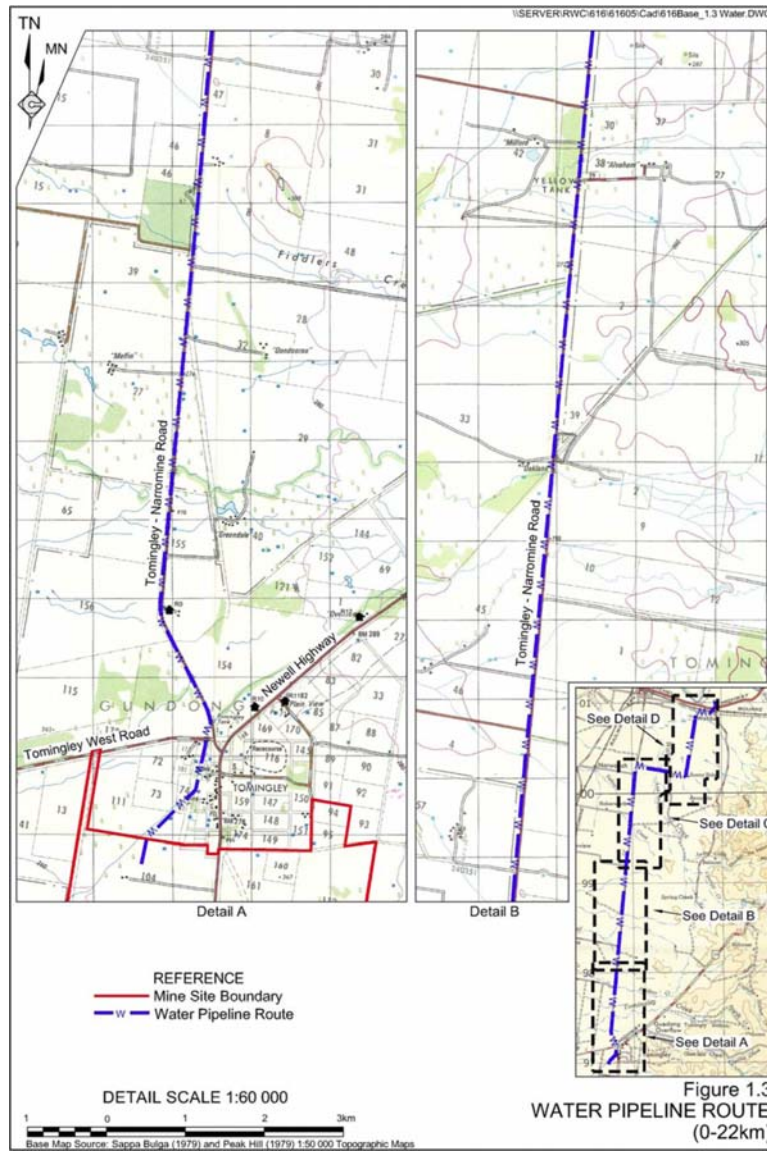


Figure 3: Water Supply Pipeline Route

3. STATUTORY CONTEXT

3.1 Major Project

Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), as in force immediately before its repeal on 1 October 2011 and as modified by Schedule 6A to the Act, continues to apply to the project application, since it is a "transitional Part 3A project" for the purposes of Schedule 6A. The proposal was originally classified as a major project under Part 3A, because it constitutes development for the purpose of mining with a capital investment value of more than \$30 million, and therefore meets the criteria under clause 5(1)(c), Schedule 1 of the then *State Environmental Planning Policy (Major Development) 2005*.

Consequently, the Minister for Planning and Infrastructure is the approval authority for the project application. However, the Deputy Director-General, Development Assessment and Systems Performance, may determine the project application under the Minister's delegation of 14 September 2011, since:

- there were less than 25 public submissions in the nature of objections; and
- neither of the local Councils objected to the application.

3.2 Permissibility

When the application for the project was first made, *Narromine Local Environmental Plan 1997* (Narromine LEP 1997) was in force and the land affected by the project was zoned 1(a) General Rural. As development for the purpose of agriculture was permissible in this zone, so too was development for the purpose of mining (by virtue of the operation of the Mining SEPP). Additionally, construction of infrastructure was permissible in this zone, therefore the pipeline was permissible.

Since the application was made, *Narromine Local Environmental Plan 2011* (Narromine LEP 2011) has repealed and replaced Narromine LEP 1997. The land subject to the proposed mine site is now zoned RU1 Primary Production under the *Narromine Local Environmental Plan 2011* (Narromine LEP 2011). Open cut mining is permissible with development consent in this zone. Underground mining is also permissible with development consent on the project site under *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP).

The proposed water supply pipeline crosses land zoned RU1 Primary Production and SP2 Infrastructure under the Narromine LEP 2011. The pipeline is permissible without development consent in the RU1 zone, and would be prohibited development in all SP2 zones regardless of characterisation (only development for the purpose of roads and ancillary development is permitted in those zones). However, the Narromine LEP 2011 includes savings provisions such that applications made prior to the commencement of the LEP are to be determined as if the Narromine LEP 2011 had not commenced.

Consequently, the Minister or his delegate may approve the carrying out of the project.

3.3 Other Approvals

Under section 75U of the EP&A Act, a number of other approvals have been integrated into the major project approval process and are not required to be separately obtained for the project. These include:

- heritage-related approvals under the *Heritage Act 1977* and *National Parks and Wildlife Act 1974*; and
- various water-related approvals to take and use water, and to undertake works within 40 m of a watercourse, under the *Water Act 1912* and *Water Management Act 2000*.

Under section 75V of the Act, a number of further approvals are required to be obtained, but these must be approved in a manner that is consistent with any Part 3A approval for the project. These include:

- a mining lease under the *Mining Act 1992*;
- an Environment Protection Licence under the *Protection of the Environment Operations Act 1997*; and
- consent under the *Roads Act 1993* to undertake works within a road reserve.

The Department has consulted with the relevant Government authorities responsible for these other approvals (see Section 4) and has considered the issues relating to these approvals in its assessment of the project (see Section 5). None of these authorities object to the project on grounds related to these other approvals.

3.4 Exhibition and Notification

Under section 75H(3) of the EP&A Act, the Director-General is required to make the EA for the project publicly available for at least 30 days. After accepting the EA for the project, the Department:

- made the EA publicly available from 17 November 2011 until 19 December 2011:
 - on the Department's website;
 - at the Department's Information Centre, Narromine Shire Council's office and at the office of the Nature Conservation Council;
- notified relevant State Government authorities and Narromine Shire Council by letter; and
- advertised the exhibition in local media.

This satisfies the requirements of section 75H(3) of the EP&A Act.

During the assessment process, the Department also made a number of documents available for viewing or download on its website. These documents included the:

- project application;
- Director-General's environmental assessment requirements;
- EA; and
- Alkane's response to issues raised in submissions (Response to Submissions, or RTS).

3.5 Environmental Planning Instruments

Under Section 75I of the EP&A Act, the Director-General's report is required to include a copy of, or reference to, the provisions of environmental planning instruments that substantially govern the carrying out of the project.

The Department has considered the project against the relevant provisions of the Narromine LEP 2011 and several State Environmental Planning Policies (SEPPs) (see **Appendix B**) as well as Alkane's consideration of these issues (see section 3.3 of the EA), and is satisfied that none of these instruments substantially govern the carrying out of the project.

3.6 Objects of the Environmental Planning and Assessment Act 1979

Decision-makers are required to consider the objects of the EP&A Act when making decisions under the Act. These objects are detailed in section 5 of the Act, and include:

'The objects of this Act are:

- (a) *to encourage:*
 - (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
 - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
 - (iii) *the protection, provision and co-ordination of communication and utility services,*
 - (iv) *the provision of land for public purposes,*
 - (v) *the provision and co-ordination of community services and facilities, and*
 - (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
 - (vii) *ecologically sustainable development (ESD), and*
 - (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.'*

The Department is satisfied that the project encourages the proper use of resources (Object 5(a)(i)) and the promotion of orderly and economic use of land (Object 5(a)(ii)).

The encouragement of environmental protection (Object 5(a)(i)) is considered in detail in Section 5 of this report. Based on this consideration, the Department is satisfied that the impacts of the project can be mitigated and/or managed to ensure an acceptable level of environmental performance.

Finally, the Department has fully considered the encouragement of ecologically sustainable development (ESD) (Object 5(a)(vii)) throughout its assessment of the merits of the project application, and sought to integrate all significant economic and environmental considerations and avoid any serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences. Based on this consideration, the Department is satisfied that the project can be carried out in a manner that is consistent with the principles of ESD.

3.7 Statement of Compliance

Under section 75I of the EP&A Act, the Director-General's report is required to include a statement relating to compliance with the environmental assessment requirements issued for respect to the project. The Department is satisfied that the environmental assessment requirements have been complied with.

4. CONSULTATION

The Department exhibited the EA for the project between 17 November and 19 December 2011. The Department received a total of 8 submissions on the project, comprising:

- 7 from Government agencies/authorities; and
- 1 from a special interest group.

A full copy of the submissions is attached in **Appendix C**. Alkane has subsequently provided formal responses to the issues raised in these submissions (the RTS, see **Appendix D**).

A summary of the issues raised during the consultation process is provided below.

4.1 Public Authorities

The **Division of Resources and Energy** (DRE), part of the Department of Trade and Investment, Regional Infrastructure and Services, initially did not support the proposal based on the lack of consideration given to three issues:

- the retention of 4 voids in the final landform and a lack of information about mineralisation beneath the open cuts to justify not backfilling 3 of the 4 voids;
- the location of a waste rock emplacement within the potential zone of high-wall instability for the Wyoming Three open cut; and
- no active revegetation strategy for the open cut voids.

As noted in section 2, Alkane has removed the Caloma Two open cut from its proposal following consultation with DRE. Alkane has also committed to further defining the potential resource beneath the open cuts and to backfill Wyoming Three, if it would not result in the sterilisation of a mineable resource. DRE has subsequently accepted Alkane's justification for retaining 3 voids on this basis. Alkane provided further information on geotechnical stability affecting the area of the proposed high wall and has also committed to undertake some active revegetation of open cuts where practicable.

The **Office of Environment & Heritage** (OEH), incorporating the **Environment Protection Authority** (EPA), raised a series of concerns and requests for additional information/clarification in relation to biodiversity, groundwater, hazardous materials management, waste, noise, air quality and surface water. Key among these issues were OEH's concerns around the adequacy of the proposed biodiversity offset package, protection of groundwater quality through the appropriate lining of water storages, and management of hazardous materials (particularly cyanide). The EPA also recommended updates to air quality and noise modelling.

The **NSW Office of Water** (NOW) commented on the project's groundwater and surface water assessments, water supply, licensing and proposed monitoring and mitigation. NOW recommended further assessment of key issues prior to determining the project, including:

- additional baseline monitoring to address the level of uncertainty in the groundwater modelling, and to accurately predict likely dewatering and licensing requirements;

- flooding - including potential impacts both on the mine site and off-site. NOW raised concerns that the predicted flood is only based on the 1 in 2 year Average Recurrence Interval (ARI) event and the assessment of potential off-site impacts was not provided; and
- design of surface water diversion structures including channel slope and stabilisation, and the proximity of flood control levees to Gundong Creek.

Alkane then undertook further flood modelling for the project based on a 100 year ARI event, along with a review of the predicted flows in the surface water diversion structures and proposed armouring to prevent scour, which is discussed further in section 5.1. Alkane also recommenced baseline groundwater monitoring which is to continue until the commencement of mining activities, with the aim of informing a groundwater monitoring and management regime.

Roads and Maritime Services (RMS) did not object to the proposal and highlighted the existence of a Works Authorisation Deed in relation to proposed works that would affect the Newell Highway (ie the haulage road underpass). RMS sought reference to this Deed in the project approval conditions to ensure the works are conducted in accordance with the Deed.

The **Department of Primary Industries – Catchments and Lands (DPI)** did not object to the proposal and sought clarification about where the water pipeline intersects with Crown land parcels.

Narromine Shire Council principally focussed on the impacts of the project on local infrastructure and the village of Tomingley. Council requested that Alkane enter into a Planning Agreement to provide contributions towards local infrastructure and services, road upgrades required for the project and road maintenance costs. Council also raised concerns about the potential noise impacts of the project on Tomingley residents and the final landform following mining activities.

Alkane and Narromine Shire Council have reached general agreement on the form and content of a Planning Agreement for the project, which would include contributions to public infrastructure and services, road upgrades and road maintenance costs

Parkes Shire Council requested that Alkane provide additional detail with respect to socio-economic impacts of the proposal, including the potential impact of an influx of people on the services and infrastructure in Peak Hill.

4.2 Lower Macquarie Water Utilities Alliance

The **Lower Macquarie Water Utilities Alliance (LMWUA)**, made up of nearby local councils including Parkes, Dubbo and Narromine, sought consideration of long term management of the proposed water supply infrastructure, impacts on surrounding groundwater users and stormwater impacts. Alkane subsequently reviewed its designs to achieve a 50 year design life for the water supply pipeline, and the terms of the planning agreement with Narromine Council includes the provision to transfer ownership of the pipeline to Council at the completion of mining operations, if requested by Council.

5. ASSESSMENT

The Department considers that the key issues associated with the project are:

- water issues, particularly in relation to surface water management and the potential for adverse impacts on groundwater through drawdown or contamination;
- flora and fauna impacts;
- noise impacts;
- blasting impacts;
- air quality impacts;
- traffic impacts; and
- site rehabilitation and final landform.

5.1 Water Resources

The project raises 3 key water-related issues:

- surface water impacts including flooding;
- groundwater impacts associated with mine dewatering; and
- potential contamination of groundwater or surface water with hazardous materials handled on the site (particularly cyanide-containing materials).

Surface Water

The site lies within the Macquarie-Bogan catchment and generally drains westwards to a diverted channel of Gundong Creek, which then flows to the Bogan River. This diverted channel is characterised by elevated concentrations of suspended solids, nitrogen and phosphorous, due to historical agricultural and mining activities. The project site catchment is bisected by the Newell Highway, with poorly formed ephemeral drainage lines to the east of the highway characterised by unformed sheet flows during periods of wet weather, which drain to the west through culverts beneath the highway.

Alkane proposes to reconfigure the site water catchments by constructing diversion bunds to separate clean and potentially contaminated water flows and to divert surface water flows around the open cut voids (see **Figure 4**). The EA estimates that, with this surface water management infrastructure in place, total run-off from the site would be slightly reduced (17 ML/year or a reduction of approximately 6%). On this basis, the EA considers that the project is unlikely to adversely affect the volumes of water received by the surrounding water catchment, and would therefore be unlikely to significantly affect existing flows within local watercourses.

The EA also predicts that the active management of storm water runoff, including implementation of erosion and sediment control measures, would significantly reduce the solids, phosphorous, nitrogen and gross pollutant loads discharged from the site compared with the current situation.

All pipeline watercourse crossings would be underbored, and with the implementation of standard erosion and sediment control measures, including rehabilitation, the likely impacts of this component of the project on surface water quality are predicted to be minimal.

Flooding

The EA includes an assessment of the pre-development and operational-stage flood levels to:

- determine the height of bunding required to protect the mine site from flooding by Gundong Creek;
- predict changes in flood elevations along Gundong Creek as a result of site infrastructure; and
- determine the need for bunding around the Caloma One open cut pit, to protect it from floodwaters backing up at the Newell Highway culverts.

Based on modelling of a 1 in 100-year ARI peak flow event, the surface water assessment predicts that the maximum increase in flood levels within Gundong Creek would be 0.64 m (from the current level of 268.47 m AHD to 269.11 m AHD). To accommodate this level, and to minimise the risk of site flooding, Alkane proposes to install bunding along the western boundary of the site to a height of 1.25 m (comprising a design height of 0.75 m plus 0.5 m of freeboard).

With regard to potential changes to local (off-site) flooding behaviour as a result of this bunding, the EA predicts that, in most cases, 100-year ARI flooding levels would change by no more than about 0.05 m in small areas of adjacent properties. The Department considers this an acceptable outcome, particularly in the context of a significant flooding event (ie a 100-year ARI event).

The culverts under the Newell Highway are recognised as currently being insufficient to convey the full flow of a 1 in 100-year ARI event, and there is local anecdotal evidence to suggest that, in periods of heavy rain, water backs up and flows over the highway. Water backing up behind the Newell Highway culvert may flood the highway and affect the structural integrity of the culverts and associated embankments as well as operations on the project site.

Modelling in the EA estimates that a volume of 46,000 m³ of water would inundate the site east of the culverts during a 100-year ARI event, assuming complete blockage of the culverts. Alkane has designed the surface water diversion structures with a greater capacity than the design event, to prevent this water from overtopping into the mine site or onto neighbouring properties. RMS noted that this project design would not result in an increased flow of water into the culverts beneath the highway, therefore it had no further requirements in this regard. The Department has recommended a condition of approval to ensure the design of surface water diversion structures achieves this outcome.

Based on the implementation of the proposed designs, the Department is satisfied that the risk of mine infrastructure being inundated during flood events is minimal, and that the project is likely to result in negligible off-site flooding impacts.

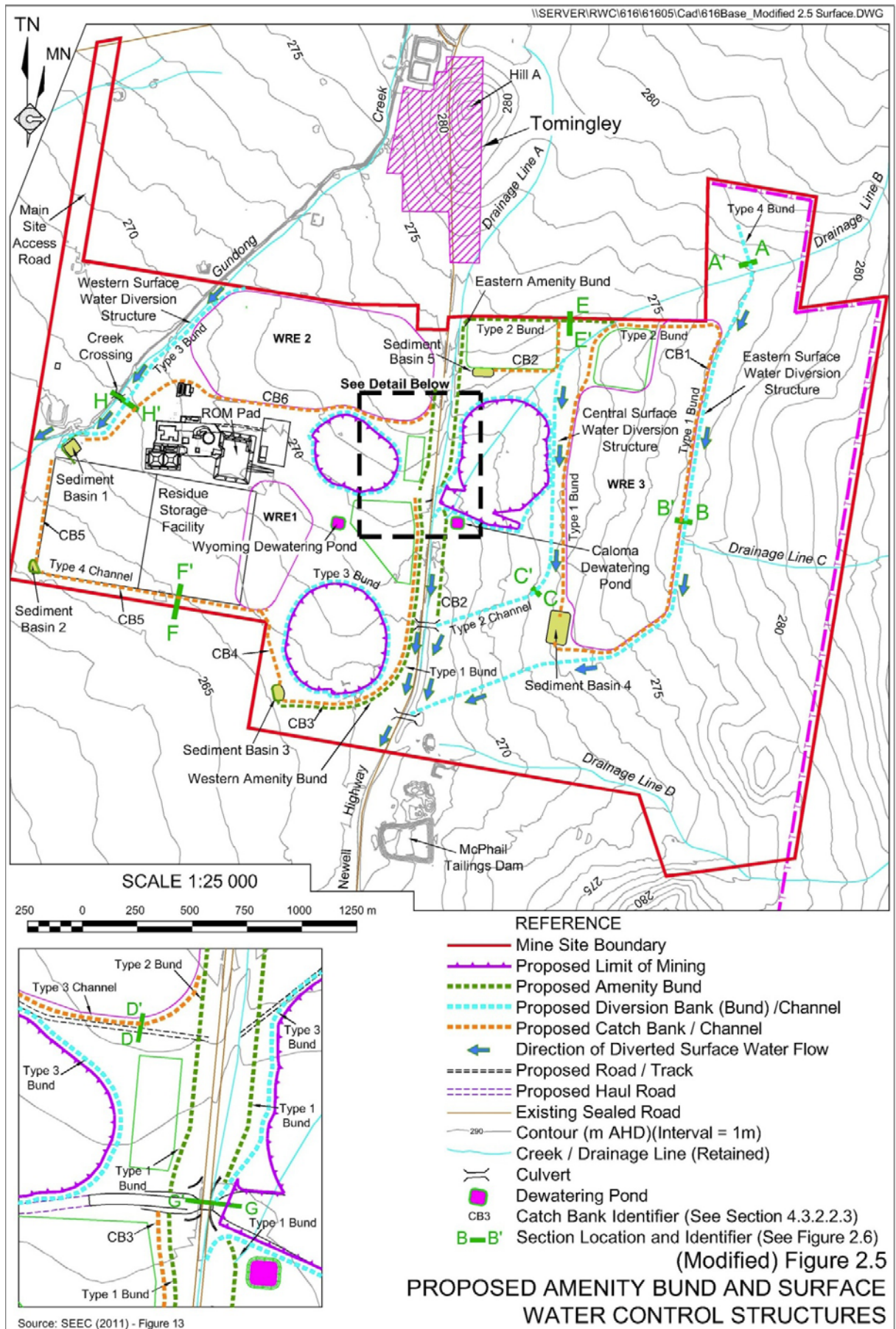


Figure 4: Proposed site drainage

Groundwater Drawdown

The EA includes a groundwater assessment prepared by The Impax Group, which considers the predicted impacts of the project on the surrounding groundwater system, groundwater users and groundwater dependent ecosystems around the site.

The project site and surrounds are underlain by alluvial clays and sandy clays associated with Gundong Creek. The sandier parts of the alluvium, closer to the original Gundong Creek channel (which is located well to the west of the project site) host a shallow aquifer (<20 m deep). This aquifer does not extend into the clays and sandy clays found on the project site. However, deeper, fractured rock aquifers occur in the shales and siltstones underlying the alluvium, including on and around the project site.

Five monitoring bores (installed as part of the groundwater assessment) within 2 km of the proposed mine site were recorded as having standing water levels of between 37.2 m and 63.5 m below ground level. Despite a significant rainfall event during the monitoring period, standing water levels remained relatively unchanged. From this, the EA concludes that there is limited connectivity between the surface and the deeper aquifers.

In addition to this targeted groundwater monitoring, Alkane has drilled more than 1,300 exploration holes across and around the proposed mine site and has observed that:

- groundwater flow has not been recorded in exploration holes between the surface and a depth of 50 m (ie no alluvial aquifers have been identified);
- groundwater flow was observed in approximately 7.5% of exploration holes that penetrated to between 50 m and 100 m below surface;
- groundwater flow was observed in a further 10% of exploration holes that penetrated more than 100 m below surface; and
- when encountered, groundwater was typically identified at depths between 70 m and 100 m below surface, and between 120 m and 130 m below surface, often intersecting in proximity to the identified mineralisation.

Groundwater quality testing in the EA indicates that water from the Gundong Creek alluvium is of reasonable quality (electrical conductivity of 444 $\mu\text{S}/\text{cm}$), while deeper groundwater (such as would be encountered and directly affected by the proposed open cut and underground mining) is saline (electrical conductivity from 10,800 $\mu\text{S}/\text{cm}$ to 29,200 $\mu\text{S}/\text{cm}$).

The groundwater assessment identified 15 registered bores within 10 km of the proposed mine site:

- 7 located to the north and northeast of Tomingley with depths ranging from 1.8 m to 18.3 m, targeting the Gundong Creek alluvium;
- 2 bores southeast of the mine site (73 m and 81 m deep), drilled through clay topsoils, shale, siltstone and/ or conglomerate bedrock;
- 1 test bore to the northeast (114 m deep) drilled through sandstone and basalt; and
- a cluster of 5 shallow (3.5 – 4.5 m deep) monitoring bores associated with the Tomingley Service Station, none of which have a record of groundwater interception.

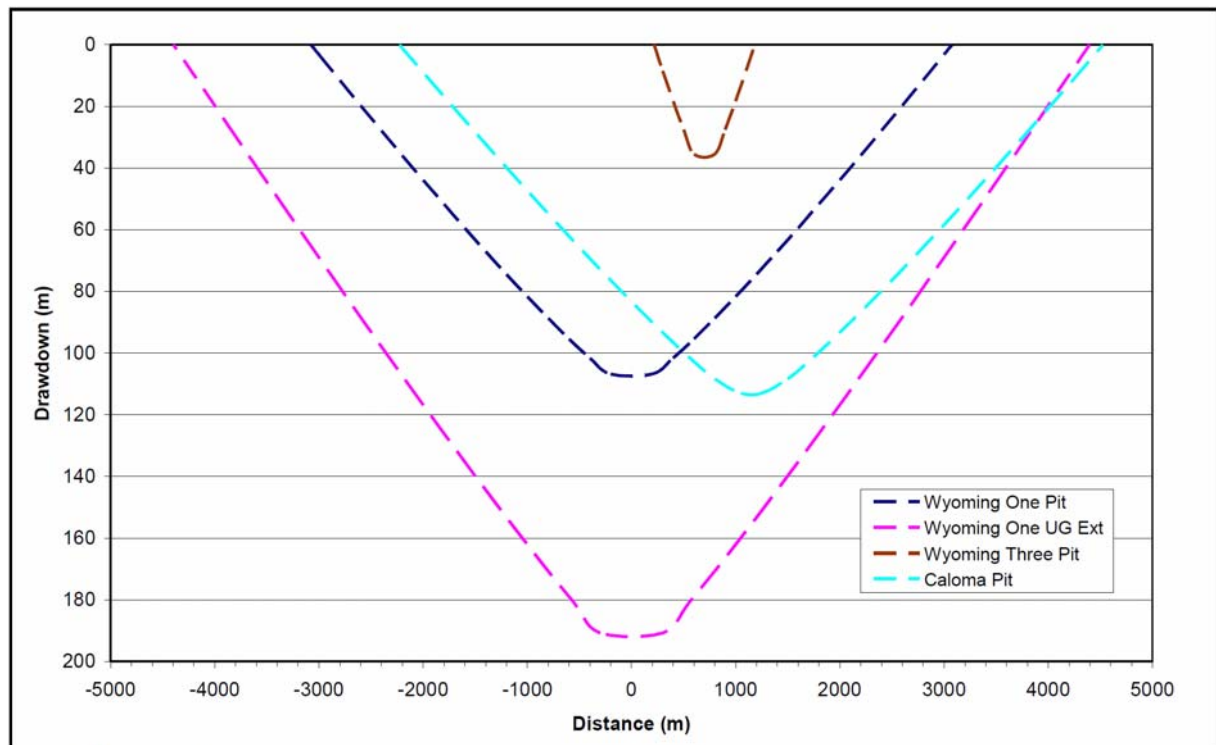
The EA identified that very few of these bores are currently used to supply water, with some abandoned and others never used. The bores that appear to be actively used are those associated with extraction of water from the shallow Gundong Creek alluvium. The closest registered user of the deeper fractured rock aquifer is approximately 7 km away from the site. Modelled groundwater drawdown (as shown in **Figure 5**) is dominated by the Wyoming One underground mine, the extent of which is predicted to be between 2.3 km and 5.6 km from the mine void.

The EA predicts that groundwater drawdown associated with mine dewatering is unlikely to adversely impact existing groundwater users, given the apparent lack of connection between alluvial and deep aquifers in the area and the limited number of bores in operation. Further, no groundwater dependent ecosystems have been identified that may be affected by changes in local and regional aquifers.

The NSW Office of Water (NOW) expressed concern that the groundwater modelling in the EA was based on only nine months of baseline monitoring data, and that at least 12 months of data, and ideally 24 months, should be used to ensure that groundwater system dynamics are fully and accurately understood. While the Department agrees that the use of only nine months of baseline groundwater is not ideal, it is satisfied that there is sufficient information to demonstrate that the project is unlikely to have an adverse impact on local and regional groundwater resources, bore users

or groundwater dependent ecosystems. Furthermore, it is likely to be some time before mining would reach the point of potential groundwater interception.

Alkane has since recommenced baseline groundwater monitoring and has committed to use this additional data to inform, verify and update groundwater monitoring and management measures for the project prior to groundwater interception. The Department has recommended a condition of approval which requires additional baseline monitoring to be undertaken and for the results of this monitoring to inform updated groundwater monitoring and management measures within 12 months of the date of project approval. NOW has accepted this approach.



Source: Impax (2011) – Figure 20

Figure 5: Predicted Groundwater Drawdown Profile

While the EA has suggested that there is unlikely to be any significant connection between the groundwater aquifer directly affected by the project and the shallow aquifers in the Gundong Creek alluvium, Alkane has nonetheless committed to monitor water levels in the Gundong Creek alluvium. The Department notes that Alkane would be required to obtain sufficient water licenses to account for groundwater taken by the project, and has recommended conditions of approval that:

- require monitoring of the water level in the Gundong Creek alluvium (including additional baseline monitoring as discussed above); and
- include the provision of a compensatory water supply for any owner of privately-owned land whose water entitlement is adversely affected by the project.

The groundwater assessment concluded that the potential drawdown impacts associated with the operation of the Woodlands bore would be acceptable. Following its review of this assessment, NOW indicated that there is no hydrological impediment to the volume of water to be extracted for the project and it has granted a license for an entitlement of 1000 ML/year.

Subject to these recommended conditions, and the implementation of a comprehensive Water Management Plan, the Department is satisfied that the groundwater impacts of the project could be managed within acceptable environmental limits.

Contamination of Surface Water and Groundwater

Given that the proposal involves the storage and use of hazardous materials, including cyanide-containing materials, potential exists for contamination of groundwater (through site seepage) and surface waters (in the event of a site overflow/discharge).

The EA indicates that the tailings or residue storage facility (RSF), processing plant water dams and dewatering ponds have all been designed to be nil discharge, through the provision of adequate freeboard as follows:

- RSF – 500 mm of freeboard, sufficient to contain a 1 in 10,000-year ARI, 72-hour rainfall event without overtopping; and
- processing plant water dams and dewatering ponds – 189 mm freeboard, sufficient to contain a 1 in 100-year ARI, 72-hour rainfall event.

To prevent seepage of cyanide-containing materials from these storage structures, Alkane has committed to achieve a maximum permeability of 1×10^{-9} m/s in the floor of the RSF to a depth of 900 mm. The RFS site is underlain by up to 25 m of in-situ alluvial clays, which will further impede seepage of process waters. Alkane would also use a compacted clay lining for the walls of the RSF and install high density polyethylene liners for the process water dams and dewatering ponds.

The Department has recommended a condition reflecting these standards, but has noted that a lesser permeability standard may be acceptable following the completion of a comprehensive risk assessment. In addition, the Department notes that the design of the RSF will need to comply with the requirements of the Dams Safety Committee under the *Dams Safety Act 1978*.

The Department has confirmed, in consultation with the EPA and NOW, that the proposed design measures to be applied to the project to prevent overtopping of contaminated water storages and seepage into the groundwater system are adequate and consistent with good environmental practice. Provided these design outcomes are achieved, the Department is satisfied that the project presents an acceptably small contamination risk to groundwater and surface water.

Given the environmental significance of hazardous materials to be handled on the site (particularly cyanide-containing materials), it is important that any failure of on-site containment systems is quickly identified and responded to. In this context, the Department has recommended that Alkane be required to develop and implement a comprehensive Surface Water Monitoring Program, including on-site monitoring to ensure that on-site water storages are operating within design limits. This monitoring program would be complemented by additional to identify any water quality impacts and changes in watercourse health (particularly Gundong Creek) that may be attributable to project operations.

Additionally, the Department has recommended conditions requiring the preparation of a Hazardous Materials Management Plan consistent with the *International Cyanide Management Code for the Manufacture, Transport and Use of Cyanide in the Production of Gold* and to ensure sodium cyanide and other hazardous materials are transported, stored and handled in accordance with the relevant Australian Standard.

Conclusion

The Department is satisfied that the project can be suitably managed to ensure there are no significant impacts on the region's surface or groundwater resources. However, Alkane should be required to:

- ensure that it has sufficient water for all stages of the project and if necessary, adjust the scale of mining operations to match its available water supply;
- provide suitable compensation or compensatory measures to the owners of any privately-owned land whose water supply is adversely affected by the project;
- ensure all surface water discharges from the site comply with limits in any environment protection licence granted by EPA;
- design storage facilities to achieve conservative permeability standards and with the capacity to contain significant rainfall events;
- prepare and implement a Hazardous Materials Management Plan (focussing on management of sodium cyanide) in consultation with NOW, EPA, Councils, RMS, WorkCover NSW and DRE; and
- prepare and implement a comprehensive Water Management Plan for the mine in consultation with EPA, NOW and DRE.

5.2 Biodiversity

The key flora and fauna impact associated with the project would be loss of habitat caused by vegetation clearing on the site and along the proposed water supply pipeline route. The use of cyanide in dissolving gold from the crushed ore also poses potential impacts to avian and other fauna, if not managed in manner that avoids fauna access to toxic materials.

The EA includes an assessment of the potential biodiversity impacts of the project, prepared by OzArk Environmental and Heritage.

Flora

The EA estimates that approximately 82.5% of the proposed mine site has been cleared of native vegetation, with remnant vegetation largely restricted to the boundaries of the site, along paper road easements and in association with the diverted channel of Gundong Creek. **Figure 6** shows the distribution of vegetation communities across the site, which comprise:

- Community 1 – Inland Grey Box – Poplar Box – White Cypress tall woodland on red loams (Benson 76);
- Community 2 – River Red Gum riverine woodland forest (Benson 78);
- Community 3 – Fuzzy Box – Inland Grey Box on alluvial brown loam soils (Benson 201);
- Community 4 – Poplar Box – Belah woodland on clay alluvial plains (Benson 56);
- Community 5 – Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57); and
- Community 6 – Mugga Ironbark (Planted).

Of these, Community 1 is a component of the *Inland Grey Box Woodland Endangered Ecological Community* (EEC) listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act), while Community 3 is a component of the *Fuzzy Box on Alluvials EEC*.

The pipeline route would pass through the above communities, plus one additional vegetation community classified as Yellow Box – Blakely's Red Gum Grassy Woodland (one remnant of 0.42 ha). This community is a component of the *White Box, Yellow Box and Blakely's Red Gum EEC*.

Of the overall mine site footprint of 300 ha, 22.4 ha of native vegetation would be cleared, including 3.7 ha of EEC. The components of the project which would require clearing include the open cut pits and waste rock emplacements (**Figure 6**). The EA notes that vegetation along the pipeline corridor could be entirely avoided, or the extent of clearing minimised, through careful route selection and construction management.

Flora surveys of the proposed mine site identified 124 flora species, of which 66 (53.2%) are native and 58 (46.8%) are exotic. Along the proposed water supply pipeline corridor, 196 flora species were identified, of which 131 (66%) are native and 65 (33.2%) are exotic. No threatened flora species were identified on the mine site or along the water supply pipeline corridor.

Fauna

Fauna surveys identified 134 also species (123 native and 11 introduced), of which 9 are considered to be of conservation significance:

- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) – listed as threatened under the TSC Act;
- Superb Parrot (*Polytelis swainsonii*) – listed as threatened under the TSC Act;
- Rainbow Bee-eater (*Merops ornate*) – listed as threatened under the TSC Act;
- Little Eagle (*Hieraaetus morphnoides*) – preliminary determination as threatened under the TSC Act;
- Spotted Harrier (*Circus assimilis*) – preliminary determination as threatened under the TSC Act;
- White-breasted Woodswallow (*Artamus leucorhynchus*) – preliminary determination as threatened under the TSC Act;
- Little Pied Bat (*Chalinolobus picatus*) – listed as threatened under the TSC Act;
- Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*) – listed as threatened under the TSC Act; and
- Fat-tailed Dunnart (*Smithopsis crassicaudata*) – recognised as being of conservation concern.

The EA presents tests of significance for each of these species, but concludes that the project is unlikely to significantly affect any threatened species. The proposed mine site represents limited habitat value for these species, given its disturbed state and fragmented vegetation. However, the site does represent potential roosting habitat for bird and bat species, particularly in the form of tree hollows. Of the 476 individual trees to be removed as part of the project, 32 are considered to have high habitat value and a further 59 have moderate habitat value.

The EA indicates that one of the trees to be removed contains roosting and breeding nests for a local family of Grey-crowned Babblers, although this is not the sole tree utilised by the species around the site. The Department considers it important that, where removal of these tree hollows cannot be avoided, that similar compensatory roosting opportunities are provided. To facilitate this, the Department has recommended a condition of approval requiring the preparation of a Biodiversity

Management Plan which includes pre-clearing surveys to identify habitat trees and the presence of fauna including the Grey-crowned Babbler and the provision of suitable alternative roosting habitat.

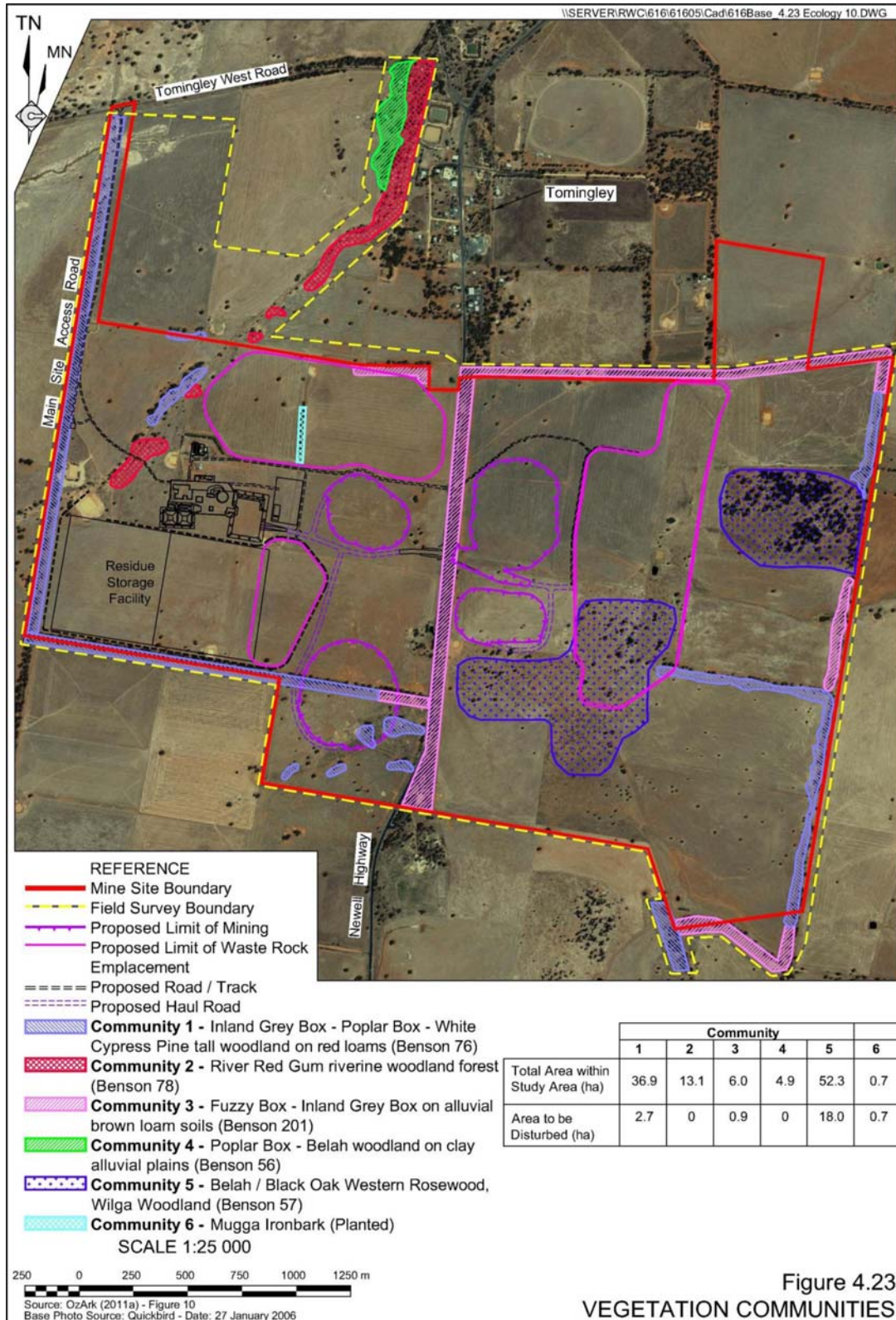


Figure 4.23 VEGETATION COMMUNITIES

Figure 6: Vegetation Communities on the Site

Biodiversity Offset

Alkane has developed an offset package for the project (see **Figure 7**), based on the Biobanking Assessment Methodology. The offset package focuses on rehabilitation and revegetation of areas of the site, particularly along the riparian corridor of the Gundong Creek channel. The proposed offset would compensate the clearing of 22.4 ha of vegetation by protecting and conserving 66.6 ha of

existing vegetation on the site, with a further 61.0 ha of native vegetation to be provided through rehabilitation and/or revegetation. Compared with the 3.7 ha of the two EECs to be cleared by the project, some 73.6 ha of the same EECs are proposed to be conserved or rehabilitated.

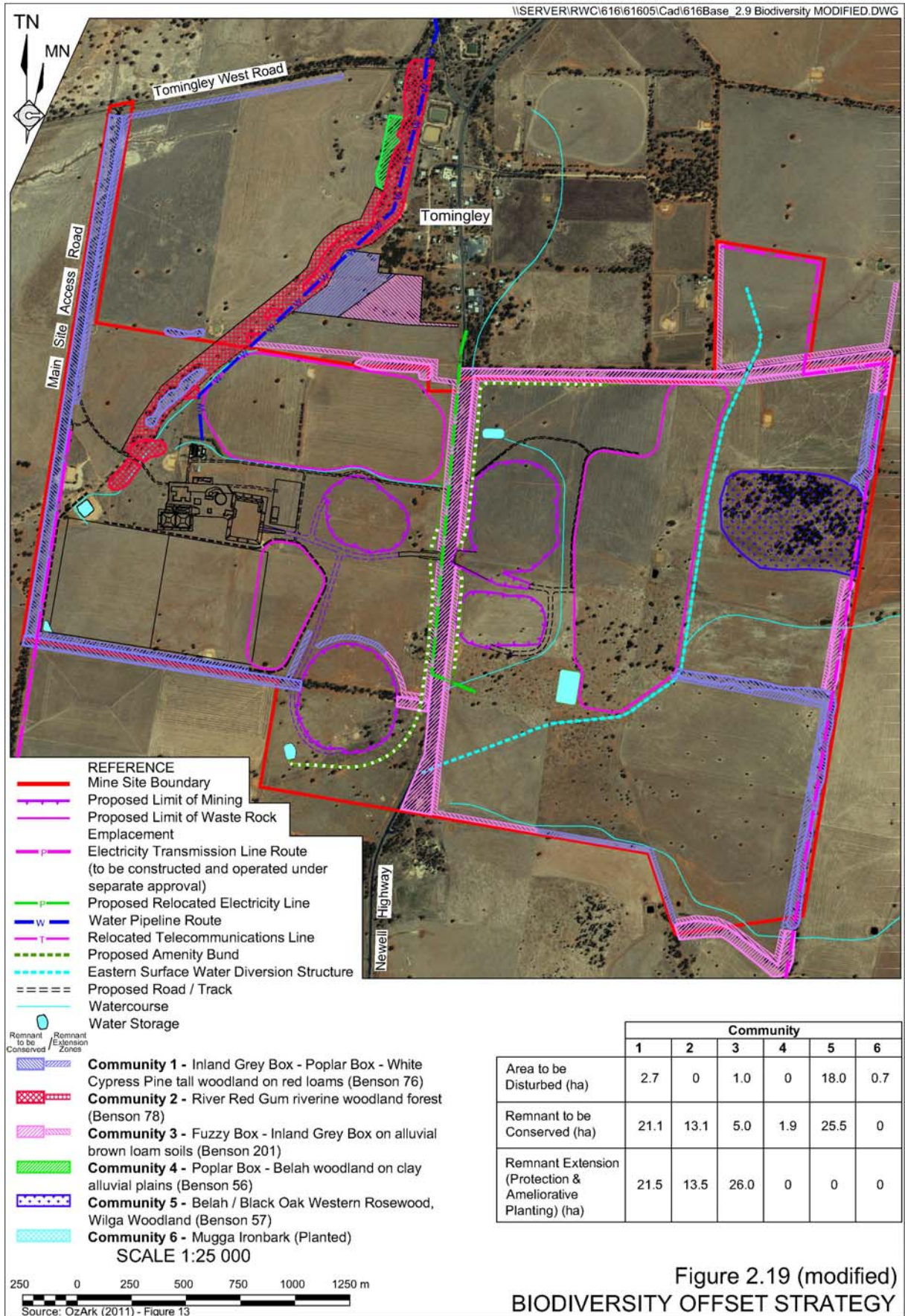


Figure 2.19 (modified)
BIODIVERSITY OFFSET STRATEGY

Figure 7: Proposed Offset Package

Predicted vegetation clearing and offset areas proposed as part of the offset package are summarised in **Table 2** below.

Table 2: Vegetation Clearing and Proposed Offsets

Community	Area to be Disturbed (ha)	Area to be Conserved (ha)	Area to be Rehabilitated/Enhanced (ha)
Community 1 – Inland Grey Box – Poplar Box – White Cypress tall woodland on red loams (Benson 76)	2.7	21.1	21.5
Community 2 – River Red Gum riverine woodland forest (Benson 78)	0.0	13.1	13.5
Community 3 – Fuzzy Box – Inland Grey Box on alluvial brown loam soils (Benson 201)	1.0	5.0	26.0
Community 4 – Poplar Box – Belah woodland on clay alluvial plains (Benson 56)	0.0	1.9	0.0
Community 5 – Belah/ Black Oak Western Rosewood, Wilga Woodland (Benson 57)	18.0	25.5	0
Community 6 – Mugga Ironbark (Planted)	0.7	0.0	0.0
TOTAL	22.4	66.6	61.0

OEH has consistently argued that the proposed offset package is not appropriate given its distribution along site boundaries and easements, with infrastructure bisecting offset areas in some places. OEH argues that distribution of the offset in this manner makes it susceptible to edge effects and weed invasion, and generally devalues the offset area. OEH has expressed a preference for an alternative, contiguous offset area to be located, and has suggested that Alkane may find it problematic to secure the proposed offset package in perpetuity given the spread and location of the offset areas.

The Department fully concurs with the technical basis underpinning the issues raised by OEH with respect to the quality of the proposed offset package, but considers that these issues need to be framed in the context of the existing site and the magnitude of the potential impact. Existing vegetation on the site to be removed as part of the project, or conserved and rehabilitated as part of the offset package, is itself largely reduced in quality as a result of historical clearing. The vegetation is fragmented, isolated and already subject to many of the degrading effects raised by OEH as being of concern. The proposed offset package would go some way to ameliorating this current situation, and the Department highlights in particular the significant rehabilitation works proposed along Gundong Creek. These works are likely to have significant implications beyond improved habitat, with improvements in bank stability, water quality and general amenity expected as a result of the rehabilitation works. While Alkane may not be able to fully remove the external factors leading to edge effects (for example), the Department considers that the proposed offset package is a significant step forward in improving the quality and connectivity of the vegetation that currently exists in the area.

The Department also highlights that the need for, and scope of, the proposed offset package needs to be viewed in light of the scale and impact of the vegetation clearing in question. A total of 22.4 ha of native vegetation is proposed to be cleared, of which only some 3.7 ha has been identified as EECs. The Department considers that it is the EECs that should be the principal driver for an offset package. Alkane has proposed to conserve, enhance and/or re-establish 73.6 ha of EEC, which is considered to be a significant improvement in the area and quality of these communities. If the 3.7 ha of EEC to be cleared is of such significance as to warrant a formal offset, then an offset of 73.6 ha of this vegetation should also be viewed as significant.

While it is accepted that an alternative offset package providing a single consolidated and contiguous area of vegetation would, as OEH points out, deliver greater biodiversity outcomes, the Department is satisfied that the proposed offset package is, in this case, appropriate and acceptable given the condition and spatial orientation of the vegetation proposed to be cleared. On this basis, the Department has recommended conditions of approval that require an offset package generally along the lines proposed by Alkane, and for these offsets to be secured in perpetuity.

On the basis of the EA's position that vegetation along the pipeline corridor could be entirely avoided or only minimally impacted, additional provision has not been included in the proposed offset strategy to account for pipeline-associated impacts. The Department considers that the proposed offsets are sufficient to accommodate any small incremental increase in clearing for construction of the pipeline.

Impacts of Cyanide on Fauna

Residue from gold processing on the site would contain Weak Acid Dissociable (WAD) cyanide compounds that, when exposed to weak acids (such as in the stomachs of fauna), could produce toxic cyanide ions.

Alkane proposes to maintain the WAD cyanide concentration of the material directed to the RSF at less than 20 mg/L (90th percentile) and less than 30 mg/L (maximum). These concentrations are in line with the recommendations of the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) set out within the *Framework for Management of Risks to Wildlife from Sodium Cyanide Use in Gold Mining*.

Alkane also proposes to implement management measures at the RSF to prevent or reduce the potential for fauna exposure, including the avoidance of standing water (which may appear as desirable roosting or feeding habitat), fencing to prevent land access and maintenance of alternative water sources on the site (such as sediment basins) to attract fauna away from the RSF.

The EA also assessed the likelihood that key threatened species may find the RSF desirable, given their known foraging and habitat behaviours. The facility was considered to be undesirable to the:

- Grey-crowned Babbler, which prefers foraging on the ground among leaf litter, around fallen trees and from the bark of shrubs and trees;
- Superb Parrot, which prefers to forage on the ground and sometimes in trees, for the seeds of grasses and other plants, fruits and berries, nectar, flowers and some insects; and
- Little Eagle, which searches for prey on the wing or from a high exposed perch, and takes prey from the ground, the shrub layer or the canopy. Key prey (rabbits, other mammals and insects) are not likely to frequent the RSF, given the physical exclusion measures noted above); and
- Little Pied Bat and Eastern Bentwing Bat feed predominantly on airborne insects. The RSF is not considered likely to be a key source of insects.

The Department is satisfied that Alkane has adequately demonstrated that there is limited likelihood of cyanide impacts on native fauna, given the nature of the threatened fauna species in the area and the mitigation measures proposed. The Department has recommended that Alkane be required to maintain WAD cyanide in tailings at no greater than 20 mg/L (90th percentile) or 30 mg/L (maximum), and to implement a Biodiversity Management Plan which includes measures to minimise the likelihood of fauna contact with tailings and monitoring the effectiveness of preventative measures.

Conclusion

Given the limited remnant vegetation proposed to be cleared and its current quality, there is limited potential for significant impacts on threatened species (particularly fauna) through habitat loss.

The Department is satisfied that Alkane has made all reasonable endeavours to avoid vegetation clearing where possible. With the implementation of these avoidance measures, the protection and enhancement of existing vegetation and additional rehabilitation of previously disturbed areas, the Department is satisfied that the biodiversity impacts of the project can be managed such that it would maintain or improve biodiversity outcomes for the site and region in the medium to long term.

5.3 Noise

The project has the potential to generate operational and road traffic noise impacts, particularly given its close proximity to the village of Tomingley. The EA includes a noise impact assessment (NIA) prepared by SLR Consulting Australia Pty Ltd in accordance with applicable guidelines, including the *NSW Industrial Noise Policy (INP)*, the *Environmental Criteria for Road Traffic Noise (ECRTN)* and the *Interim Construction Noise Guideline (ICNG)*.

The NIA includes background noise monitoring and predictive modelling of the project's potential noise impacts on surrounding receivers, based on the adoption of a number of design and operational safeguards, including:

- strategically scheduling and locating the operations of the mining fleet, restricting the most noisy activities to daytime hours (ie 7am to 6pm) and locating night-time activities where landforms would provide the most attenuation;
- placing and operating the secondary crusher and screen tower within an enclosure engineered to achieve a noise reduction of at least 13 dB; and

- constructing waste rock emplacements so as to first establish and then maintain a higher wall of material (generally 15 m in height) on the northern edge (ie closest to the village) of each successive lift of the emplacements, to act as a noise attenuation bund.

The Department and OEH are satisfied that these measures are reasonable and feasible and that the predictions in the NIA are robust, and suitably conservative. Alkane also considered the use of noise-attenuated plant. However, it did not propose this measure as the company considered this level of technology to not be economically feasible. The Department accepts this position.

Operational Noise

The NIA assessed receivers around the proposed mine site in four distinct Noise Assessment Groups (NAGs) based on similarities in location and general background acoustic environment (see **Figure 8**):

- NAG A rural residences surrounding the mine and Tomingley village, with ambient noise levels affected by both local roads and the Newell Highway (receivers R1, R4, R5, R6, R8, R9, R10, R11 and R12);
- NAG B residence in a rural setting with minimal traffic noise influence (receiver R2);
- NAG C residences within Tomingley village, with ambient noise highly elevated due to the Newell Highway (receivers R3, R13, R18, R19, R21, R24, R25, R26, R27, R28, R29, R33, R35 and R40); and
- NAG D within Tomingley village, ambient noise elevated due to the Newell Highway (receivers R16, R17, R22, R23, R32 and R37).

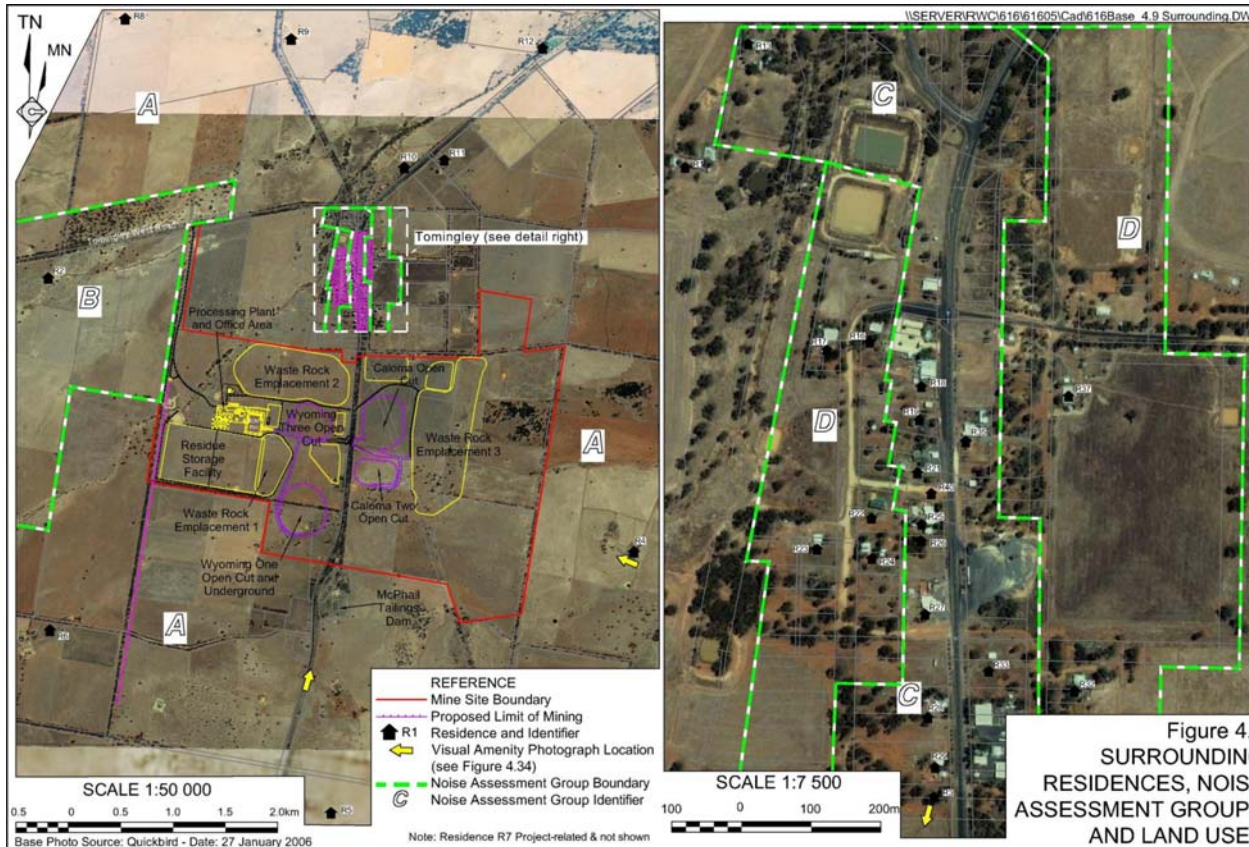


Figure 8: Noise Assessment Groups

Based on background noise modelling, project specific noise levels (PSNLs) were calculated for each NAG (see Table 3 below).

Table 3: Operational Noise Criteria

NAG	Day (dB(A))	Evening (dB(A))	Night (dB(A))
A	35	35	35
B	36	35	35
C	45	35	35
D	43	38	36

Noise modelling was undertaken to predict the noise impacts of the project at each of these receiver groups, under various meteorological conditions, based on five construction / operation scenarios, all of which were chosen to represent either a peak in or a period of noise emissions:

- **Scenario 1A** – representative of months 1 to 3, for initial site construction operations including soil stripping operations; overburden removal; and construction of roads, soil stockpiles, amenity bund for Waste Rock Emplacement 2, other bunds and the RSF embankments;
- **Scenario 1B** – representative of months 10 to 12, for site construction and initial mining operations including overburden removal and initial mining operations at Caloma One and Wyoming One open cuts and the construction of roads, soil stockpiles and Waste Rock Emplacements 2 and 3;
- **Scenario 2** – representative of around month 15, for mining operations within the Caloma One, Wyoming One and Wyoming Three open cuts; haulage of ore material to the ROM pad; operation of the crushing, screening and processing plants; and waste dumping;
- **Scenario 3** – representative of the end of Year 2, for mining operations within the Caloma One, Wyoming One and Wyoming Three open cuts; haulage of ore material to the ROM pad; operation of the crushing, screening and processing plants; waste dumping; and initial rehabilitation of Waste Rock Emplacement 1; and
- **Scenario 4** – representative of the end of Year 4, for mining operations within the Wyoming One and Caloma Two¹ open cuts, haulage of ore material to the ROM pad, operation of crushing, screening and processing plant, and rehabilitation of Waste Rock Emplacements 2 and 3.

The assessment indicates that, even with the proposed mitigation measures in place, the project would result in exceedances of the applicable PSNLs at 18 residences under the modelled scenarios (see **Table 4**). However, only 2 of these (R3 and R29) are predicted to be moderately affected (3-5 dB exceedance), with the remainder predicted to be marginally affected (1-2 dB exceedance). Additionally, one privately-owned vacant landholding would be significantly affected (>5 dB exceedance) over >25% of the property during worst case conditions.

Table 4: Summary of Predicted Operational Noise Limit Exceedances

Noise Exceedance	Management Approach	No. of Affected Private Properties			
		Scenario 1A	Scenario 2	Scenario 3	Scenario 4
Marginally affected residences (1-2 dB exceedance)	Noise mitigation at source	1	12	17	1
Moderately affected residences (3-5 dB exceedance)	Noise mitigation, including mitigation at residence	2	-	1	-
Significantly affected residences (>5 dB exceedance)	Voluntary acquisition	-	-	-	-
Significantly affected land (>5 dB exceedance on >25% of land)	Voluntary acquisition	-	-	1	-
Total Private Properties Exceeding Noise Criteria		3	12	19	1

The majority of marginal exceedances will occur only during night-time inversion conditions, primarily for receivers in Tomingley village, with 3 properties marginally affected outside the village. The Department accepts that such marginal exceedances (ie an increase of 1-2 dB over the permitted PSNLs) are generally not perceptible to the human ear.

There are two residences predicted to have moderate daytime exceedances under Scenario 1A, one of which (R3) also has a moderate night-time exceedance under Scenario 3. Scenario 1A is limited in duration to the first 3 months of works on-site. Predicted exceedances are associated with soil stripping activities, which would only occur on a campaign basis. The EA does not report the period over which Scenario 3 will prevail, but the extent of the mining fleet involved suggests that it is the period of peak waste stripping operations, which the project schedule indicates extends over Years 2 and 3. Thus the night-time exceedance at R3 is likely to be much more significant in both impact and duration than the two relatively short-term daytime exceedances.

The Department notes that Alkane has committed to implement architectural treatments for all moderately-affected residential receivers, but only if the impact is demonstrated by monitoring. The

¹ Caloma Two open cut pit is no longer proposed to be extracted under this project application, unless later modified. However, the noise emissions associated with its extraction remain within the current noise model.

Department has instead recommended conditions providing an up-front entitlement to architectural treatment (such as double glazing, insulation, and/or air conditioning) for the two residences predicted to be moderately-affected by the project. Under the Department's recommended noise management conditions, the significantly-affected vacant land property would also have to be acquired by Alkane at the request of the landowner.

In addition to the mitigation measures assumed in the noise modelling, Alkane has committed to implement a proactive and reactive noise management system, including the installation of a real-time noise monitoring site in the village and scaling back of noisy operational activities during adverse weather conditions (ie inversions).

The Department believes that if such a proactive system was effectively implemented, then the number of marginally and moderately affected properties could be reduced below the level predicted. Accordingly, the Department has recommended conditions requiring Alkane to develop and implement such a system, as part of a comprehensive Noise Management Plan for the project.

The Department has also recommended a number of other conditions to manage the operational noise emissions of the project. These include requirements to:

- comply with operational noise limits;
- undertake additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at residences which are either predicted or else demonstrated by monitoring to be significantly or moderately affected, if requested by the landowner;
- develop a comprehensive Noise Management Plan, including real-time noise monitoring and an active management system to identify and manage potential exceedances; and
- communicate regularly with the community, including publicly reporting all monitoring results, and effectively responding to enquiries and complaints.

With these measures in place the Department believes that operational noise levels can be managed to ensure acceptable impacts, even during worst case scenarios.

Sleep Disturbance

The EA includes an assessment of the potential for sleep disturbance associated with mining operations during the night-time period, which indicates that the project would not exceed the applicable sleep disturbance criteria. Nonetheless, the Department has recommended conditions requiring that Alkane comply with the relevant sleep disturbance criteria at all residences.

Pipeline Construction Noise

The EA presents a 'back calculation' to determine the minimum separation distance required to avoid receivers being characterised under the ICNG as 'noise affected' (ie receiving 40-50 dB(A)_{LAeq(15min)}) or 'highly noise affected' (ie receiving >75 dB(A)_{LAeq(15min)}) during construction of the proposed water supply pipeline.

Construction of the pipeline would take place well outside the required separation distance (29 m) within which construction noise could be expected to 'highly affect' any residential receiver. It would, however encroach well within the calculated separation distances within which receivers could be considered to be 'noise affected'. R9, R 13 and R 17 are, respectively, 125 m, 115 m and 85 m from the proposed pipeline construction works. Noise levels between 57-66 dB(A)_{LAeq(15min)} are predicted at these 3 sites during the various stages of construction. However, Alkane argues that, given that all receivers would be affected by construction for no more than three weeks, elevated construction noise would be manageable and acceptable.

As with construction-related noise for the mine site, the Department is satisfied that construction noise generated in relation to the proposed water supply pipeline could be effectively managed through the development and implementation of a Noise Management Plan. This may involve restrictions on either hours of work or the use of equipment in combination. While elevated construction noise impacts are predicted at several residences along the proposed pipeline corridor, the Department notes that the closest such residence is at a distance of 85 m and that receivers would generally experience no more than three weeks of construction noise before works pass their location. On this basis, the Department considers that construction noise outcomes for the water supply pipeline are acceptable.

Traffic Noise

The EA contains a traffic noise assessment demonstrating that, with the exception of the Newell Highway south of the proposed mine site, both existing traffic noise and future traffic noise (including project-related traffic) would lie comfortably below the ECRTN's assessment thresholds (generally by 10-15 dB(A)).

In the case of the Newell Highway, existing traffic noise exceeds the daytime and night-time assessment thresholds of 60 dB(A) and 55 dB(A) by 0.8 dB(A) and 0.7 dB(A), respectively. As a result of the project, future traffic noise levels would increase by a further 0.2 dB(A) during the day and 0.5 dB(A) during the night, which both lie below the level requiring consideration of further noise mitigation measures under the ECRTN. In summary, as might be expected, the Newell Highway already represents a relatively noisy environment given the otherwise rural nature of the project surroundings. Project-related impacts will add only marginally to existing traffic noise levels.

The Department considers that the EA has demonstrated that acceptable traffic noise outcomes would be achieved without the need for further mitigation and management.

5.4 Blasting Impacts

Blasting has the potential to affect people, structures and private property in three main ways:

- annoyance and discomfort, known as 'amenity impacts';
- structural damage to homes, buildings, infrastructure and property improvements; and
- direct risks to the safety of people and livestock (for example through 'flyrock').

The EA includes a blast impact assessment (BIA) undertaken by SLR Consulting Australia Pty Ltd. The assessment calculates the predicted airblast and vibration levels as a result of the proposed maximum instantaneous charge (MIC) of 68 kg, and compares the results against relevant amenity-based ground vibration and overpressure criteria at the closest receiver to the mine (residence R3).

The criteria recommended by the Australian and New Zealand Environment and Conservation Council (ANZECC) to minimise annoyance and discomfort at residences are shown in **Table 5**. The calculated blast vibration and overpressure impacts produced by blasting at each open cut pit at the nearest receiver (R3), as calculated in the BIA, are shown in **Table 6**.

Table 5: Recommended Blast Criteria

Blast Impact	Amenity Criteria*	Structural Damage Criteria**
Airblast Overpressure	115 dB (Lin Peak) for 95% of blasts in any year 120 dB (Lin Peak) for 100% of blasts	133 dB (Lin Peak)
Ground Vibration	5 mm/sec for 95% of blasts in any year 10 mm/sec for 100% of blasts	10 mm/sec

* ANZECC Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration

** Australian Standard AS2187.2-2006 Explosives – Storage, Transport and Use (houses and low-rise residential buildings).

Table 6: Predicted Blast Vibration and Overpressure Impacts at Receiver R3

Blast Location	Offset Distance (m)	Ground Vibration (mm/s)	Airblast (dB Linear)
Wyoming Three	871	1.7	116.5
Caloma One	715	2.3	118.6
Wyoming One	1,579	0.7	110.3

Table 6 shows that the predicted level of airblast at R3 for blasting at an MIC of 68 kg at the near point of the Wyoming One open cut complies with the general amenity criterion of 115 dB (Lin). However, exceedances of 1.5 dB (Lin) and 3.6 dB (Lin) are predicted for blasting at the near point of the Wyoming Three and Caloma open cuts, respectively. The BIA indicates that, where blasting in these open cuts approaches R3, the MIC may need to be reduced (through a reduction in the height of the explosive column) in order to comply with 115 dB (Lin). The BIA then calculates that the necessary reduction in MIC to 51 kg would lead to a significant reduction in the achieved bench height (from 11 m to 5.2 m). However, the standard permits 5% of blasts to exceed 115 dB (Lin), providing that none exceed 120 dB (Lin).

The Department notes that Alkane conducted over 1500 blasts at its nearby Peak Hill open cut gold mine between 1996 and 2005, the nearest of which was just 200 m from the residential edge of the

town. Of those blasts, just 34 (2.2%) exceeded the 115 dB (Lin) criterion. Alkane has also committed to only conducting blasting activities between 9:00 am and 5:00 pm on Mondays to Saturdays, to minimise amenity impacts on surrounding receivers.

All criteria for the protection of structural integrity of residences would be met. Based on the modelling undertaken, the EA has also determined that blasting could be undertaken within 105 m of the Newell Highway underpass without exceeding the required 50 mm/s vibration criterion for structural integrity. To ensure that the integrity of the Newell Highway underpass is maintained, Alkane proposes to implement precautionary monitoring for all blasts within 150 m, and to modify blasting where appropriate to ensure that the 50 mm/s criterion is not exceeded.

Blasting has the potential to generate fragmented material that could be ejected across the Newell Highway (fly rock), with consequent implications for road safety. The blasting design assumed in the EA suggests that fly rock would be limited to an envelope of 50 m in front of the blast, 20 m on each side of the blast and 10 m behind the blast. Provided that the blasting design and separation distances are maintained, the EA considers that fly rock is unlikely to pose a threat to the safe operation of the Highway. Alkane has committed to design blast size and orientation to ensure the risk of fly rock potentially impacting the highway is minimised.

Given the proximity of potential blasting activities to the Newell Highway, the Department considers that careful attention must be given to the timing, intensity and overall management of blasting. In this regard, the Department has recommended that Alkane be required to consult with RMS and meet its requirements for any blasting proposed within 500 m of the Highway. This consultation would enable issues relating to the structural integrity of the highway, road user safety and general traffic operations to be taken into account when planning and conducting blasting activities.

The Department accepts that blasting can feasibly be managed to meet all relevant criteria by reducing MIC and applying other blast management techniques. To ensure blasting for the project is suitably managed, the Department has recommended conditions requiring Alkane to:

- require blasting operations to comply with all relevant criteria at private properties;
- limit blast frequencies and hours;
- prepare and implement a Blast Management Plan that confirms the blast design and management techniques to be used to ensure that blasting operations comply with all relevant criteria at private properties and the Newell Highway, including fly rock and other safety risks;
- keep residents notified and up to date regarding blasting operations, and facilitate feedback/complaint management; and
- provide for property structural inspections and investigations for all private residences within 2 km of the project blast area, on request.

5.5 Air Quality

The EA includes a specialist Air Quality Impact Assessment (AQIA) undertaken by PAE Holmes broadly in accordance with applicable guidelines, including OEH's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

The AQIA modelled total suspended particulates (TSP), fine particulate matter (PM₁₀) and deposited dust for three representative mining scenarios (Years 1, 2 and 4), which together represent the years of greatest predicted dust emissions. As with the noise modelling scenarios, it should be noted that the Year 2 scenario extends for around 2 years. The modelled dust emissions inventory for the mine varies between 1.227 million kg/year for Year 1, down to 1.034 million kg/year for Year 4.

The modelling undertaken for dust (TSP, PM₁₀ and deposited dust) is based on a number of proposed mitigation measures that Alkane would implement, including:

- minimising disturbance areas and clearly marking roads;
- operating spray systems in the crushing and screening circuit;
- watering of haul roads and ROM ore surge stockpiles;
- limiting the development of minor roads and rehabilitating disused roads;
- revegetating completed sections of the waste rock emplacements as soon as possible;
- restricting blasting to only occur during favourable conditions;
- dust control systems on drill rigs, eg dust aprons, extraction systems and/or water sprays;
- using adequate stemming in blast drill holes;
- undertake blasting operations only in appropriate weather conditions; and
- progressive rehabilitation of disturbed areas.

Most ambient air quality criteria are met for all receivers under all scenarios. However, a number of exceedances are predicted with respect to 24-hour average PM₁₀ concentrations for all three scenarios. As might be expected, the worst cases are the Year 1 and Year 2 scenarios (ie the first 3 years of mine life). The predicted exceedances for the nearest receivers for these two scenarios are shown in **Table 7**. The basis of these predictions is to add project-related emissions to a calculated 70th percentile background level of 25 µg/m³. The Department notes that this approach, while endorsed by the Victorian EPA, is not in accordance with OEH's *Approved Methods*.

Table 7: Predicted 24-hour PM₁₀ Exceedances – End Year 1 and End Year 2

Receiver	Criterion	24-hour PM ₁₀ (µg/m ³)
R3	50	59
R28		57
R29		58
R32		54
R33		51
R40		55

By the end of Year 4, air quality modelling predicts that these exceedances of the 24-hour average PM₁₀ criterion would drop to a 1 µg/m³ exceedance at R3 and R29 only (contributions of 26 µg/m³ attributable to the project in both cases).

Given the predicted exceedances, it is important to consider how often they might occur. The EA predicts that the likely frequency of the PM₁₀ contributions from the project exceeding 25 µg/m³ to be approximately one day per year. Combined with the 30% probability of background levels in excess of 25 µg/m³, the predicted frequency of an exceedance is 0.09% in any one year (or equivalent to one day every three years).

The Department considers these to be moderate, rather than significant, predicted exceedances. It also notes the low predicted frequency of exceedance. Further, it considers that substantial opportunities exist to reduce either project emissions or mining operations on those days when background dust is either high, or else predicted to be high. EPA holds a similar opinion, and sought conditions which provided for real-time air quality monitoring data to use in reactive management, to minimise exceedances and dust impacts within the village of Tomingley. The Department supports this request.

To ensure that acceptable air quality outcomes are achieved, the Department has recommended a broad suite of conditions to mitigate and manage air quality impacts, including requiring Alkane to:

- comply with air quality criteria;
- implement all reasonable and feasible 'source-based' measures to minimise dust emissions on site;
- develop a comprehensive Air Quality Management Plan, which includes a dust monitoring program that uses a combination of real-time and supplementary attended monitoring measures and adequately supports a proactive and reactive air quality management system;
- independently investigate air quality complaints and undertake applicable management measures;
- respond effectively to enquiries or complaints; and
- publicly report on its environmental performance.

Based on assessments undertaken for similar projects, the Department is satisfied that emissions of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) associated with diesel use and blast fumes would be relatively minor and not warrant further assessment. Notwithstanding, the Department has recommended conditions requiring Alkane to implement all reasonable and feasible measures to minimise off-site odours and fumes.

With the implementation of these measures, the Department is satisfied that the air quality impacts of the project are able to be adequately minimised and mitigated, and that the project can be managed in a manner that would not result in any significant impacts on Tomingley village and the wider area.

5.6 Traffic

The proposed mine site would be accessed via a new access connection to be formed from the northwest corner of the site onto Tomingley West Road. From here, traffic would travel to or from the site in four principal directions:

- west – via Tomingley West Road;

- north – via Tomingley West Road to Tomingley, then north on Tomingley-Narromine Road to Narromine;
- northeast – via Tomingley West Road to Tomingley, then northeast on the Newell Highway to Dubbo; and
- south – via Tomingley West Road to Tomingley, then south on the Newell Highway to Peak Hill and Parkes.

It is expected that the construction phase would generate 200 vehicle movements per day (180 light vehicles and 20 heavy vehicles), while ongoing operations would generate 144 movements per day (108 light vehicles and 66 heavy vehicles). The EA contains an assessment of traffic expected to be generated by the project during construction and operation, as both project-related increments and as percentage increases over existing road traffic volumes, as summarised in **Table 8**.

Table 8: Current and Predicted Traffic Volumes

Road	Vehicle Type	Current Traffic	Project Traffic	Vehicle Increase	Total Traffic Increase
Construction Phase					
Newell Highway	Light vehicles	1,775	120	6.8%	5.1%
	Heavy vehicles	875	14	1.6%	
Tomingley-Narromine Road	Light vehicles	280	60	21.4%	16.5%
	Heavy vehicles	120	6	5.0%	
Tomingley West Road	Light vehicles	40	180	450.0%	333.3%
	Heavy vehicles	20	20	100.0%	
Mine Operation Phase					
Newell Highway	Light vehicles	2,250	102	4.5%	3.2%
	Heavy vehicles	1,125	6	0.5%	
Tomingley-Narromine Road	Light vehicles	349	34	9.7%	7.2%
	Heavy vehicles	149	2	1.3%	
Tomingley West Road	Light vehicles	49	136	377.6%	294.6%
	Heavy vehicles	25	8	32.0%	

The EA indicates that these traffic volumes would fall within the design capacities of all affected roads, and that the two key local intersections – between Tomingley West Road and Tomingley-Narromine Road, and between the Newell Highway and Tomingley-Narromine Road – would continue to operate with a level of service (LOS) of A and B respectively. Consequently no upgrading of these intersections is proposed. The Department agrees with this assessment.

However, in respect of Tomingley West Road, the traffic assessment concludes that it should be upgraded to properly accommodate project-related traffic. Since public exhibition of the EA, Alkane and Narromine Shire Council have negotiated a Planning Agreement that would facilitate these upgrades and provide for ongoing road maintenance contributions to Council. In broad terms the upgrade works include:

- upgrade of Tomingley West Road from immediately south of the causeway to the mine access road in accordance with plans approved by Council;
- installation of suitable edging on the Tomingley West Road causeway located near the intersection with Narromine-Tomingley Road;
- installation of two new street lights at the intersection of Tomingley West Road and Narromine-Tomingley Road; and
- maintenance of Tomingley West Road from the intersection with Narromine-Tomingley Road to the mine access road for the duration of the project.

Subject to the implementation of these road upgrades, the Department is satisfied that traffic impacts associated with the project can be managed within acceptable capacity, safety and amenity limits. The Department has therefore recommended conditions of approval requiring the completion of these upgrades prior to the commencement of mining operations and to the satisfaction of Council.

To ensure protection of the amenity of local residents, particularly those in and around the village of Tomingley, the Department recommends limiting heavy vehicle movements to and from the site to a total of eight per day (as assumed in the EA) and restricting the hours of vehicle movements (from 7:00 am to 10:00 pm Monday to Saturday and 8:00 am to 10:00 pm on Sunday and public holidays).

The Department also proposes that Alkane develop and implement a Traffic Management Plan for the project to minimise potential conflicts with other roads users (particularly along Tomingley West Road).

5.7 Rehabilitation

The EA includes conceptual plans for the project site landform following the completion of mining operations. Rehabilitation would be undertaken progressively, with the aim of returning it to a mix of conservation, agriculture and possible commercial use (refer to **Figure 9**).

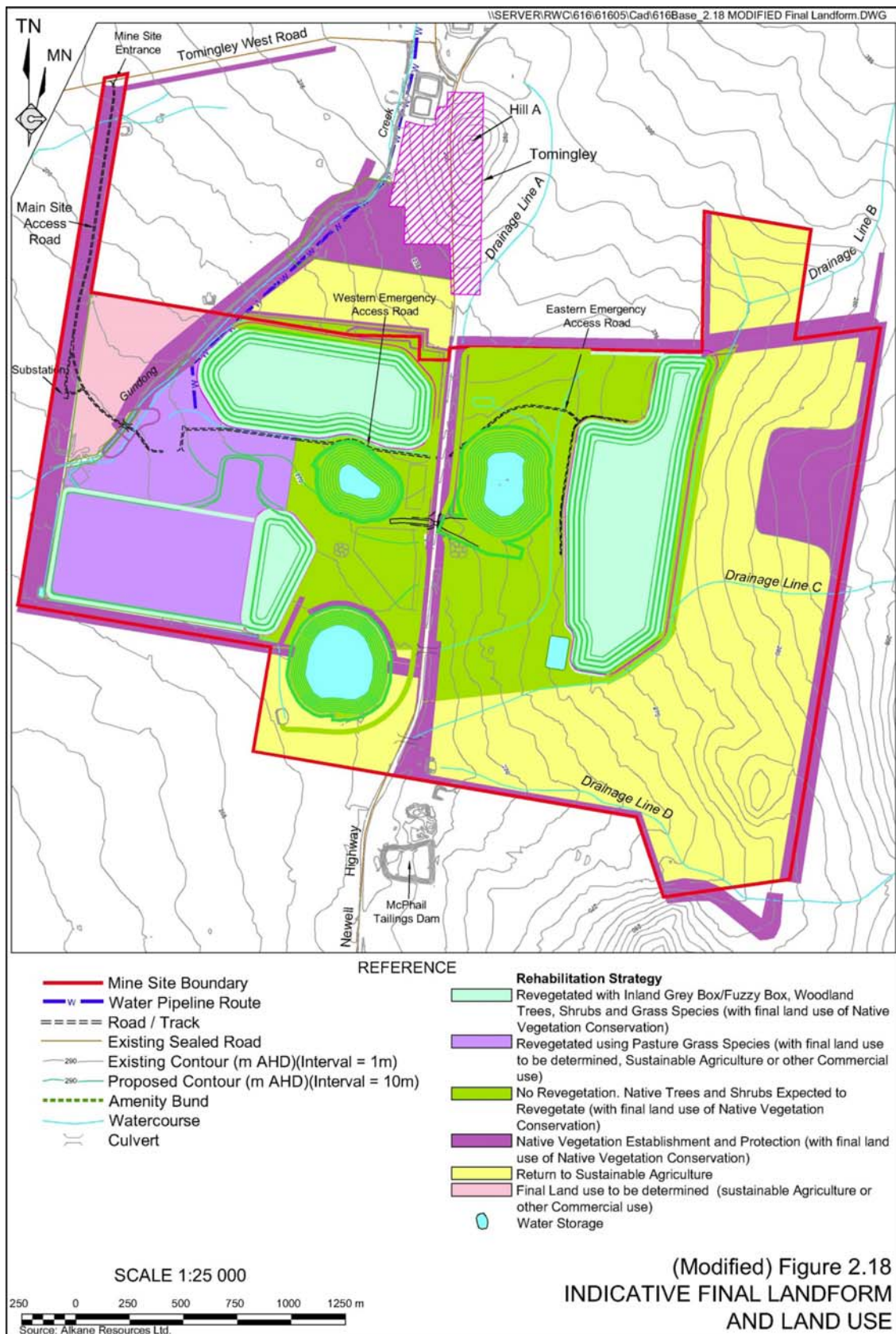


Figure 9: Indicative Final Landform and Land Use

Key features of the proposed post-mining landform and rehabilitation strategy include:

- mine voids would gradually fill with water to a level approximately 60-80 m below natural ground surface (equilibrium is predicted to be reached within 85 years for Caloma One and Wyoming One, and within 50 years for Wyoming Three), with some revegetation of batters within these voids above the water level;
- waste emplacements would be stabilised and revegetated with Inland Grey Box/Fuzzy Box woodland species;
- retention of site water infrastructure, 66 kV substation, main access road, western emergency access road and site buildings, with remaining site infrastructure to be either dismantled and reused, or disposed of;
- potential commercial use in the decommissioned processing facility and RSF areas;
- agricultural use; and
- passive regeneration of undisturbed areas of the site not identified in the biodiversity offset or for agricultural use.

DRE is generally satisfied with the proposed rehabilitation approach, but was initially concerned with the proposed retention of water-filled voids and the lack of information to justify the potential for consequent potential sterilisation of additional underground resources. In particular, DRE argued that the voids were unlikely to be a community benefit, given that the salinity of the water would increase over time, through evaporative concentration. DRE sought consideration of backfilling all voids, provided that this would not result in the sterilisation of potentially-recoverable underground resources.

Alkane subsequently removed the Caloma Two pit from the proposal, and has committed to backfill the Wyoming Three void if further exploration beneath the open cuts confirms that backfilling would not result in the sterilisation of a mineable resource. DRE has accepted this approach. The Department is satisfied that this outcome achieves a balance between maximising the potential recovery of mineral resources and reducing the extent of voids, and has recommended a condition requiring Alkane to undertake further assessment of the feasibility of backfilling the Wyoming Three void within three years of the commencement of mining.

The Department is satisfied that Alkane's rehabilitation and final land use objectives are achievable, and that they are compatible with surrounding land uses, particularly Tomingley village. The Department has recommended conditions requiring Alkane to develop a Rehabilitation Management Plan, which would set the objectives for future use of the project site, including detailed performance and completion criteria for the progressive revegetation and rehabilitation of the site.

5.8 Other Issues

The project application raises a number of other relevant issues, which are addressed in **Table 9** below.

Table 9: Assessment of Other Issues

Issue	Consideration	Conclusion
<i>Aboriginal heritage</i>	<ul style="list-style-type: none"> • Nineteen heritage items were identified across the mine study area. Of these, two would be directly impacted – TGP-ST7 (initially thought to be a carved tree) and TGP-ST10 (a possible scarred tree). A further four items are located close to the project footprint (two artefact scatters and two scarred trees) and would require mitigation and management measures to minimise the potential for impacts. • Subsequent investigations into TGP-ST7 following exhibition of the EA concluded that it is unlikely to be a carved tree. It was therefore assessed to be of low significance. • Thirty-eight items/ sites were identified along the water supply pipeline route. Thirty seven of these (36 scarred trees and one ceremonial/ dreaming place) would not be directly affected by the project and would be subject to appropriate mitigation and management to avoid indirect impacts. Only one item, an open scatter with a potential archaeological deposit (PAD) would be directly affected by the pipeline. This site has been assessed as 	<ul style="list-style-type: none"> • The Department is satisfied that Alkane has undertaken an adequate and appropriate level of assessment of potential impacts on Aboriginal heritage. • The project is unlikely to have a significant impact on Aboriginal heritage and those items which cannot be avoided have been assessed to have limited significance. • The Department recommends that Alkane be required to prepare and implement a Heritage Management Plan to ensure the appropriate salvage, recording and/ or protection of known items of Aboriginal heritage significance.

	having low significance.	
<i>Non-Aboriginal Heritage</i>	<ul style="list-style-type: none"> • Six non-Aboriginal heritage items were identified on the mine site, of which three lay within the proposed disturbance footprint (a halfpenny coin, farm machinery and a building remnant). The halfpenny coin is considered of local significance and has already been salvaged, while the other two items (TGP-HS5 and TGP-HS5) have been assessed as having limited local significance. • Further assessment of items TGP-HS5 and TGP-HS6 was undertaken following exhibition of the EA and is included in the RTS. The assessment concluded that the two items should be considered as a single unit, with a low significance. • Two items of non-Aboriginal heritage significance were identified along the water supply pipeline route, both of which are blazed trees. Neither site would be disturbed during construction or operation of the pipeline. 	<ul style="list-style-type: none"> • The Department is satisfied that Alkane has undertaken an adequate and appropriate level of assessment of potential impacts on non-Aboriginal heritage. • The project is unlikely to have a significant impact on non-Aboriginal heritage and those items which cannot be avoided have been assessed to have limited significance. • The Department recommends that Alkane be required to prepare and implement a Heritage Management Plan to ensure the appropriate salvage, recording and/ or protection of known items of non-Aboriginal heritage significance.
<i>Visual Amenity</i>	<ul style="list-style-type: none"> • The proposed mine site is visible from the southern and western sections of Tomingley; from isolated rural residential premises to the west, north and east, and from the Newell Highway and Tomingley West Road. • The relatively flat, rural nature of the area means that the proposed mine would be visually prominent without application of appropriate screening measures. • Vegetated amenity bunds between 3 m and 4.5 m in height are proposed adjacent to the eastern and western boundaries of the Newell Highway, to the north of the Caloma open cut, to the south of the Wyoming open cut and to the north of Waste Rock Emplacement 2. • The northern faces of Waste Rock Emplacements 2 and 3 would be constructed and rehabilitated to a height of 15 m, principally as a noise mitigation measure, and would act as an additional visual screen. • Rehabilitation and revegetation associated with the biodiversity offset package would provide additional vegetation screening around the boundaries of the site. • Alkane has committed to at-receiver visual screening measures, where reasonable, at the request of any affected land owner. 	<ul style="list-style-type: none"> • Although the proposed mine site is visually exposed, particularly from the Newell Highway, the Department is satisfied that potential visual amenity impacts can be effectively mitigated through the use of vegetated bunding as proposed by Alkane. The Department recommends requiring the proposed bunding as a condition of approval. • In addition, the Department has recommended a condition to require provision of reasonable screening at any receiver with significant views towards the project.
<i>Socio-economics</i>	<ul style="list-style-type: none"> • The project would generate 100 full-time-equivalent direct employment positions during construction and between 85 and 90 during operations. • The project would involve capital investment of approximately \$65.6 million, and is expected to inject approximately \$28.6 million into the local and regional economy annually. It is expected to contribute a further \$20.4 million to the State and Commonwealth economies each year. • As part of the draft Planning Agreement negotiated with Council, Alkane has committed to contributing \$950,000 over the first eight years of operations to a community fund, road maintenance and provision of Council environmental management expertise. This would be in addition to the capital investment in upgrading Tomingley West Road. • Parkes Shire Council raised concern in its submission in relation to the potential impacts of the project on the town of Peak Hill, particularly any influx of employees. Alkane 	<ul style="list-style-type: none"> • The Department is satisfied that the project would have a positive socio-economic effect on the Tomingley locality and region through direct investment and the generation of employment opportunities. • Potential negative impacts on local amenity can be effectively mitigated within acceptable limits. • The terms of the Planning Agreement negotiated between Alkane and Council includes contributions towards road upgrades and maintenance, as well as \$430,000 towards a community fund and \$160,000 towards developing Council's environmental management expertise. • The Department is satisfied that a Planning Agreement would adequately address any residual impacts on the local community,

presented additional justification in its RTS to support the claim that most employees are expected to commute from regional centres such as Dubbo. Alkane admits that there is potential for employees to relocate to Peak Hill, but expects the total number to be modest and within the capacity of the town. Further, Alkane argues that the potential positive impacts on local businesses from the mine would more than offset any residual negative impacts associated with mine-induced population growth.

and recommends a condition of approval requiring Alkane to enter into a Planning Agreement with Narromine Council, in general accordance with the terms of the agreement already negotiated between the parties.

6. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of approval for the Tomingley Gold Project (see **Appendix F**). These conditions are summarised in **Appendix E**. The conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the project;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Alkane has considered and accepted both the proposed format of the approval instrument and the conditions as recommended.

7. CONCLUSION

The Department has carried out a detailed assessment of the merits of the project, in accordance with the requirements of the EP&A Act. This assessment has found that, despite the residents of Tomingley being in relatively close proximity to the proposed mine, the operation of the project could be managed such that it would not result in unacceptable noise, dust, blasting, traffic or visual amenity impacts. Proposed measures to manage these impacts include:

- the construction and maintenance of vegetated amenity bunding and vegetation screens;
- proactive management of potential noise, blasting and air quality impacts, including real-time monitoring, community engagement and restricting activities during adverse meteorological conditions; and
- adaptive management of the project to ensure ongoing compliance of mining operations with project-specific criteria.

Although the project is likely to result in the localised drawdown of saline groundwater, the Department is satisfied that the project would not significantly impact any groundwater user in the region given the aquifer's salinity, the absence of extractive use and the low likelihood of connection to the alluvial aquifer of Gundong Creek.

With the implementation of appropriate storage design and surface water control measures, including a comprehensive water management plan, the Department is satisfied that the potential water quality and flooding impacts of the project can be adequately managed to within acceptable levels.

The project would require the removal of 22.4 ha of remnant native vegetation which would be offset by the conservation and enhancement of remaining vegetation on the site. Alkane also proposes to rehabilitate the site to enhance existing native vegetation and facilitate the active and passive regeneration of woodland around the site.

The Department has recommended a range of conditions to ensure that these impacts are suitably mitigated, managed and/ or offset. These conditions include requirements for Alkane to:

- continue baseline groundwater monitoring to refine and update, as relevant, the proposed approach to the mitigation and management of potential groundwater impacts prior to interception of the groundwater table;
- implement additional measures to minimise the dust, noise, blasting and traffic impacts of the project;

- enter into a Planning Agreement with Narromine Shire Council for upgrades to Tomingley West Road, road maintenance contributions, contributions towards a community fund and contributions towards enhancing Council's environmental management expertise;
- develop and implement a significant biodiversity offset to ensure the project maintains and potentially improves the biodiversity values of the region in the medium to long term;
- conserve the proposed biodiversity offset area in perpetuity;
- progressively rehabilitate the site, and continue to investigate opportunities to backfill mine voids, particularly the Wyoming Three void, as part of the site rehabilitation;
- monitor and regularly report on its environmental performance; and
- commission independent audits of its operations, to ensure that it is complying with its conditions of approval and implementing best practice on the site.

The Department's assessment also found that the project would provide economic and social benefits to both the region and NSW, being:

- employment for up to 100 employees during site establishment and 85 to 90 employees during mining operations;
- a capital investment of \$65.6 million; and
- royalties and payroll taxes for the State Government.

On balance, the Department believes that the project's benefits sufficiently outweigh its residual costs and that it is in the public interest. The project should therefore be approved subject to strict conditions.

8. RECOMMENDATION

It is RECOMMENDED that the Deputy Director-General, as delegate for the Minister:

- consider the findings and recommendations of this report;
- approve the project application, subject to conditions, under section 75J of the EP&A Act; and
- sign the attached project approval (see **Appendix F**).

Howard Reed

Howard Reed *19.7.12*
 Manager, Mining Projects

[Signature] *19.7.12*

Chris Wilson
 Executive Director
 Major Project Assessments

David Kitto *19/7/12*

David Kitto
 Director Mining & Industry Projects

[Signature]

Richard Pearson *24/7/12*
 Deputy Director-General
 Development Assessment and Systems Performance

APPENDIX A – ENVIRONMENTAL ASSESSMENT

See relevant link.

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3426

APPENDIX B – ENVIRONMENTAL PLANNING INSTRUMENTS

State Environmental Planning Policy (Major Development) 2005

See discussion in Section 3.1.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)

Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining, including:

- compatibility with other land uses;
- natural resource management and environmental management;
- resource recovery;
- transport; and
- rehabilitation.

These matters do not have to be considered when determining major projects. However, the Department has considered all of these matters in its assessment report, where appropriate. Based on this assessment, the Department is satisfied that the project is able to be managed in a manner that is generally consistent with the aims, objectives and provisions of the Mining SEPP.

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP)

Under clause 45 of the Infrastructure SEPP, development in the vicinity of an electricity supply easement is required to be referred to the electricity supply authority for comment. The project would involve the relocation of a 1.7 km section of 22 kV power transmission line to facilitate the Caloma Two open cut. Essential Energy, the owner of this infrastructure made a submission on the project, identifying that the project is not expected to result in any significant impacts to electricity supply infrastructure.

In accordance with clause 104 of the SEPP, the application was referred to the RMS, which subsequently confirmed that it does not object to the project (see assessment report).

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)

The Department has considered the Hazard and Risk Assessment provided in the EA and is satisfied that the proposal is not potentially hazardous or offensive, and that the proposal is generally consistent with the aims, objectives and provisions of SEPP 33

The Department is satisfied that the project is not potentially hazardous or offensive, and that the proposal is generally consistent with the aims, objectives and provisions of SEPP 33.

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

The EA states that the project site contains potential Koala habitat (as defined by SEPP 44), however, no evidence of Koala activity, either direct observation or indirect evidence (such as scats or scratches on tree trunks) was recorded on the project site. The EA also states that, as a result of previous clearing, Koalas are unlikely to occur on the project site and, consequently SEPP 44 does not apply to the project. The Department accepts that the project site contains potential Koala habitat and is satisfied that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 44. As such, the Department is satisfied that the project would be unlikely to impact on Koalas.

State Environmental Planning Policy No.55 – Remediation of Land (SEPP 55)

SEPP 55 is concerned with the remediation of contaminated land. It sets out matters relating to contaminated land that a consent authority must consider in determining an application for development consent. BIM indicated that it is not aware of cyanide or mercury being used during previous mining operations and that as a result, disturbance or ongoing management of contaminated material as a result of the project is not anticipated. The Department has considered the matters in SEPP 55 and the information in the EA and is satisfied that the land can be used for mining purposes.

Narromine Local Environmental Plan 2011

See discussion in section 3.2.

APPENDIX C – SUBMISSIONS

See relevant link.

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3426

APPENDIX D – RESPONSE TO SUBMISSIONS

See relevant link.

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3426

APPENDIX E – SUMMARY OF CONDITIONS OF APPROVAL

Aspect	Condition	Requirement
Schedule 2: Administrative Conditions		
<i>Minimise Harm</i>	1	Obligation to minimise harm occurring to the environment
<i>Limits on Approval</i>	5	Approval for mining operations restricted to 31 December 2022
	6	Limits extraction and processing of ore on site to 1.5 million tonnes per annum
	7	excludes the Caloma Two open cut pit from the scope of the project
<i>Planning Agreement</i>	14	Requires Alkane to enter into a Planning Agreement with Narromine Shire Council
Schedule 3: Specific Environmental Conditions		
<i>Noise</i>	1-2	Specifies acquisition and additional noise mitigation measures for affected properties
	3	Noise assessment criteria
	4	Operating hours
	5	Noise related operating conditions
	6	Noise Management Plan
<i>Blasting</i>	7	Blasting assessment criteria
	8	Blasting hours
	9	Blasting frequency
	13	Operating conditions
	14	Blast Management Plan
<i>Air Quality</i>	17	Air quality assessment criteria
	18	Air quality operating conditions
	19	Air Quality and Greenhouse Gas Management Plan
<i>Meteorological Monitoring</i>	20	Requires meteorological monitoring at a location representative of the site
<i>Soil and Water</i>	21-22	Ensure adequate supply of water for operation and preferential use of recycled water for mining operations
	23	Surface water discharge limits as per the EPL
	24	Criteria for WAD Cyanide in Tailings
	28-31	Design and performance of RSF and process water storages on site
	32	Additional baseline groundwater monitoring
	33	Water Management Plan
<i>Biodiversity</i>	34-35	Biodiversity Offset to be secured in perpetuity
	36	Biodiversity Management Plan
<i>Heritage</i>	38	Heritage Management Plan
<i>Transport</i>	39	Dangerous goods to be transported in accordance with the Dangerous Goods Code
	40-43	Road upgrades and maintenance
	45	Traffic Management Plan
<i>Visual</i>	47	Vegetated amenity bunds
	48	Additional mitigation measures
<i>Hazardous Materials</i>	49	Final Hazards Analysis
<i>Waste</i>	50	Hazardous Materials Management Plan
	51	Waste management requirements.
<i>Rehabilitation</i>	52	Backfilling Wyoming Three void
	53	Rehabilitation objectives
	54	Progressive rehabilitation
	55	Rehabilitation Management Plan
Schedule 4: Additional Procedures		
<i>Notification</i>	1	Notification of affected landowners
<i>Independent review</i>	4-6	Independent environmental review on request
<i>Land Acquisition</i>	7-8	Acquisition of significantly affected land on request
Schedule 5: Environmental Management, Reporting and Auditing		
<i>Environmental Management and Strategy</i>	1	Environmental Management Strategy
<i>Adaptive Management</i>	2	Risk based environmental management
<i>Plan Requirements</i>	3	Requirements for management plans
<i>Annual Review</i>	4	Annual Review of environmental performance and approval compliance
<i>Revision of</i>	5	Requirement to revise strategies, plans and programs

<i>Strategies, Plans and Programs</i>		
<i>CCC</i>	6	Requirement for Community Consultative Committee
<i>Incident Reporting</i>	7-8	Requirement to report incidents
<i>Auditing</i>	9-10	Requirement to undertake regular independent environmental audits
<i>Access to Information</i>	11	Requirement to publicly report environmental information

APPENDIX F – PROJECT APPROVAL
