

# **Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning**

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**Kalgoorlie Consolidated Gold Mines Pty Ltd**

**Report and recommendations  
of the Environmental Protection Authority,  
pursuant to the Minister for the Environment  
remittal under Section 43.**

**Environmental Protection Authority  
Perth, Western Australia  
Bulletin 1273 (supersedes Bulletin 1270)  
December 2007**

### **Environmental Impact Assessment Process Timelines**

<b>Date</b>	<b>Progress stages</b>	<b>Time (weeks)</b>
<b>11/11/05</b>	<b>Level of Assessment set (following any appeals upheld)</b>	<b>0 weeks</b>
<b>04/09/06</b>	<b>Proponent Document Released for Public Comment</b>	<b>43 weeks</b>
<b>30/10/06</b>	<b>Public Comment Period Closed</b>	<b>8 weeks</b>
<b>11/10/07</b>	<b>Final Proponent response to the issues raised</b>	<b>49 weeks</b>
<b>29/10/07</b>	<b>EPA report to the Minister for the Environment</b>	<b>3 weeks</b>
<b>5/11/07</b>	<b>Minister for the Environment remits proposal to EPA</b>	<b>1 week</b>
<b>3/12/07</b>	<b>EPA report to the Minister for Environment</b>	<b>4 weeks</b>

**Report Released: 3/12/07**  
**Appeals Close: 17/12/07**

**All clarifications from Bulletin 1270 are in blue print.**

Assessment No. 1581

## Summary and recommendations

This [revised](#) report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the proposal by Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) to expand their Fimiston operations in Kalgoorlie by widening and deepening the Superpit by means of the Golden Pike Cutback, and to plan for mine closure.

[Following the release of the EPA's initial advice and recommendations to the Minister for the Environment, Bulletin 1270, the Minister for the Environment directed the EPA to re-assess the proposal more fully by the final preparation of the report not being delegated to the Chairman. The reason for this direction was the Minister's concern that there may have been a perception of bias and/or a conflict of interest arising from the previous assessment because the former Chairman, Barry Carbon, had received payment from KCGM for some consultancy work carried out nine years ago.](#)

[The EPA Board notes it was regrettable the previous Chairman, Mr Barry Carbon, did not record his previous association with KCGM nine years ago. However, the EPA Board confirms that this in no way affected the EPA's deliberations and conclusion on the environmental acceptability of the proposal.](#)

This report is on the assessment of the proposed expansion, under Section 40 of the *Environmental Protection Act 1986* (the EP Act), as a change to a previously approved proposal (revised proposal) with the environmental conditions on the previously approved proposal being applicable unless amended following this assessment, as referred to in Section 45B(b) of the EP Act. The previously approved proposal was Fimiston Project Stage II – Mine and Waste Dumps, for which Ministerial Statement 188 was issued on 24 October 1991.

Section 44 of the EP Act requires the EPA to report to the Minister for the Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

### **Key environmental factors and principles**

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) Noise and vibration;

- (b) Dust and air quality;
- (c) Tailings and groundwater management; and
- (d) Mine rehabilitation and closure.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation. The EPA has provided comment on the issue of public safety in Section 5 (Other Advice).

The following principles were considered by the EPA in relation to the proposal:

- (a) Principle 1, the precautionary principle;
- (b) Principle 2, the principle of intergenerational equity;
- (c) Principle 4, principles relating to improved valuation, pricing and incentive mechanisms; and
- (d) Principle 5, the principle of waste minimisation.

### **Conclusion**

The EPA has considered the proposal by KCGM to expand their Fimiston operations in Kalgoorlie by widening and deepening the Superpit by means of the Golden Pike Cutback, and to plan for mine closure.

The EPA notes that each of the four key environmental issues associated with this project can be adequately managed by a combination of the proponent's commitments, existing and proposed regulations administered by other agencies, and the recommended conditions set out in Appendix 4.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised by this proposal, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4.

### **Recommendations**

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the expansion of KCGM's Fimiston Operations by widening and deepening the Superpit by means of a cutback (the Golden Pike Cutback). This expansion would also require additional Tailings Storage capacity.
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments; and

4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

### **Conditions**

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by KCGM to expand their Fimiston operations in Kalgoorlie by widening and deepening the Superpit through the Golden Pike Cutback and to plan for mine closure is approved for implementation. These conditions are presented in Appendix 4.

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# 1. Introduction and background

This [revised](#) report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the key environmental factors and principles for the proposal by Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM), to expand their Fimiston operations in Kalgoorlie by widening and deepening the Superpit by means of the Golden Pike Cutback, and to plan for mine closure

[Following the release of the EPA's initial advice and recommendations to the Minister for the Environment, Bulletin 1270, the Minister for the Environment directed the EPA to re-assess the proposal more fully by the final preparation of the report not being delegated to the Chairman. The reason for this direction was the Minister's concern that there may have been a perception of bias and/or a conflict of interest arising from the previous assessment because the former Chairman, Barry Carbon, had received payment from KCGM for some consultancy work carried out nine years ago.](#)

[The EPA Board notes it was regrettable the previous Chairman, Mr Barry Carbon, did not record his previous association with KCGM nine years ago. However, the EPA Board confirms that this in no way affected the EPA's deliberations and conclusion on the environmental acceptability of the proposal.](#)

Prior to 1989, the Kalgoorlie Golden Mile area was mined by a number of companies, each with their own operations. In 1989 a new management company, KCGM, was created to combine the individual operations. Currently, KCGM manages the operations at the Fimiston premises for its two joint venture owners, Newmont Australia Limited and Barrick Gold of Australia Ltd.

In 1991, the EPA assessed a proposal by KCGM to rationalise open-cut mining activities into a single operation, now know as the Superpit (EPA, 1991). The proposal was consistent with the plan developed in 1988/9 by the Golden Mile Mining Development Planning Committee entitled "Conceptual Plan for Mining Developments on the Golden Mile" (Department of Mines, 1989). In its report, the EPA reiterated its "support for the use of the concept of adequate separation between mining and residential landuse as the basis of a long term mechanism to alleviate conflicts". The EPA noted that the mechanism for achieving this separation involved planning, mining and landuse issues. The main environmental factors assessed by the EPA in its 1991 report were:

- (a) Rehabilitation of disturbed areas;
- (b) Impacts associated with dust and noise from mining operations;
- (c) Location of waste dumps;
- (d) Impacts from the use of hypersaline water for dust suppression; and
- (e) Modification of surface drainage increasing the potential for flooding on-site.

The Minister for the Environment issued Ministerial Statement 188 in October 1991 allowing the project to proceed.

The mining has been close to the Boulder side of the city, and the current proposal would extend the operations closer to the Williamstown side. Mining operations will not occur as close to Williamstown as they currently are to Boulder.

In addition, tailings seepage from the two current Fimiston Tailings Dams has caused groundwater mounding, at the most severe point bringing groundwater levels to within 2m below surface level in an area of 15 – 20 square kilometres around the facilities (Thompson & Brett, 2004). This is now being managed and has been reduced to approximately 6m below ground level. The groundwater is naturally very salty, and it poses a threat to vegetation and fauna should it discharge to the surface or rise to levels where vegetation may access it. Since this proposal involves increased use of tailings dams, seepage rates may increase with the potential to cause impact. As the scale of operations increases, so does the need to ensure that long-term environmental impacts from the operations are understood and adequate plans are in place for the ultimate cessation of mining and closure of the site. For these reasons, the EPA determined that the proposed changes to the operations should be formally assessed. In addition, Ministerial Statement 188, published in 1991 should be updated in line with current conditions and standards.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 6 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. [The EPA has undertaken a further review of the company's response to submissions in preparing this revised report and finds it acceptable.](#) Issues arising from this process which have been taken into account by the EPA, appear in the report itself.

## **2. The proposal**

KCGM proposes to undertake a cutback, the Golden Pike Cutback, along a section of the western edge of the existing Fimiston Open Pit. The cutback would allow for the widening and deepening of the pit to 600 metres (m). The Golden Pike Cutback would cover a surface area of 46 hectares (ha). KCGM proposes to implement this cutback in 2008.

The additional waste rock which would be produced as a result of the proposed expansion is proposed to be accommodated in two new waste rock dumps to the north of the pit and west of the Fimiston I Tailings Storage Facility (tailings dam).

Two storage options are proposed to accommodate the additional tailings resulting from the treatment of the gold-bearing ore. Option 1 is to increase the heights of the existing Fimiston I and II tailings dams from the conditionally approved heights of

40m and 45m respectively to 50m and 60m respectively. Option 2 is to recommission the historic Kaltails tailings dam and raise its height from 25m to 45 m.

Figure 1 provides the location of the proposed Golden Pike Cutback, the northern waste dumps, Fimiston I and II and the historic Kaltails tailings dam.

The proposal also includes a strategy for mine closure. The conceptual plan identifies areas that will require closure planning, i.e. underground mines, open pits, processing plants, waste rock dumps, tailings storage facilities, infrastructure, utilities and service corridors, exploration areas and historical sites. The plan also identifies processes that are required prior to closure planning i.e. stakeholder consultation, risk assessment, financial provisioning and decisions on land use. Before these processes can be finalised some studies need to be carried out to obtain information, i.e. predicted water levels and water quality in the pit and rate of filling, pit wall stability, rehabilitation trials and monitoring, and acid drainage potential of waste. The strategy also suggests a closure planning timetable and conceptual closure criteria. Progressive rehabilitation of waste rock dumps is planned during the remaining mine life.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 4 of the Public Environmental Review “Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning” (KCGM, 2006).

**Table 1: Summary of change to key proposal characteristics**

<b>Element</b>	<b>Existing Operations</b>	<b>Proposed</b>
<b>General</b>		
Project Life (Open Pit)	To approximately 2012	To approximately 2017
Mining Production Rate	Approximately 89 million tonnes per annum	No change
Milling Production Rate	Approximately 13.5 million tonnes per annum	No change
<b>Fimiston Open Pit</b>		
Area	Approximately 300 hectares	Increase of 46 hectares
Final pit depth	Approximately 470 metres	Approximately 600 metres
<b>Remaining Waste Movement</b>		
Southern and Eastern waste rock dumps	Approximately 460-600 million tonnes depending on backfill	Increase of 120-160 Million tonnes depending on backfill
Southern pit back-fill	Approximately 140 million tonnes if resource not sterilised	No change
Northern pit back-fill	n/a	Approximately 40 million tonnes if resource not sterilised
Northern waste rock dumps	n/a	Approximately 140 million tonnes occupying 115 hectares

<b>Element</b>	<b>Existing Operations</b>	<b>Proposed</b>
<b>Tailings Storage Facilities</b>		
<b>Option 1</b>		
Fimiston I	Proposed height 40 metres (1)	Increase in height to 50 metres
Fimiston II	Proposed height 45 metres (1)	Increase in height to 60 metres
<b>Option 2</b>		
Fimiston I	Proposed height 40 metres (1)	No change
Fimiston II	Proposed height 45 metres (1)	No change
Kaltails	n/a	Increase in height from 25 to 45 metres
<b>Water Consumption</b>		
Potable (per year)	Approximately 1460 megalitres	No change
Non-potable (per year)	Approximately 10 715 megalitres	No change
<b>Greenhouse Gas Emission</b>		
	Approximately 440 800 tonnes of carbon dioxide equivalent	No change from 2006 emissions. 8% increase from 2005 emissions.

Notes

1. Subject to further approvals

The potential impacts of the proposal initially predicted by the proponent in the PER document (KCGM, 2006) and their proposed management are summarised in Table E2 (Executive Summary) of the proponent's document.

Since the release of the PER, the proponent has estimated that the amount of waste to be disposed of to the northern waste dumps is 140 Mt instead of 30 Mt as stated in the PER. The proponent has also amended the amount of waste rock to be backfilled into the pit from 55 Mt in the PER to 40 Mt, conditional on this backfill not sterilising a resource.

KCGM has also changed their preferred option for tailings disposal from Option 1 to Option 2.

Due to a change in the location of the proposed Superpit lookout, which requires the Loopline Railway to utilise the gazetted railway reserve at the foot of the planned noise bund, the noise bund for the Golden Pike would be 14m high instead of the 20m proposed in the PER

To compensate for the change in bund height, KCGM will limit Golden Pike cutback operations for the first bench (10m) to day and evening time periods (7am to 10pm). This would ensure that the effective bund height for night time operations is around 24 m.

Dust monitors at the Hewitt, Hopkins and Clancy Street monitoring locations have been upgraded to provide instantaneous 10-minute average PM<sub>10</sub> concentrations.

KCGM has made an application to the Minister for the Environment for approval under Regulation 17 of the *Environmental Protection (Noise) Regulations 1997*, to exceed the applicable standard for noise. This application, if approved, would not increase the level of noise currently emitted from KCGM's operations, but would enable KCGM to operate legally above the normal standards, whilst tightening the legal controls that prevent increases. The application is being processed simultaneously with this assessment, and will be released for public comment with this report.

In addition KCGM has provided the following additional information:

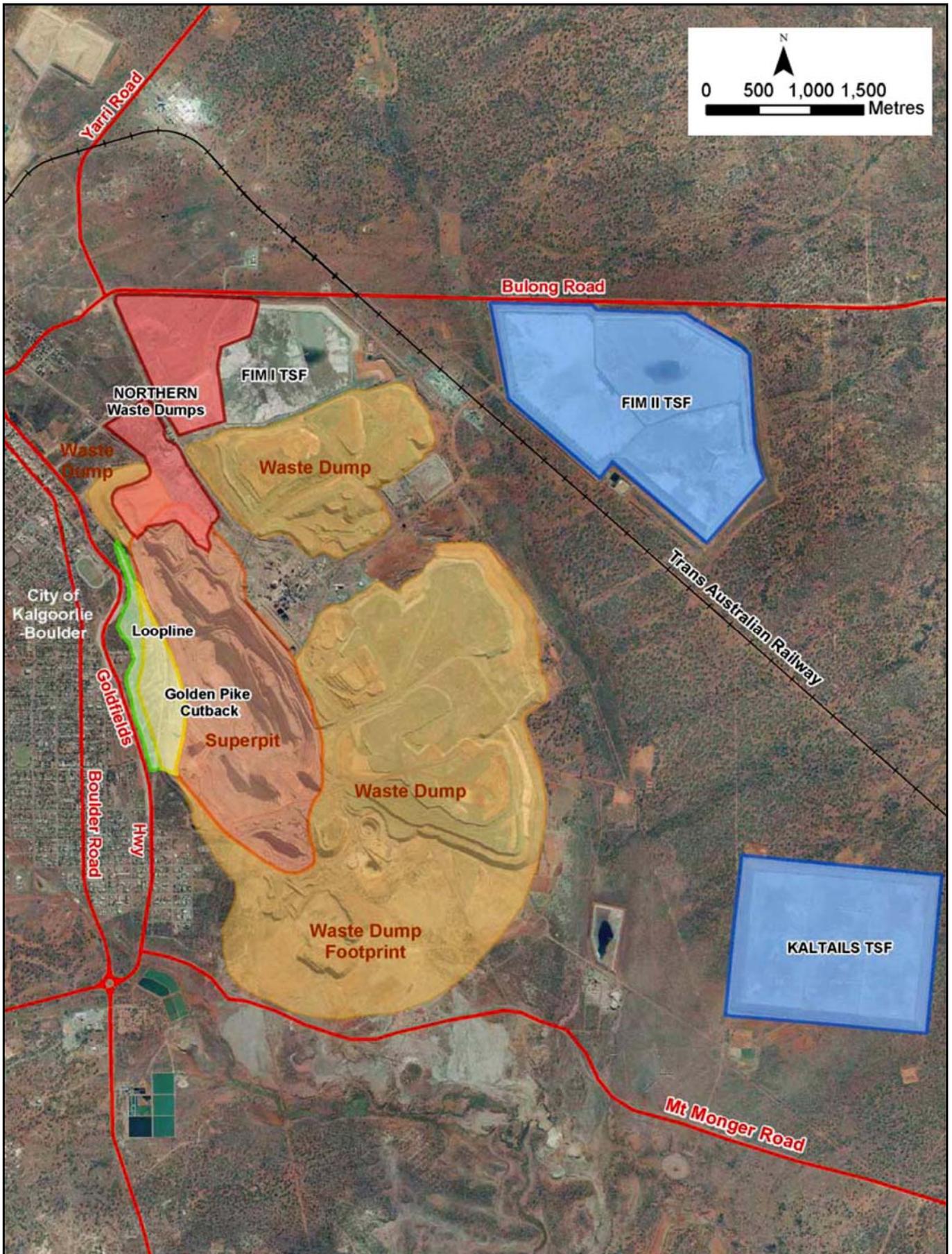
- Report on Ambient Particulate Metal in dust (Environ 2007a) and a health risk assessment of metals in fugitive dust emissions;
- an update to the Fimiston Pit Particulate Modelling (Environ 2007c);
- a report entitled "Air Dispersion Modelling of Mercury Emissions" (Environ 2006);
- a revised Air Quality Management Plan (Environ 2007b);
- a revised Closure Plan (KCGM 2007a); and
- a draft Rehabilitation Management Plan (KCGM 2007b).

The above documents are available on KCGM's website ([www.superpit.com.au](http://www.superpit.com.au)) and hard copies are available on request from KCGM.

### **3. Key environmental factors and principles**

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as flora, fauna, and greenhouse gases are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation. The issues of acid and metalliferous drainage from mine waste and financial assurances for closure will be managed by the Department of Industry and Resources' (DOIR) Environmental Division. Public safety will be managed by the Department of Consumer and Employment Protection via the *Mines Safety and Inspection Regulations 1995*.



*Figure 1: Plan View of Proposed Project*

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

- (a) Noise and vibration;
- (b) Dust and air quality;
- (c) Tailings and groundwater management; and
- (d) Mine rehabilitation and closure.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.4. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

- Principle 1, the precautionary principle;
- Principle 2, the principle of intergenerational equity;
- Principle 4, principles relating to improved valuation, pricing and incentive mechanisms; and
- Principle 5, the principle of waste minimisation.

### **3.1 Noise and vibration**

#### **Description**

##### Existing noise levels

KCGM operates under Ministerial Statement 188 and related noise level standards which were issued in 1992, prior to the gazettal of the *Environmental Protection (Noise) Regulations 1997*. Current noise levels generated by KCGM operations do not meet the criteria in the noise regulations at some locations in Kalgoorlie-Boulder. Average measured  $L_{10}$  noise levels at Kalgoorlie Technical School (KTS) and Boulder Primary School (BPS) loggers range from 52 – 53 dB during the day and night (without adjustment for tonality). This is up to 5 dB above daytime criteria and 15 dB above night time criteria for these locations.

##### Operational noise levels post expansion

Worst case operational noise levels post expansion (with the Golden Pike cutback at 20m below ground level) were modelled. At the calculation points in Baden Street, Williamstown and Hewitt and Short Streets, Boulder, noise was predicted to exceed night time criteria by up to 16 dB (without adjustment for tonality). Worst case night time noise levels at the KTS, BPS and York Street loggers are predicted to exceed the criteria by up to 17 dB at these locations (without adjustment for tonality).

It is predicted that, for the worst case, mining at ground level for the Golden Pike cutback (considered in isolation) will not comply with the night time assigned levels at the Boulder Primary School and York Street loggers by 4 and 1 dB respectively. However due to the existing mining noise these exceedences are unlikely to be distinguishable.

After the preparation of the PER document the proposed height of the noise bund for the Golden Pike cutback was reduced from 20 m to 14 m due to changes in the route for the Loopline railway. Revised noise modelling was undertaken for the 14 m bund height which indicated that noise levels would be slightly greater than the worst case scenario in the original 20m noise bund modelling. However, all of the predicted levels from the Golden Pike cutback in isolation are still below the current measured noise levels at the monitoring sites.

#### Northern Waste dumps

The outer walls of the northern waste dumps are proposed to be built during daytime hours (7 am to 7 pm) and on days when wind direction favours the carriage of noise away from residential areas. However, even with these restrictions, day time criteria at Baden, Hewitt and Short Streets could be exceeded by 5-13 dB. The construction of the outer walls would occur in campaign dumping over 2-3 years.

With the outer walls in place, exceedences of night time criteria could still occur. As such, KCGM propose to implement the controls described in Appendix E1 of the PER, so that assigned levels can be met.

Since the release of the PER, KCGM has made application to the Minister for the Environment under Regulation 17 of the *Environmental Protection (Noise) Regulations 1997* for approval to exceed the prescribed noise standard for both mining operations and the building of the outer walls of the northern waste dumps. This application, if approved, would not increase the level of noise currently emitted from KCGM's operations, but would enable KCGM's current operations to operate legally above normal standards, whilst tightening the legal controls that prevent increases. The application is being progressed simultaneously to this assessment, and will be released for public comment with this report.

#### Airblast overpressure

Airblast is the pressure wave (sound) produced by a blast and transmitted through the air. The airblast level is measured as a noise level in decibels (dB)  $L_{\text{Linear peak}}$ . Airblast levels are regulated by the *Environmental Protection (Noise) Regulations 1997*. The levels set by the Regulations are below the level of 133 dB  $L_{\text{Linear peak}}$  recommended in Australian Standard 2187.2-2006 for the prevention of damage to buildings and are designed to be protective of human comfort.

Currently KCGM operate in accordance with their existing Ministerial conditions requiring the that airblast levels from any blast do not exceed 125 dB  $L_{\text{Linear peak}}$  and not more than one in ten blasts exceeds 120 dB  $L_{\text{Linear peak}}$  when measured at an approved monitoring site. These levels are consistent with the current Noise Regulations for Monday to Saturday daytime blasting.

KCGM monitors airblast levels at the approved monitoring site for every blast. Results are reported quarterly to the DEC. Monitoring data for the years 2000 – 2007

show that the measured airblast levels were below 120 dB  $L_{\text{Linear peak}}$  for 99% of blasts.

KCGM also commissioned a study by Terrock Consulting Engineers to investigate the impacts of blasting for the Golden Pike Cutback. The study found that privately owned houses in Kalgoorlie-Boulder would, for a single blast with a 5m stemming height and 108 kg charge mass at the cutback perimeter, be exposed to an airblast in general around 115 dB L with less than one in ten blasts resulting in airblast levels of 115 -120 dBL. Airblast levels at nearby industrial premises will generally be in the range of 115 – 120 dBL reaching 120 – 125 dBL on occasions.

### *Vibration*

Australian Standard 2187.2-2006 considers the magnitude of ground vibration together with ground vibration frequencies to define damage criteria for buildings. For residential buildings and light commercial type buildings the recommended peak component particle velocity to prevent minor or cosmetic damage is 15 millimetres per second (mm/s) at 4 Hertz (Hz) increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above.

KCGM operates to achieve ground vibration not exceeding 10 mm/s at houses with no more than one in ten consecutive blasts exceeding 5 mm/s at houses. This is below the recommended levels to prevent minor or cosmetic damage and is designed for human comfort. Blast monitoring results are reported to the DEC quarterly. Monitored results are consistently below 5 mm/s.

KCGM also commissioned a study by Terrock Consulting Engineers to investigate the impacts of vibration for the Golden Pike Cutback. The study concluded that the maximum vibration levels that would be received by any house not owned by KCGM during blasting for the Golden Pike cutback would not exceed 5 mm/s and the average level would not exceed 2 mm/s.

### **Submissions**

The Department of Environment and Conservation (DEC) raised a number of technical noise queries. The majority of public submissions were concerned about noise, including the location and number of monitoring stations, independence of monitoring, the potential granting of a Regulation 17 exception, the impact of vibration and overpressure, and damage to buildings.

### **Assessment**

The EPA's environmental objective for this factor is to protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels are as low as reasonably practical given the historical planning issues.

The DEC advised that airblast levels from this proposal should be manageable within the prescribed standards in the *Environmental Protection (Noise) Regulations 1997*.

The DEC advised that noise from construction and operations can be managed through a combination of the construction provisions of the noise regulations and an approval under Regulation 17. While construction of the noise bund and walls can be progressed under Regulation 13, the EPA has recommended a condition (Condition 8-

1 Appendix 4) to prevent commencement of the proposed mining operations prior to the granting of approval under Regulation 17 of the Noise Regulations.

#### *Airblast overpressure*

The EPA considers that it is appropriate for KCGM to comply with the current Noise Regulations regarding airblast levels rather than the previous Ministerial conditions. KCGM should note that the Noise Regulations do not distinguish between residential and commercial premises. Lower limits also apply to Sunday blasting, which the EPA recommends that KCGM should not undertake (see recommended condition 9-4).

The EPA recommends condition 9-1 which limits blasting to between the hours of 0700 and 1800 hours, unless blasting is necessary for safety reasons. The EPA also recommends a review of KCGM's revised Noise and Vibration Monitoring and Management Program to ensure that airblast monitors are appropriately situated, that equipment meets requirements and is adequately calibrated, and that data is recorded according to Australian standards and reported to DEC (see recommended condition 9-6).

#### *Vibration*

The EPA notes that the maximum vibration levels committed to by KCGM are well below the recommended levels to prevent minor or cosmetic damage to residences. As there is no regulatory instrument for the control of vibration from blasting occurring outside of a mine site the EPA has recommended condition 9-5. The EPA considers that the vibration levels in the recommended condition should be protective of human comfort as well as prevent damage to residential buildings.

The EPA notes that KCGM has a blast management plan for blasting at the Golden Pike cutback. This plan is designed to control dust, airblast overpressure, vibration and flyrock from blasting.

The issue of damage to buildings from blasting is not considered to fall under the EP Act. However, the EPA notes that the impact of blasting vibration depends on the blasting source, the transmission path and conditions at the receival point and that while it is unlikely, it is possible that greater impacts than anticipated could occur. Blasting can be controlled at source but unusual site specific ground conditions, such as fractures, may transmit more vibration than expected. Additionally, building construction and materials may have high stresses in the structure, low damping properties or ability to resonate which could result in unexpected impacts. The EPA understands that KCGM investigates complaints of building damage and makes good damage where it is feasible that damage was caused by blasting. The EPA recommends that KCGM continues operating a complaints system, recording and investigating claims of damage and includes providing a written report to home owners detailing the outcome of the investigation. KCGM could also take a proactive approach and arrange with home owners to inspect houses in the vicinity of the Golden Pike cutback prior to blasting, so that any damage that may be due to blasting can be identified.

The EPA also recommends a review of KCGM's revised Noise and Vibration Monitoring and Management Program to ensure that vibration monitors are appropriately situated, that equipment meets requirements and is adequately

calibrated, and that data is recorded according to Australian standards and reported to DEC (see recommended condition 9-6).

## Summary

Having particular regard to the:

- a) advice from the DEC regarding ground vibration, airblast levels and noise from construction;
- b) control of noise available under the *Environmental Protection (Noise) Regulations 1997*;
- c) the current application by KCGM under Noise Regulation 17;
- d) the airblast overpressure and vibration limits applying to blasting; and
- e) KCGM's blast management plan for the Golden Pke cutback,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor provided that the proponent complies with the requirements of any Noise Regulation 17 approval.

## 3.2 Dust and air quality

### Description

#### Total Suspended Particulates

KCGM has monitored total suspended particulates (TSP) from 2002-2005 at Hopkins Street, the Boulder Shire Yard, Clancy Street and Hewitt Street from 9am to 6pm on days when blasting may take place. Results of this monitoring show that there are a substantial number of days when TSP standards set for residential areas near Kwinana under the *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992* are exceeded. While not all dust originates from KCGM, when the wind is in the direction from KCGM operations, KCGM is likely to be a large contributor.

#### PM<sub>10</sub> Particulates

KCGM has also monitored for particulate matter with an equivalent aerodynamic diameter of 10 micrometres or less (PM<sub>10</sub>) using a continuous monitor at the Boulder Shire Yard site. In 2006, the 24 hour average concentration of PM<sub>10</sub> exceeded the National Environment Protection Measure (NEPM) standard on five days. KCGM advised that on four of these days the wind direction was not predominately from the KCGM site and that the 24 hour average PM<sub>10</sub> standard was also exceeded on four days at a control site.

#### Potential health impacts

Preliminary metal analysis on dust samples was presented in the PER. The results of this analysis were not conclusive, and since the release of the PER, further investigation of the metals content has been undertaken. The investigation found that Kalgoorlie area soils have naturally elevated levels of arsenic, chromium and nickel compared to other Australian locations. Fimiston waste rock, the most probable source of dust, has elevated levels of arsenic, copper and manganese compared to Kalgoorlie area soils.

A Health Risk Assessment (HRA) was undertaken to assess the health implications of metals (including mercury) in dust. The dust emissions used in the HRA were revised to include increased emissions from waste dumps and reduced emissions from the pit,

as this was considered a more realistic scenario. Fourteen metals were identified in the dust and an additive effect was assumed in the calculation of health risks. [Acute and chronic non-carcinogenic health risks as well as carcinogenic risk were considered for the metals in the dust. Results for acute and chronic non-carcinogenic health risk indicated no cause for concern.](#) The calculated Incremental Carcinogenic Risk (ICR) met the US-EPA *de minimus* criterion ( $1 \times 10^{-6}$ ), which was used in the absence of an authoritative Australian guideline.

KCGM also undertook worst case air dispersion modelling of mercury. The predicted maximum ground level concentrations at the Gidji Roaster were low, at less than  $0.2\mu\text{g}/\text{m}^3$ . Ground level concentrations in the worst case modelling at the Carbon Regeneration Plant were equal to the Californian Office of Environmental Health Hazard Assessment acute exposure level of  $1.8\mu\text{g}/\text{m}^3$ . Using actual rather than worst case modelling gave much lower predictions.

### **Submissions**

Both the Department of Health (DOH) and DEC looked at the accuracy of particle dispersion modelling in AUSPLUME and the uncertainties associated with emissions. Therefore they recommended a management plan which addressed:

- air quality targets;
- action thresholds;
- management actions if thresholds exceeded;
- on-going monitoring;
- responsibilities for implementing and reviewing;
- implementation and review timetable; and
- detailed and accountable complaint register.

The majority of public submissions were concerned with dust levels and the adequacy of monitoring and management. Public submissions requested that a public health study be undertaken to prove that the community is/will not be affected by dust.

### **Assessment**

The EPA's environmental objective for this factor is to ensure that the dust levels generated by the proposal do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.

[Advice from the DOH states that the DOH is satisfied that levels of metals in dust measured at KCGM monitors are unlikely to cause any significant health impacts.](#)

There is a long term and existing dust problem in Kalgoorlie and KCGM is one of the major contributors. As such, the EPA recognises that KCGM's contribution must be kept as low as [practicable](#).

#### *Air Quality Management Plan*

During the assessment, KCGM provided an updated Air Quality Management Plan. This plan includes the management of dust and the management of mercury emissions. The DoH and the DEC Air Quality Management Branch reviewed the most recent version of this plan and advised that it has addressed most of the issues raised. The DoH and the DEC will continue to work with KCGM to produce an effective Air Quality Management plan, and to ensure that the plan is updated appropriately.

The EPA notes that KCGM's dust monitoring was carried out to assess blasting impacts and the data cannot isolate short duration peak dust events nor be correlated with wind direction. The BAM monitors now being installed will be able to record PM<sub>10</sub> levels continuously and correlate these with wind directions.

The EPA notes the limitations of the AUSPLUME model when using area sources to model ground level particulate emissions.

#### Mercury emissions

The DoH advised that it is satisfied that there is a sufficient level of safety built in to the modelling scenario that the predicted level of 1.8ug/m<sup>3</sup> is highly unlikely to be reached in real-time operations. The annual exposure rates predicted at both the Gidji Roaster and Carbon Regeneration Plant are well below the US-EPA and World Health Organisation annual guidelines for chronic inhalation exposure. The cumulative effects of exposure from soil and waste rock dust have been considered and can be accommodated within the safety margins.

#### Health Risk Assessment

The DoH advised that the HRA is primarily of a screening nature. The calculated Incremental Carcinogenic Risk for metals revealed that when bioavailability is taken into consideration, the ICR falls within the US-EPA *de minimis* criterion of  $1 \times 10^{-6}$ .

Overall, the DoH indicates that it is unlikely that either mercury emissions or concentrations of metals in dust will cause a significant impact on health.

The EPA recognises that effective management of dust is essential, and this requires monitoring, management responses and benchmarking changes in dust levels in response to management actions. In order to ensure that this is achieved, the EPA recommends a condition, (Condition 7, Appendix 4) requiring the preparation and implementation and review of an Air Quality Management Plan.

### **Summary**

Having particular regard to the:

- (a) advice from the DoH regarding mercury emissions;
- (b) monitoring of dust emissions in the Kalgoorlie – Boulder area; and
- (c) recommended conditions,

it is the EPA's opinion that the proposal can be managed to meet the EPA's objectives for this factor provided that the proponent complies with the recommended Ministerial Conditions.

## **3.3 Tailings and groundwater management**

### **Description**

#### Background

KCGM currently use two tailings dams, namely, Fimiston I and II. The current approved heights of Fimiston I and II are 32.5m and 33m respectively, with

conditional approval for heights of 40m and 45m respectively. These heights are conditional on agreed groundwater level targets and progress against groundwater level reduction targets.

Currently the primary beneficial use of groundwater in the area is for mining and mineral processing. However, seepage from the tailings dams can impact the environment by raising groundwater levels to a point where contaminated water can be accessed by vegetation and fauna.

Both Fimiston I and II have a history of seepage. The impact of the seepage has been to raise water levels over a 15 to 20 square kilometre area through the displacement of natural groundwater and lateral seepage, and to impact the quality of the groundwater. The natural groundwater has a salinity of 20 to 50 grams/litre (g/L) and the tailings water has a salinity of approximately 130g/L.

KCGM began seepage recovery in 1993 to lower water levels around the existing Fimiston tailings dams. In some areas groundwater levels had risen to 2m below ground level. KCGM formulated a Seepage and Groundwater Management Plan (SGMP) in 2005, which includes the long term objective of reducing groundwater levels to agreed historic levels.

The increased salinity extends up to two kilometres from the existing Fimiston tailings dams. (Thompson & Brett, 2004). A recent review of groundwater management (Peter Clifton & Ass, 2006) confirmed that the 50g/L salinity contour was less than 2 kilometres from the footprint of the tailings dams, except in the central floodway area where the drawdown from extraction bores is causing higher salinity water to migrate to this area. Cyanide concentrations confirm the limited movement of seepage away from the tailings dams.

A recent review of seepage recovery (Peter Clifton & Ass, 2006) compares groundwater level contours for 1995/2000/2005. These show that the recovery bores are lowering the water mound around the tailings dams.

The historic Kaltails tailings dam also had seepage problems during operation and caused groundwater levels to rise to the south and southwest of the tailings dam. Vegetation deaths occurred prior to 1991 in what was then part of the Lakeside Timber Reserve. The impacted area was subsequently excised from the reserve.

Groundwater recovery increased at the historic Kaltails tailings dam in 1994. After tailings deposition ceased in 1999, water levels declined and by 2002 target levels agreed in the Tailings Storage Facility decommissioning plan had been achieved. By 2003 water recovery from the north, west and east wall recovery bores was ceased. Water recovery has continued on a reduced scale to recover seepage from the southern wall.

### Proposal

KCGM has put forward two options for disposal of the increased volume of tailings resulting from this proposal.

Option 1 is to:

- Increase the final height of Fimiston I tailings dam to 50m; and
- Increase the final height of Fimiston II tailings dam to 60m.

Option 2 is to:

- Recommission the historic Kaltails tailings dam and increase the height from 30m to 45m.

KCGM's preferred option is Option 2. However both options are included in the assessment in case re-opening of the historic Kaltails tailings dam is not feasible.

#### Option 1

KCGM expects that due to the downward hydraulic gradient remaining approximately constant as the embankment height increases, seepage rates would not increase significantly. Increasing the tailings dam heights may, however, increase seepage and potentially increase the distance that contamination would extend.

KCGM proposes to continue to manage seepage from the Fimiston tailings dams through the Seepage and Groundwater Management Plan and the licence conditions under Part V of the EP Act.

#### Option 2

The recommissioning of the historic Kaltails tailings dam is likely to result in seepage similar to that which occurred when it was operating. A seepage rate of 50 L/s (1 577 ML/a) has been estimated for the recommissioned tailings dam. By engineering seepage recovery systems in advance of recommissioning, modelling has predicted that the recommissioned tailings dam would have reduced seepage from that of the previous operations. Seepage would be managed by water recovery bores being operated at a rate calculated to prevent mounding of groundwater and degradation of vegetation outside the immediate perimeter of the tailings dam. The current Seepage and Groundwater Management Plan would be extended to cover the recommissioned Kaltails tailings dam.

### **Submissions**

DEC noted that groundwater may be contaminated with metals and metalloids and discharge to surface environment may cause contamination, and that potential environmental impacts of current and proposed groundwater management should be quantified. A number of public submitters were concerned with seepage from tailings storage facilities and the impacts from rising groundwater levels on vegetation, lakes, stygofauna, termites and honey ants.

### **Assessment**

The EPA's environmental objective for this factor is to maintain or improve the quantity and quality of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

Groundwater is currently managed via the Seepage and Groundwater Management Plan and Part V of the EP Act. It is noted that the Seepage and Groundwater Management Plan states that “Protection of vegetation requires the depth to groundwater to be maintained sufficiently deep so as not to impact on the soils or roots from which plants source water”. The EPA notes that the DEC is reviewing information on the depth of tree roots and has requested KCGM to conduct further research into the access of groundwater by tree roots at depth.

The current Seepage and Groundwater Management Plan requires the monitoring of pH, conductivity, copper, arsenic, zinc, iron and mercury in groundwater bores around the tailings dams. The current indications are that there is minimal metal leaching from the tailings. If groundwater levels are managed so that vegetation is not exposed to contaminated groundwater and groundwater does not discharge to the surface there will be no environmental impact. The EPA noted that the issue of groundwater levels is being actively managed through the Seepage and Groundwater Management Plan by the Department of Environment and Conservation (DEC) under Part V of the EP Act, and it is evident that the water recovery bores are making an impact on groundwater levels. The DEC has advised that future tailings dam height increases are contingent on meeting targets in the Seepage and Groundwater Management Plan.

Due to the acidity and salinity of the water and the geology of the area, the possibility of stygofauna occurring in the groundwater around the tailings dams is low. However, it is possible that stygofauna could exist in superficial calcrete aquifers or in the deeper palaeochannel sands beneath the historic Kaltails tailings dam and at the Southern Borefield. If stygofauna were present beneath the Kaltails tailings dam, it is likely that these have already been impacted by the earlier seepage from the tailings dam.

The EPA notes that both of the two presented options are environmentally acceptable. The DEC and the Department of Industry and Resources (DoIR) have noted that Option 2 has some advantage over Option 1 since this would reduce seepage in the long term from the Fimiston tailings dams. With appropriate management from recommissioning, seepage from the historic Kaltails tailings dam is unlikely to cause any further environmental impact. This is also the proponent’s preferred option.

The EPA notes that KCGM will need to continue groundwater management and monitoring after cessation of its operations, and closure plans will need to address this matter.

### **Summary**

Having particular regard to:

- a) the Seepage and Groundwater Management Plan;
- b) active management of groundwater through Part V of the EP Act; and
- c) the apparent success of current management methods,

it is the opinion of the EPA that the proposal can be managed to meet the EPA’s environmental objective for this factor provided that the proponent continues to adhere to conditions set by Part V.

### **3.4 Mine rehabilitation and closure**

#### **Description**

KCGM provided a conceptual closure plan with the PER document (Appendix B1). This plan identifies the areas of the mine site that will require detailed closure plans, namely, open pits, waste rock dumps, processing plants, historic mining activities, underground mines, infrastructure and utilities, and tailings storage facilities.

This plan describes the processes that will be undertaken in finalising the closure plan. This includes consultation, risk assessment, decisions on land use, water balance in the Superpit, opportunities for backfilling, rehabilitation trials, acid rock drainage tests, and management and disposal of recovered tailings dam water.

Since release of the PER, KCGM has provided a draft Rehabilitation and Closure Management Plan. This plan provides further details regarding the design and construction of waste dumps and final landform of dumps, the final form and encapsulation of tailings dams, waste material characterisation and further work planned regarding acid generation potential, topsoil management, revegetation species, growth mediums, mulch and fertiliser trials, seeding methodology, revegetation monitoring and independent review of rehabilitation techniques.

In addition, the EPA requested that KCGM provide specific outcomes for:

- a) landform, including waste characterisation;
- b) vegetation/rehabilitation outcomes; and
- c) progressive rehabilitation timelines.

The revised draft Rehabilitation and Closure Management Plan includes specific rehabilitation tasks for 2007/8, the rehabilitation status of the Fimiston site as at 31 July 2007, and planned works for 2007 – 2011. DoIR requires the Rehabilitation and Closure Management Plan to be finalised in January 2008.

The draft Rehabilitation and Closure Management Plan also includes a timetable for the preparation of closure plans and public consultation. The draft Rehabilitation and Closure Management Plan proposes that an initial mine closure plan will be prepared by April 2010, preliminary site specific plans closure plans five years before closure and final site specific plans three years before closure. Active community consultation would take place in the two years between preliminary and final site specific plans.

KCGM has also provided a conceptual mine closure strategy which contains initial closure criteria for KCGM's operations.

With the large area to be rehabilitated, and the slow growth of vegetation, revegetation must take place progressively. KCGM has provided the following targets:

Waste Rock Dump Rehabilitation Schedule	Rehabilitation (Surface Area)	Total Footprint Area	Total Surface Area	Landform Completion Percentage
Rehabilitation 2007 (area still to be completed in 2007)	8 ha	1001 ha	1128 ha	1%
Rehabilitation 2008	60 ha	1057 ha	1188 ha	5%
Rehabilitation 2009	74 ha	1105 ha	1262 ha	6%
Rehabilitation 2010	36 ha	1129 ha	1298 ha	3%
Rehabilitation 2011	159 ha	1228 ha	1457 ha	11%
Total Waste Rock Dump Rehabilitation by end 2011 (624 ha)				44%*

\* This includes areas that will not be available for rehabilitation until mine closure e.g. waste rock used for capping TSFs and low grade stockpiles.

### Submissions

DEC made comment on KCGM's current rehabilitation. Public submissions suggested that a bond was needed for future indemnity against any damage to property from pit wall failure and also for security and monitoring. Submissions also suggested that the financial assurance bond should be increased to reflect estimated mine closure cost.

### Assessment

The EPA's environmental objective for this factor is to ensure, as far as practicable, that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.

The KCGM site covers a large area with exploration areas, pits, noise bunds, waste dumps, tailings dams and a legacy of historic disturbance. The EPA notes that rehabilitation of the site will be a major undertaking. Vegetation in arid areas is slow to establish and may need as long as seven years growth before it can be considered as successful.

Foremost in successfully establishing revegetation is the construction of stable, non-eroding, non-polluting landforms that will sustain vegetation. Landforms requiring revegetation are waste dumps, noise bunds, tailings storage facilities and cleared areas. Co-ordination between mining operations and rehabilitation plans is essential to ensure that the placement of wastes and conservation of resources such as growth medium result in favourable conditions for the growth of vegetation. As such, the EPA notes that KCGM should be working towards closure well in advance of the final closure plan.

The EPA understands that since soils and materials are still being characterised, rehabilitation work is restricted at the moment. However, the EPA recommends that KCGM aims to rehabilitate all available areas in the next three years, so that rehabilitation may then proceed at a rate consistent with areas becoming available.

The EPA notes that the proponent will need to bring forward timelines for studies into the future of the Superpit and pit water, disposal of TSF recovery water, decisions on landuse, community consultation and rehabilitation in order to be in a position to prepare a meaningful rehabilitation and closure plan.

The EPA notes KCGM's intention to continue to engage in community consultation via its ongoing community consultation strategy, and to initiate formal community consultation on closure five years prior to closure.

Whilst KCGM has committed to preparing a closure plan for the whole site by April 2010, the EPA considers that early planning for closure is of such importance to the success of rehabilitation, that a condition requiring this is warranted. (Condition 11-1, Appendix 4). The EPA acknowledges that other agencies are involved in mine closure and rehabilitation and this is noted in the condition.

Financial assurance bonds for the rehabilitation of the site are held by DOIR under conditions imposed through Section 84 of the *Mining Act 1987*.

### **Summary**

Having particular regard to the:

- a) content of the revised draft Rehabilitation and Closure Management Plan;
- b) recommended condition; and
- c) financial assurance under Section 84 of the *Mining Act 1987*,

it is the opinion of the EPA that the mine rehabilitation and closure plan is acceptable at this time. The EPA recognises that this is a living document and will undergo many revisions prior to the closure of the Fimiston Operation.

### **3.5 Environmental principles**

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the *Environmental Protection Act (1986)*. Appendix 3 contains a summary of the EPA's consideration of the principles.

## **4. Conditions and Commitments**

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the

impacts of the proposal on the environment. The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponents responsibility for, and commitment to, continuous improvement in environmental performance.

#### **4.1 Recommended conditions**

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Kalgoorlie Consolidated Gold Mines Pty Ltd to expand its Fimiston operations in Kalgoorlie by widening and deepening the Superpit by means of the Golden Pike Cutback, and to plan for mine closure, is approved for implementation.

### **5. Other Advice**

#### **5.1 Landuse Planning**

The EPA recognises that historical development has resulted in close proximity of the resource and the townsite. However, large open pit mines are not desirable close to residences and the EPA believes that future planning of similar developments must consider the impacts to local communities and ensure appropriate separation.

This proposal would reduce the current 400m buffer between mining operations and residential areas to 200m. The EPA therefore recommends that a condition (Condition 8-1, Appendix 4) is imposed restricting KCGM from active mining operations within 400 m of a property zoned residential under the Town Planning Scheme without the written consent of the owner of that property. The EPA understands that KCGM currently owns those residential properties that are between 200m and 400m distant from mining operations.

The community also raised concerns about the impact of waste dumping at both the northern and southern waste rock dumps due to the minimal buffer distance. The EPA has therefore recommended a condition (Condition 6-1, Appendix 4) which requires a management plan prior to waste dumping at distances of less than 500m to residences.

#### **5.2 Community consultation**

The local community raised a number of concerns during the EPA site visit in April 2007, including danger from flyrock, vibration damage, noise and dust impacts.

The matter of flyrock falls under the jurisdiction of the Department of Consumer and Employment Protection via the *Mine Safety and Inspection Regulations 1995*, however the EPA notes that the public should be given a clear understanding of what response KCGM will provide if flyrock becomes an issue.

As such, in line with best practice community consultation, the EPA recommends that KCGM develop and publish a charter that clearly illustrates what the public can

expect from KCGM. This should also cover all aspects of community concern, such as building damage, noise, and dust.

### **5.3 Acid and Metalliferous Drainage**

Black Flag Shale beds occur within the mining area of the Superpit. This material has the potential to generate acid drainage. This issue needs to be considered in relation to the placement of Black Flag Shale within waste dumps, existing waste dumps containing Black Flag Shale, and acid drainage from the pit walls post-mine closure. DOIR can regulate the management of acid producing material in waste dumps. The potential for acidification of pit water will need to be taken into account in the final mine closure plan.

## **6. Conclusions**

The EPA has considered the proposal by Kalgoorlie Consolidated Gold Mines Pty Ltd to expand their Fimiston operations in Kalgoorlie by widening and deepening the Superpit by means of the Golden Pike Cutback, and to plan for mine closure.

The EPA notes that each of the four key Environmental issues associated with this project can be adequately managed by a combination of the proponent's commitments, existing and proposed regulations administered by other agencies, and the recommended conditions set out in Appendix 4.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised by this proposal, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4.

## **7. Recommendations**

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the expansion of KCGM's Fimiston operations in Kalgoorlie by widening and deepening the Superpit by means of the Golden Pike Cutback, and to plan for mine closure.
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

# **Appendix 1**

## **List of submitters**

**Organisations:**

Department of Environment and Conservation  
Department of Health  
Department of Industry and Resources  
Department of Consumer and Employment Protection  
Department of Indigenous Affairs  
Goldfields Esperance Area Consultative Committee Inc  
Kalgoorlie-Boulder Chamber of Industry Inc  
Alliance for a Clean Environment

**Individuals:**

26 individual/confidential submissions

# **Appendix 2**

## **References**

Australian Standard 2187.2-2006 *Explosives—Storage and use Part 2: Use of explosives*. Prepared by the Standards Australia Committee CE-005, published by Standards Australia, Fourth edition, February 2006.

Cooke (2004) *Review of Environmental and Public Safety Impacts of Mining in the Kalgoorlie Area*. Professor Tony Cooke, January 2004

Department of Environmental Protection (1999) *Noise Regulation 17, Environmental Protection (Kalgoorlie Consolidated Gold Mine Pty Ltd, Mt Charlotte Gold Mine Noise Emissions), Approval Notice 1999*. Department of Environmental Protection, October 1999

Department of Mines (1989) *Conceptual Plan for Mining Developments on the Golden Mile*. Department of Mines, Western Australia, July 1989

Environ (2006) *Air Dispersion Modelling of Mercury Emissions for Kalgoorlie Consolidated Gold Mines*, Environ Australia Pty Ltd, July 2006

Environ (2007a) *Ambient Particulate Metals for Kalgoorlie Consolidated Gold Mines*, Environ Australia Pty Ltd, September 2007

Environ (2007b) *Air Quality Management Plan for Kalgoorlie Consolidated Gold Mines*, Environ Australia Pty Ltd, September 2007

Environ (2007c) *Letter to Kalgoorlie Consolidated Gold Mines dated 20 September 2007 from Environ*.

EPA (1991) *Bulletin 539, Fimiston project stage II – mine and waste dumps*. Environmental Protection Authority, July 1991.

KCGM (1990) *Consultative Environmental Review Mine and Waste Dumps – Fimiston*, Kalgoorlie Consolidate Gold Mines Pty Ltd, August 1990

KCGM (2004) *Submission to the Minister for State Development On the Final Report of the Independent Review of a Proposal to Raise the Fimiston I Tailings Dam at Kalgoorlie*. Kalgoorlie Consolidate Gold Mines Pty Ltd, November 2004

KCGM (2006) *Public Environmental Review - Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning*. Environ, September 2006

KCGM (2007a) *Conceptual Mine Closure Strategy*. Kalgoorlie Consolidate Gold Mines Pty Ltd, August 2007

KCGM (2007b) *Rehabilitation Management Plan*. Kalgoorlie Consolidate Gold Mines Pty Ltd, August 2007

Lilly (2007) *A Review of Flyrock Potential in the Golden Pike Cutback*. Dr Peter A Lilly, CSIRO, January 2007

Mitchell McCotter (1991) *Golden Mile Social Impact Study*. Mitchell McCotter, for The Steering Committee for the Golden Mile Social Impact Study, June 1991

SKM (2005) *Airborne contaminants or Emissions of Significance in the Kalgoorlie-Boulder, Coolgardie and Kambalda Area*. SKM, for Department of Environment, March 2005

Snowden (2007) *Independent Review of Golden Pike Cutback Geotechnical Design*. Snowden Mining Industry Consultants Pty Ltd, 30 April 2007

The Golden Mile Mining Development Planning Committee (date unknown) *Kalgoorlie/Boulder Mining/Community Buffer Zone*. Author unknown, date unknown

Thompson & Brett (2004) *Independent Review of a Proposal to Raise the Fimiston I Tailings Dam at Kalgoorlie*. Thompson & Brett Consulting Engineers, October 2004

## **Appendix 3**

**Summary of identification of key environmental factors and principles**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
<b>BIOPHYSICAL</b>			
Flora	Clearing of 116 ha of rehabilitated and disturbed land Potential vegetation impact from tailings seepage.	DEC: Risk to conservation reserve can be managed. Rehabilitation plan needs finalising, management of exotic species and review of rehabilitation raised. Concern over clearing of green belt.	Rehabilitation issues can be considered under closure management. <b>No further assessment of this factor required.</b>
Fauna	Minor impacts due to vegetation clearing.	Feral animal control raised in a public submission.	Minor impact. <b>No further assessment of this factor required.</b>
Water resources	No change to current usage	A public submission suggested that alternative fresh water options should be considered.	Use of treated wastewater commenced. <b>No further assessment of this factor required.</b>
<b>POLLUTION</b>			
Noise and Vibration	Additional noise from Golden Pike Cutback and continuation of noise from mining operations in the pit. Vehicle and dumping noise at waste dump and ore stock piles. Noise from blasting. Vibration from blasting.	DEC: A number of concern regarding noise modelling were raised. A Regulation 17 amendment has been applied for by KCGM.  A majority of public submissions raised concerns regarding noise. Concerns were that noise levels were unacceptable, the location and number of monitoring stations, independence of monitoring and the potential granting of a Regulation 17 amendment. A number of public submissions raised concerns about the impact of vibration and overpressure, including damage to buildings.	<b>Noise and vibration considered to be a relevant environmental factor</b>
Dust	Regional dust issues, to which KCGM operations are a major industry contributor. Mining operations closer to town and additional waste dumps to the north of pit. Main dust source predicted to be from haulage. Metals and silica content of dust	DoH and DEC: Problems with Ausplume in modelling particle dispersion; Large uncertainties associated with emissions; Good quality meteorological data needed; No construction emissions modelled as too difficult to quantify; A good management plan required with: <ul style="list-style-type: none"> <li>▪ Air quality targets;</li> <li>▪ Action thresholds;</li> </ul>	<b>Dust considered to be a relevant environmental factor</b>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	generated may have potential health impacts.	<ul style="list-style-type: none"> <li>▪ Management actions if thresholds exceeded;</li> <li>▪ On-going monitoring;</li> <li>▪ Responsibilities for implementing and reviewing;</li> <li>▪ Implementation and review timetable; and</li> <li>▪ Detailed and accountable complaint register.</li> </ul> <p>Estimates of dust exposure of non-urban residents needed. Majority of public submissions raised dust as an issue with respect to unacceptable dust levels and inadequate monitoring and management plan. Public submissions requested that a public health study be undertaken to prove that the community is/will not be affected by dust. Concern raised that dust is acidic and contains other health injuring constituents..</p>	
Air quality (other than dust)	Mercury emissions from the Fimiston mill and Gidgi roaster will not be increased by the proposal but duration of emissions will be extended	<p>DoH: KCGM should:</p> <ul style="list-style-type: none"> <li>▪ Provide detailed report of mercury emissions modelling from roaster and kilns;</li> <li>▪ Consider undertaking air mercury measurements at likely higher risk receptor areas;</li> <li>▪ Provide modelled estimates of exposure and proposed action if necessary for non-urban receptors;</li> <li>▪ Inform DoH and other stakeholders about mercury emission mitigation efforts including results of scrubber trial</li> <li>▪ Provide an overall air quality management plan.</li> </ul>	<p>This is a current issue of existing operations. However, the proposal will extend the duration of mercury emissions.</p> <p><b>Addressed under Dust and Air Quality as a significant factor</b></p>
Greenhouse gases	No increase from 2006 operations but approx 8% increase from 2005 operations. Duration of emissions will be extended. Estimated emission of approx 440 800 CO <sub>2e</sub> per annum.	Not raised in submissions.	<p>Emissions are below 500 000tCO<sub>2e</sub> and predicted to decrease from 2011.</p> <p><b>No further assessment required.</b></p>
Acid and Metalliferous drainage	Black Flag Shale bed material has potential for acid generation. Potential for acid and metalliferous drainage from waste dumps and tailings	<p>DEC Insufficient evidence presented that acid drainage has been adequately assessed and if necessary managed. One public submission raised run-off from acid waste rock.</p>	<p>Acid and metalliferous drainage from waste dumps will be managed under DoIR legislation.</p> <p><b>No further assessment required</b></p>

<b>Preliminary Environmental Factors</b>	<b>Proposal Characteristics</b>	<b>Government Agency and Public Comments</b>	<b>Identification of Key Environmental Factors</b>
Groundwater	Potential impact on groundwater quality and levels from TSF seepage. Potential impact on vegetation from increased groundwater levels. Potential water quality and quantity in pit if filling with groundwater.	<p>DEC: Groundwater may be contaminated with metals and metalloids and discharge to surface environment may cause contamination. Groundwater quality and leaching potential of wastes need to be characterised and a risk assessment undertaken to quantify the potential environmental impacts of current and proposed groundwater management.</p> <p>A number of public submissions raised the issue of seepage from TSFs and vegetation damage due to rising groundwater levels. Concerns were raised that the Fimiston II TSF was not constructed to the required degree of impermeability. Opinion expressed that seepage from TSFs should be retained within KCGM tenements.</p> <p>Concern expressed about eventual contaminant discharge to Hannans Lake or other lakes in the area.</p> <p>Public submissions raised the issue of the impact of contaminated groundwater on stygofauna, termites and honey ants.</p>	<b>Groundwater quality and levels considered to be a relevant environmental factor.</b>
Surface water	Run-off from waste dumps has the potential to cause impacts.	A public submission raised the concern that surface water drainage from waste dumps could cause impacts on the town.	Proponent expected to design waste dumps to avoid run-off causing problems, regulated by DoIR. <b>No further assessment required.</b>
<b>SOCIAL SURROUNDINGS</b>			
Public Safety	Potential risk to public safety from blasting and flyrock, pit wall stability and TSF stability.	DOCEP and public submissions raised concerns regarding public safety from fly rock, pit wall instability and TSF instability. DoIR responding through review process	The EPA does not assess public safety and risk issues but will make comment under “Other advice”. Public Safety will be managed under DoIR legislation. <b>No Further Assessment required</b>
Aboriginal heritage	No sites to be impacted.	DIA: KCGM have adequately and appropriately dealt with Aboriginal heritage matters. A public submission queried Aboriginal access to “iron structures”.	No significant impact on Aboriginal heritage. <b>No further assessment required.</b>

<b>Preliminary Environmental Factors</b>	<b>Proposal Characteristics</b>	<b>Government Agency and Public Comments</b>	<b>Identification of Key Environmental Factors</b>
Rehabilitation and Mine closure	Size and extent of operations has the potential to leave permanent impact of the environment if not suitably rehabilitated. Bond requirement.	DEC: Rehabilitation concerns. Public submissions suggested that a bond was needed for future indemnity against any damage to property from pit wall failure and also for security and monitoring. Financial assurance bond should be increased to reflect estimate mine closure cost.	Financial assurances will be managed under DoIR legislation <b>Rehabilitation and Mine closure is considered to be a relevant environmental factor.</b> ..

*Abbreviations*

DEC - Department of Environment and Conservation  
DOCEP - Department of Consumer and Employment Protection  
KCGM - Kalgoorlie Consolidate Gold Mines Pty Ltd

DOH - Department of Health  
DIA - Department of Indigenous Affairs  
TSF – Tailings Storage Facility

<b>PRINCIPLES</b>		
<b>Principle</b>	<b>Relevant Yes/No</b>	<b>If yes, Consideration</b>
<p>1. The precautionary principle <i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</i> <i>In application of this precautionary principle, decisions should be guided by –</i> <i>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i> <i>(b) an assessment of the risk-weighted consequences of various options.</i></p>	Yes	Potential for long-term impacts if wastes not managed correctly. Good closure planning and management will mitigate impacts. Open pit will remain but should not cause serious or irreversible damage to the environment if adequately managed. Proponent has undertaken some studies to evaluate risk to the environment and will undertake others prior to closure planning.
<p>2. The principle of intergenerational equity <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	Yes	Management and rehabilitation of mining site will mitigate environmental impacts. However resource will be permanently decreased in this area.

<b>PRINCIPLES</b>		
<b>Principle</b>	<b>Relevant Yes/No</b>	<b>If yes, Consideration</b>
3. The principle of the conservation of biological diversity and ecological integrity <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i>	No	No loss of biodiversity
4. Principles relating to improved valuation, pricing and incentive mechanisms <i>(1) Environmental factors should be included in the valuation of assets and services. (2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement. (3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste. (4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i>	Yes	Proponents will bear costs of containing wastes, ensuring long-term management to avoid environmental impacts and rehabilitation.
5. The principle of waste minimisation <i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i>	Yes	Proposal includes small amount of backfilling of waste rock to the pit in order to reduce environmental impact of waste. Some TSF seepage is recovered from the environment.

# **Appendix 4**

## **Recommended Environmental Conditions**

RECOMMENDED ENVIRONMENTAL CONDITIONS

**STATEMENT OF REVISED CONDITIONS APPLYING TO A PROPOSAL  
(PURSUANT TO THE PROVISIONS OF THE  
ENVIRONMENTAL PROTECTION ACT 1986)**

FIMISTON GOLD MINE OPERATIONS EXTENSION (STAGE 3)  
AND MINE CLOSURE PLANNING

**Proposal:** The proposal is the continuation of mining operations at the Fimiston site and expansion and deepening of the Superpit to 600 metres via the Golden Pike Cutback. Additional waste dumps will be created to the north of the pit to contain 140 million tonnes of waste rock. The Fimiston I and II tailings storage facilities and/or the Kaltails tailings storage facility will be expanded to contain the additional tailings.

**Proponent:** Kalgoorlie Consolidate Gold Mines Pty Ltd

**Proponent Address:** Private Mail Bag 27  
KALGOORLIE WA 6430

**Assessment Number:** 1581

**Previous Assessment Number:** 248

**Previous Statement Number:** 188

**Report of the Environmental Protection Authority:** Bulletin 1270

**Previous Report of the Environmental Protection Authority:** Bulletin 539

The implementation of the proposal to which the above reports of the Environmental Protection Authority relate is subject to the following conditions and procedures. Where the conditions of this Statement are in conflict with the conditions of Statement 188, these conditions will prevail.

**1 Proposal Implementation**

1-1 The proponent shall implement the proposal as documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

**2 Proponent Nomination and Contact Details**

2-1 The proponent for the time being nominated by the Minister for the Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer of the Department of Environment and Conservation (CEO) of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

### **3 Time Limit of Authorisation**

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

### **4 Compliance Reporting**

4-1 The proponent shall submit to the CEO environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO to report more frequently.

4-2 The environmental compliance reports shall address each element of an audit program approved by the CEO and shall be prepared and submitted in a format acceptable to the CEO.

4-3 The environmental compliance reports shall:

1. be endorsed by signature of the proponent's chief executive officer or a person, approved in writing by the CEO, delegated to sign on behalf of the proponent's chief executive officer;
2. state whether the proponent has complied with each condition and procedure contained in this statement;
3. provide verifiable evidence of compliance with each condition and procedure contained in this statement;
4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;
5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;
6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance;
7. review the effectiveness of all corrective and preventative actions taken; and
8. describe the state of implementation of the proposal.

4-4 The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO.

## **5 Performance Review**

5-1 The proponent shall submit a Performance Review report every five years after the start of production to the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with implementing the project; the environmental objectives for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those objectives;
2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
3. significant improvements gained in environmental management, including the use of external peer reviews;
4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
5. the proposed environmental objectives over the next five years, including improvements in technology and management processes.

5-2 The proponent shall make the Performance Review reports required by condition 5-1 publicly available in a manner approved by the CEO.

## **6 Dumping of waste within five hundred metres of residences**

6-1 Prior to the dumping of waste within five hundred metres of residences, the proponent shall prepare and implement a management plan for waste dumping to ensure that there is no unacceptable detrimental effect on the residents to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

## **7 Air Quality**

7-1 Within three months following the issuing of the notice to the decision making authorities under Section 45(7) of the *Environmental Protection Act 1986*, the proponent shall implement the Air Quality Management Plan, prepared to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-2 The proponent shall review the Air Quality Management Plan at twelve monthly intervals, unless otherwise required by the Environmental Protection Authority, and amend the Plan to the requirements of the Environmental Protection Authority on advice of Department of Health.

7-3 The proponent shall implement the amended Air Quality Management Plan required by condition 7-2 to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

- 7-4 The proponent shall ensure that explosives are detonated at surface level on the premises only when wind directions favour the carriage of dust away from the residential areas of Kalgoorlie-Boulder, unless undertaken in accordance with regulation 8.28 (4) of the *Mines Safety and Inspection Regulations 1995*
- 7-5 The proponent shall make available continuous dust monitoring data on their website within 24 hours of the recording of that data.
- 7-6 The proponent shall keep a register of complaints regarding air emissions, investigate complaints and keep a record of the investigations and actions taken with regard to the complaint.

## **8 Noise**

- 8-1 The proponent shall not conduct any mining activities forming part of the expanded and revised proposal unless and until approval has been granted under regulation 17(7) of the *Environmental Protection (Noise) Regulations 1997*.

Note: In this condition “mining activities” does not include construction work within the meaning of regulation 13 of the *Environmental Protection (Noise) Regulations 1997*.

## **9 Airblast Overpressure and Vibration from Blasting**

- 9-1 The proponent shall ensure that explosives are detonated on the premises only between the hours of 0700 hours and 1800 hours unless undertaken in accordance with regulation 8.28 (4) of the *Mines Safety and Inspection Regulations 1995*.
- 9-2 Where explosives are detonated on the premises outside of the conditions specified in conditions 7-4 and 9-1, the circumstances which led to such detonation being necessary shall be reported by the proponent to the Director-General of the Department of Environment and Conservation within 36 hours of detonation.
- 9-3 The proponent shall ensure that all airblast overpressure levels due to blasting comply with Regulation 11 of the *Environmental Protection (Noise) Regulations 1997*.
- 9-4 The proponent shall make all reasonable effort to avoid blasting on Sundays.
- 9-5 For all blasting the proponent shall comply with the following vibration limits, measured or calculated in accordance with section J4.2 of Australian Standard 2187.2 – 2006, for the protection of human comfort at any houses and low rise buildings, theatres, schools and other similar buildings occupied by people and not owned by the proponent:
1. the peak particle velocity shall not exceed 5 mm/s for 90% of blasts per year;
  2. the peak particle velocity shall not exceed 10 mm/s for any blast;
  3. no more than one in ten consecutive blasts shall exceed 5 mm/s peak particle velocity;
- 9-6 Within six months following the issuing of the notice to the decision making authorities under Section 45(7) of the *Environmental Protection Act 1986*, the proponent shall

revise the Revised Noise and Vibration Monitoring and Management Programme, dated June 2004 to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and the Department of Environment and Conservation. This Programme shall include:

1. Locations of the air blast overpressure and ground vibration monitors and demonstration that these locations meet the requirements of regulation 21 of the *Environmental Protection (Noise) Regulations 1997* and section J3.2.2 of Australian Standard 2187.2 - 2006;
2. Description of the monitoring equipment and demonstration that the equipment complies with the requirements of schedule 4 of the *Environmental Protection (Noise) Regulations 1997* and section J3.2.1 of Australian Standard 2187.2 - 2006;
3. Calibration by an approved calibration laboratory and field checks of the monitoring equipment in accordance with schedule 4 of the *Environmental Protection (Noise) Regulations 1997* and the manufacturer's specifications and section J3.1.2 of Australian Standard 2187.2 – 2006 and recording of calibration;
4. Procedures for the recording of blast information in accordance with section J3.4 of Australian Standard 2187.2-2006;
5. Procedures for the reporting of air blast and vibration monitoring to the Department of Environment and Conservation;
6. Details of a complaints procedure and recording of complaints and action undertaken to resolve complaints;

9-7 The proponent shall implement the revised Noise and Vibration Monitoring and Management Programme to the requirements of the Minister for the Environment.

9-8 The proponent shall review the Noise and Vibration Monitoring and Management Programme as required by the Environmental Protection Authority, and amend the Plan to the requirements of the Environmental Protection Authority on advice of Department of Environment and Conservation.

9-9 The proponent shall implement the amended Noise and Vibration Monitoring and Management Programme required by condition 9-6 to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

## **10 Set Back for Mining Activities**

10-1 The proponent shall not undertake active mining operations within 400 m of a property zoned residential under the Town Planning Scheme without the written consent of the owner of that property.

Note: Active mining means any method of working by which the earth or any rock structure, coal seam, stone, fluid, or mineral bearing substance is disturbed, removed, washed, sifted, crushed, leached, roasted, floated, distilled, evaporated, smelted, refined, sintered, pelletised, or dealt with for the purpose of obtaining any mineral or rock from it for commercial purposes or for subsequent use in industry, whether it has been previously disturbed or not, and includes:

- (a) developmental and construction work associated with opening up or operating a mine;

- (b) the removal and disposal of overburden or waste or residues by mechanical or other means and the stacking, depositing, storage, and treatment of any substance considered to contain any mineral; and
- (c) transport of ore or other mining product that takes place on a road that is not a road as defined in the Road Traffic Act 1974,

but for the purpose of this condition does not include:

- (a) construction of a noise bund which is not part of any active mining activity;
- (b) rehabilitation of any area;
- (c) administration buildings or other similar facilities from which noise emissions comply with the *Environmental Protection (Noise) Regulations 1997*;
- (d) exploration operations;
- (e) operations for the care, security and maintenance of a mine and plant at the mine undertaken during any period when production or development operations at the mine are suspended;
- (f) operations undertaken to leave a mine safe to be abandoned; and
- (g) underground mining.

## **11 Rehabilitation and Closure Management Plan**

11-1 By the 30<sup>th</sup> of April 2010, the proponent shall prepare a Rehabilitation and Closure Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and shall submit the Plan to the Department of Environment and Conservation. The Plan shall include:

1. the final form of land forms and voids;
2. the proposed land use for the mine site post mining operations determined after consultation with relevant stakeholders;
3. removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
4. long-term management of ground and surface water systems affected by mining operations;
5. long-term management of potential acid generating material;
6. long-term management of pits including the Superpit and public safety provisions;
7. long-term management of tailings storage facilities;
8. a detailed Rehabilitation and Revegetation program which includes local vegetation, performance criteria and a timetable to be met;
9. identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities;
10. post-closure maintenance and monitoring;

11. re-instatement/retention of historically significant structures; and
  12. a contingency plan for a care and maintenance phase.
- 11-2 In the preparation of the Rehabilitation and Closure Management Plan required by condition 11-1, the proponent shall meet the requirements of the following agencies:
1. Department of Industry and Resources regarding items 1-10 of condition 11-1.
  2. Department of Consumer and Employee Protection regarding items 1, 6, 7 and 10 of condition 11-1.
  3. Department of Environment and Conservation regarding items 4 and 10 (Part V Licensing, Goldfields Region), 8 and 10 (Environmental Management Branch), 9 and 10 (Contaminated Sites Branch) of condition 11-1.
- 11-3 The proponent shall review the Rehabilitation and Closure Management Plan every two years, and amend the Plan as required in consultation with the agencies named in condition 11-2, to the requirements of the Minister for the Environment on advice from the relevant agencies indicated in condition 11-2.
- 11-4 The proponent shall implement the Rehabilitation and Closure Management Plan required by condition 11-3 until such time as the Minister for the Environment determines that the proponent's closure responsibilities have been fulfilled.

Note: Certain items of the Plan are covered by / subject to legislation other than the *Environmental Protection Act 1986* and will be administered by the appropriate agency as follows:

1. Department of Industry and Resources for items 1-10 of condition 11-1.
  2. Department of Consumer and Employee Protection regarding items 1, 6, 7 and 10 of condition 11-1
  3. Department of Environment and Conservation for items 4 and 10 (Part V Licensing, Goldfields Region), 8 and 10 (Environmental Management Branch), 9 and 10 (Contaminated Sites Branch) of condition 11-1.
- 11-5 The proponent shall make the Final Rehabilitation and Closure Management Plan required by condition 11-1 and subsequent revisions required by condition 11-3 publicly available, to the requirements of the Minister for the Environment and Conservation on advice of the Environmental Protection Authority.

## Notes

1. Where a condition states "on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.
2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.
3. The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.
4. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

## Schedule 1

### FIMISTON GOLD MINE OPERATIONS EXTENSION (STAGE 3) AND MINE CLOSURE PLANNING (Assessment No. 1581)

#### General Description

The project is a cutback, the Golden Pike Cutback, along a section of the western edge of the existing Fimiston Open Pit in addition to already approved mining operations on the Fimiston site. The cutback will allow for the widening and deepening of the pit to 600m. Waste rock from the cutback will be accommodated in two new waste rock dumps to the north of the pit and west of the Fimiston I tailings storage facility (TSF).

Additional tailings from the expanded project will be managed in one of two ways. Option 1 is to increase the heights of Fimiston I and II TSFs from the conditionally approved heights of 40 metres (m) and 45m respectively to 50m and 60m respectively. Option 2 is to recommission the old Kaltails TSF and raise its height from 25m to 45m.

The proposal is described in the documents *Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning: Public Environmental Review, September 2006*, including modifications made during the assessment described in Bulletin No. 1270, and in *Consultative Environmental Review Mine and Waste Dumps – Fimiston, August 1990*. Where the earlier document is inconsistent with the later document, the later document will prevail.

#### Summary description

A summary of the key proposal characteristics is presented in Table 1.

**Table 1 – Summary of the Key Proposal Characteristics**

Element	Existing Operations	Proposed
<b>General</b>		
Project Life (Open Pit)	to approximately 2012	to approximately 2017
Mining Production Rate	approximately 89 million tonnes per annum	no change
Milling Production Rate	approximately 13.5 million tonnes per annum	no change
<b>Fimiston Open Pit</b>		
Area	approximately 300 hectares	increase of 46 hectares
Final pit depth	approximately 470 metres	approximately 600 metres
<b>Remaining Waste Movement</b>		
Southern and Eastern waste rock dumps	approximately 460-600 million tonnes depending on backfill	increase of 120-160 million tonnes depending on backfill
Southern pit back-fill	approximately 140 million tonnes if resource not sterilised	no change
Northern pit back-fill	n/a	approximately 40 million tonnes if resource not sterilised
Northern waste rock dumps	n/a	approximately 140 million tonnes occupying 115 hectares
<b>Tailings Storage Facilities</b>		

<b>Element</b>	<b>Existing Operations</b>	<b>Proposed</b>
<b>Option 1</b>		
Fimiston I	proposed height 40 metres (1)	increase in height to 50 metres
Fimiston II	proposed height 45 metres (1)	increase in height to 60 metres
<b>Option 2</b>		
Fimiston I	proposed height 40 metres (1)	no change
Fimiston II	proposed height 45 metres (1)	no change
Kaltails	n/a	increase in height from 25 to 45 metres
<b>Water Consumption</b>		
Potable (per year)	approximately 1460 megalitres	no change
Non-potable (per year)	approximately 10 715 megalitres	No change
<b>Greenhouse Gas Emission</b>		
	approximately 440 800 tonnes of carbon dioxide equivalent	no change from 2006 emissions. 8% increase from 2005 emissions.

Notes

1. Subject to further approvals through Part V of the *Environmental Protection Act 1986*.

**Figure**

Figure 1 - Site Plan see page 5 above

# **Appendix 5**

**Statement 188**



WESTERN AUSTRALIA  
MINISTER FOR THE ENVIRONMENT

104/87

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED  
(PURSUANT TO THE PROVISIONS OF THE  
ENVIRONMENTAL PROTECTION ACT 1986)**

**FIMISTON PROJECT STAGE II - MINE AND WASTE DUMPS (248)**

**KALGOORLIE CONSOLIDATED GOLD MINES PTY LTD**

This proposal may be implemented subject to the following conditions:

1. In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review. (A copy of the commitments is attached).
2. Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.
3. The proponent shall, within 12 months of the date of this statement, prepare and subsequently implement brief annual rehabilitation plans for the Fimiston operations to the satisfaction of the Department of Mines on advice from the Golden Mile Mining Development Planning Committee.
4. Until 31 December 1991, the proponent shall operate the project in such a manner as to achieve reasonable noise levels in surrounding residential areas to the satisfaction of the Minister for the Environment. From 1 January 1992, the proponent shall meet noise level standards to be set by the Minister for the Environment in consultation with the Minister for Mines and the City of Kalgoorlie/Boulder. Should these standards not be available by that date, then the proponent shall meet interim noise level standards set by the Environmental Protection Authority.
5. In order to ensure that there are no unacceptable detrimental effects from noise, vibration and dust from this project on the amenity of nearby residents, the proponent shall, within 6 months of the date of this statement, prepare and subsequently implement a noise and vibration monitoring and management programme to the satisfaction of the Environmental Protection Authority and a dust monitoring and management programme to the satisfaction of the Environmental Protection Authority on advice from the Goldfields Dust Abatement Committee.

Published on

24 OCT 1991

6. Prior to the dumping of waste on the proposed north-east or south-east waste dumps within 500 metres of residences, the proponent shall prepare and implement a management plan for waste dumping to ensure that there is no unacceptable detrimental effect on the residents, to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority.
7. The proponent shall ensure that there are no unacceptable detrimental effects upon the environment resulting from leakage of hypersaline borewater along the Gidgi or Lakewood borefield systems. Accordingly, within six months of the date of this statement, the proponent shall prepare and implement a review of the operation of the borefields and pipelines to the satisfaction of the Environmental Protection Authority on advice from the Water Authority of Western Australia. This review shall include proposals for improved design, maintenance and monitoring for these facilities.
8. The proponent shall be responsible for decommissioning and removal of the plant and installations and rehabilitating the site and its environs, to the satisfaction of the Environmental Protection Authority. At least six months prior to decommissioning, the proponent shall prepare and subsequently implement a decommissioning and rehabilitation plan, to the satisfaction of the Department of Mines on advice from the Golden Mile Mining Development Planning Committee.
9. No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.
10. If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority).

Bob Pearce, MLA  
MINISTER FOR THE ENVIRONMENT

24 OCT 1991

## PROPONENT'S COMMITMENTS

FIMISTON PROJECT STAGE II - MINE AND WASTE DUMPS (248)

KALGOORLIE CONSOLIDATED GOLD MINES PTY LTD

The proponent has made the following environmental commitments:

1. KCGM will prepare and implement, by December 1992, an Environmental Management Programme (EMP) for all of its operations in agreement with the Environmental Protection Authority and the Department of Mines.
2. KCGM undertakes to prepare annual reports of the Mining and Rehabilitation sub-programme of the broader EMP, as agreed with the EPA and the Department of Mines.
3. KCGM undertakes to continue an ongoing programme of geotechnical investigations for slope stability purposes and report the findings of these investigations to the Department of Mines.
4. KCGM will develop a surface drainage system incorporating sediment detention systems and a water quality monitoring programme. The results of the sampling will be included within the annual report and updated annually.
5. In association with the Goldfields Dust Abatement Committee and Kaltails, KCGM will install and support a Dust Monitoring Programme within the Kalgoorlie-Boulder area. The data obtained will be made available to the EPA via the Goldfields Dust Abatement Committee.
6. KCGM will undertake a programme of noise monitoring to ensure continued compliance with occupational health and public nuisance noise requirements. If considered necessary an ongoing monitoring strategy will be devised.
7. KCGM will implement a progressive rehabilitation programme as outlined in section 4.3 as agreed with the EPA in consultation with the Department of Mines.

## Attachment to Statement 188 Change to Description of Proposal

**Proposal:** Partial Realignment of the Environmental Noise Bund and Loopline Railway Access

**Proponent:** Kalgoorlie Consolidated Gold Mines (KCGM)

**Change:**

- Realignment of part of the existing Environmental Noise Bund (ENB) including an access ramp for the Loopline Railway (Figure 1).
- This ENB realignment is required to ensure that protection for the community from mine noise is maintained if KCGM gains approval for a western cutback of the Fimiston Open Pit (called the Golden Pike Cutback (GPC)). Approval of the realignment of the ENB does not guarantee that the GPC will also be approved.
- The ENB realignment has provided a unique opportunity for the Loopline Society by creating an access for the Loopline Railway to run along part of the top of the ENB. This will provide patrons with views of the City of Kalgoorlie-Boulder, KCGM operations and access to the relocated Super Pit Lookout. KCGM is committed to long-term tourism development, and the continuation of the Loopline heritage feature as part of the Conceptual Mine Closure Strategy.
- The ENB will be built in four phases to allow for construction and commissioning of the Loopline Railway along the top of the bund (Figure 2). This also allows for the construction of a new Super Pit Lookout prior to the removal of the current Lookout. At this early stage the Lookout building will not be the final structure.
- Contingency options have been incorporated into the design of the ENB if the GPC does not proceed. These options are as follows:
  - GPC cancelled during or after Phase A but before Phase B - the southern end of the ENB would be extended east and married in to the existing ENB. The Super Pit Lookout could either be moved to the realigned ENB to provide a Lookout for the Loopline Railway or the existing Lookout would remain. No southern ramp would be constructed for the Loopline Railway, instead it would be recommended that a rail junction be installed at the base of the northern ramp and run a second track around the base of the existing ENB. The Loopline Railway could still continue up onto part of the realigned ENB from the north.
  - GPC cancelled during or after Phase B but before Phase C - reclamation of the existing ENB would cease and the exposed face would be rehabilitated. The position of the Lookout would have to be reviewed to determine if its location is adequate for the long-term needs of the community. If, due to the location of the remaining original ENB, the Lookout is not adequate then either more of the existing ENB may need to be removed, or the Lookout pad may need to be extended further to the east. Alternatively the existing Super Pit Lookout could be utilised as a final location with a more permanent structure.
- The existing KCGM Super Pit Tourist Lookout has become a major tourist attraction for the Goldfields with approximately 10,000 visitors per month. The current Lookout is a basic structure with a large car park / lay down area and has a footprint width of around 160m.
- The new Super Pit Lookout will be constructed at a location along the widest point of the realigned ENB which has a footprint width of around 260m. The wider footprint is required for access and a potential platform for the Loopline Railway and a more substantial Lookout building. A large car park / lay down area will be maintained for the display of equipment for functions such as Mine Open Days.
- The design of the final Super Pit Lookout building is yet to be determined but it is hoped that through community consultation, and with government support, there is the opportunity to provide a sustainable, multi-function tourism legacy (similar to that at Broken Hill). KCGM has already been approached by the Goldfields Historical Society to provide a permanent home at the final Lookout for their historical collection.

**From: Existing Portion of the Environmental Noise Bund to be Realigned**

Element	Quantities/Description
Height	Between 10 to 17 m high
Area	Approx 16.7 hectares
Volume	Approx 2.3 million tonnes (some material has been historically removed from the pit side of the existing bund).

**To: Realigned Environmental Noise Bund**

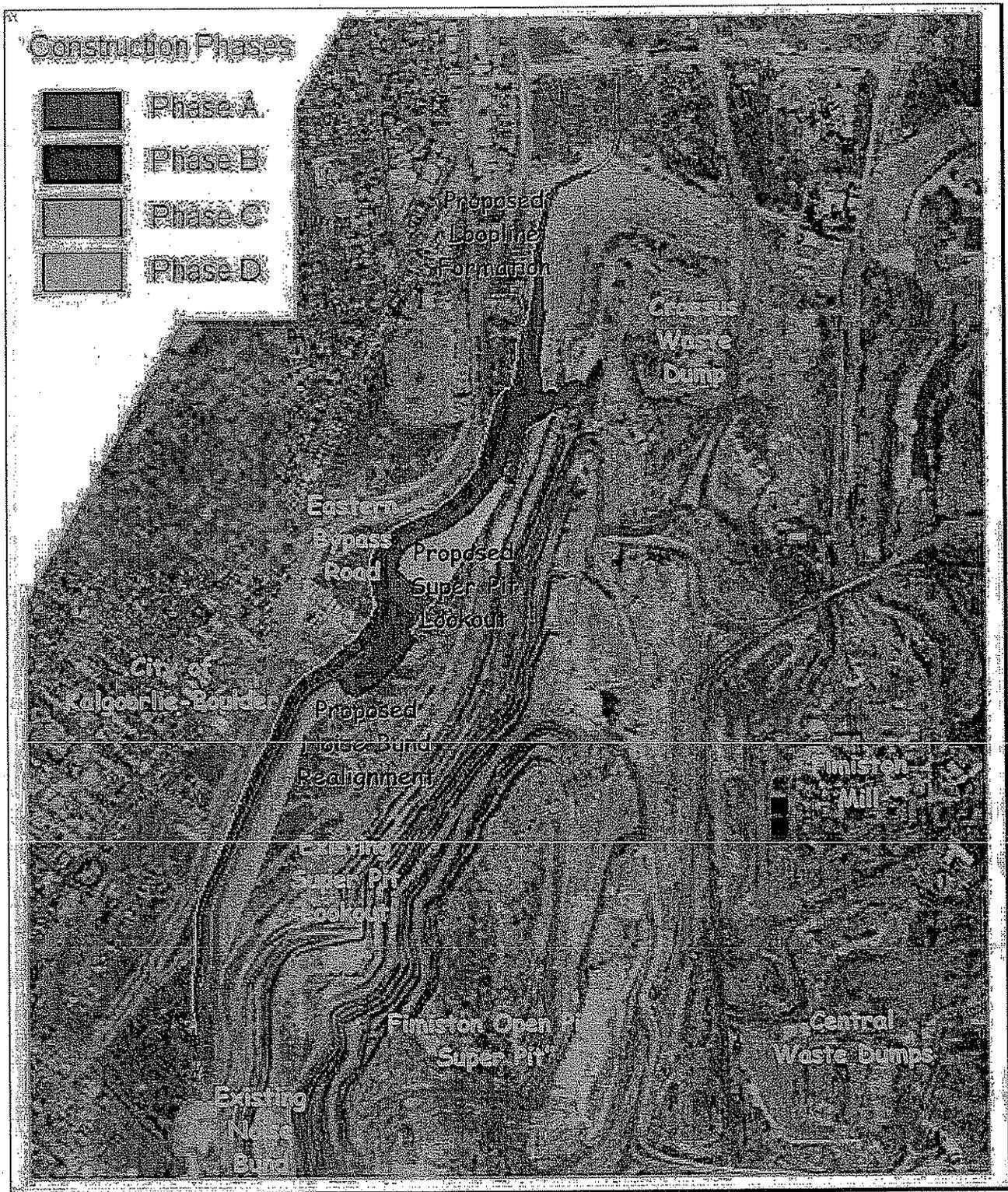
Element	Quantities/Description			
Height	20 m high			
Area	Approx 37.9 hectares			
Volume	Approx 9.25 million tonnes (around 6 million tonnes are required for the Loopline Tourist Railway and Super Pit Lookout).			
Dust Management	Dust will be managed with the use of water carts and monitoring of wind conditions, with work stopping if wind data indicates that dust may travel into nearby areas.			
Noise Management	Construction will only occur between 7:00am to 7:00pm Monday to Saturday (no Sundays or Public Holidays).			
Construction Period	Construction is estimated at 2 years based on anticipated delays for noise and dust management constraints.			
Spatial Data (Refer to Figure 1)	Centre Points			Approx Footprint Width from Centre Point
	Name	Easting	Northing	
	A	355,735	6,595,739	44 m
	B	355,831	6,595,495	71 m
	C	355,890	6,595,289	64 m
	D	355,861	6,594,975	132 m
	E	355,939	6,594,760	86 m
	F	355,876	6,594,406	70 m
	G	355,990	6,593,995	70 m
H	356,111	6,593,624	62 m	

Approval Date: 17/05/06

Figure 1. Realigned Noise Bund Location Plan



Figure 2. Realigned Noise Bund Construction Phase Plan



Site Plan for the Proposed Environmental Noise Bund Realignment and Loophole Foundation

# **Appendix 6**

## **Summary of Submissions and Proponent's Response to Submissions**