



TERRAMIN AUSTRALIA limited

**Terramin's Response to the Issues Raised Through Community Consultation Process and PIRSA Action Items.**

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## Executive Summary

A fundamental change to the draft MARP (Mining proposal) submitted by Terramin to PIRSA is the ZERO DISCHARGE policy for any potentially contaminated water. This change will be facilitated by significantly redesigning the Tailings Storage Facility and ensuring that all stormwater drainage from any potentially contaminated surface will return to the process circuit.

Terramin now proposes to remove water from the tailings by thickening to a consistency of 70% solids, the water will be returned to the process water circuit via a holding pond, which will be lined with high density polyethylene (HDPE) to prevent seepage. The Tailings Storage Facility will also be fully lined with a HDPE liner and will have more than double the stormwater storage capacity required to hold the equivalent of the worst five day storm event in history (in 1943) if it fell in one day.

Runoff from potentially acid generating stockpiles or exposed surfaces will be collected and pumped to the tailings thickener where the pH will be adjusted and returned to the process stream.

In response to community concern regarding noise, odour, dust, traffic and the proximity to the township, Terramin has incorporated several engineering design changes to address the real or perceived impacts from these issues. The addition of cladding around equipment that may generate noise, addition of dust extractors in the crusher and more sealed surfaces (all road surfaces will now be sealed). The relocation of the mine

entrance will increase the level of safety through improved traffic conditions and visibility.

In addition Terramin will monitor environmental dust, noise, odour and water quality throughout mine life and post closure to ensure that all Australian and South Australian Standards will be met. In the event that any standard is not met, despite all the precautions taken, Terramin undertakes to immediately investigate and implement an appropriate remediation program to correct the situation.

The following table presents Terramin's response to the issues raised through the Community Consultation Process on the draft MARP submitted to PIRSA in support of the Mining Lease application. The table follows the Outcome numbering order used in the draft MARP for cross checking purposes.

The response table is designed so that readers can go to the specific issues they are interested in and read Terramin's response to all the issues raised by the respondents and the Action Items requested by PIRSA

**Key to Acronyms:**

<b>ANCOLD</b>	<i>Australian National Committee on Large Dams</i>
<b>ARI</b>	<i>Annual Return Interval</i>
<b>AWE</b>	<i>Australian Water &amp; Environment</i>
<b>AMD</b>	<i>Acid Mine Drainage</i>
<b>ATC</b>	<i>Australian Tailings Consultants</i>
<b>EGi</b>	<i>Environmental Geochemistry international</i>
<b>MSDS</b>	<i>Material Safety Data Sheet</i>
<b>PM<sub>10</sub></b>	<i>Particulate material less than 10 micron diameter</i>
<b>PM<sub>2.5</sub></b>	<i>Particulate material less than 2.5 micron diameter</i>

**Key to using the Table:**

*This Table is divided into **outcomes** presented in the Draft MARP. All the **issues** raised through the community consultation process were summarised by PIRSA and allocated to the appropriate Outcome. Terramin's response and how it intends to address each issue is presented in the column - **Action to be taken by Terramin.***

*In response to the issues identified through the community consultation process PIRSA prepared a list of actions for Terramin. These actions are shown in the column **Action Requested by PIRSA.** Terramin's response to these requests and how it proposes to address the actions is shown in the column **Terramin's Reply.** Terramin's response to the PIRSA Actions list provides additional information if not already provided in the replies to the Community Consultation Issues.*

*Outcome 17.1 is the Angas Mine Environmental Risk Assessment, this outcome is addressed in the specific Outcomes from 17.2 onwards.*

**Outcome 17.2 - Ground and surface water**

*“Prevent the contamination of surface water and/or ground water and pressure loss to users of ground water”*

Issue	Action to be taken by Terramin
Impact on watercourses from dragout after rain.	A vehicle wash bay will be located approximately 100m from main road entry. All vehicles that come in contact with contaminated soil (on or off site) will have to go through the wash bay prior to leaving the property. Terramin expects this will prevent dragout from leaving the property and will not impact on the watercourses.
Security of underground water supplies.	<p>Initial investigations were presented in the draft MARP in Appendix D (soils) and Appendix M (hydrology). Six new bores are being installed in strategic locations to provide further hydrological information on both shallow and deep aquifers by AWE. New hydrological information will be used to develop a more detailed model of the regional hydrology. The model will be verified through a monitoring program designed to detect water levels and allow time for management to respond to seasonal variations.</p> <p>The hydrological model will be used to test current values for drawdown rate, the extent of the cone of depression and related hydrological values. The improved information regarding permeability combined with the hydrological model will improve our current predictions of the rate of movement and concentration of any metals through the groundwater for environmental control measures.</p> <p>The current mine plan indicates that mining will not intercept water that would affect the regional water table. This will be confirmed by the hydrological model currently being developed by AWE.</p> <p>The main potential source of contaminants to groundwater during the operational phase is leakage through the base or overflow from the Tailings Storage Facility. Terramin has redesigned the Tailings Storage Facility with plastic liners to ensure total containment of contaminants, preventing these reaching surface or groundwater. This will be achieved by installing a thickening plant to thicken the tailings (~70% solid) prior to release and by using a liner at the base and top of the Tailings Storage Facility.</p> <p>The environmental monitoring program has both management and environmental protection components; the management component will ensure that if contamination of groundwater or losses of water pressure occur they will be rapidly detected, contained, remediated and positive action taken to prevent reoccurrence. The environmental component will report to PIRSA, the</p>

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	<p>EPA and stakeholders regarding the effectiveness of Terramin's management systems and provide evidence that the water quality criteria are being met.</p> <p>Ground and surface water quality are governed by the Environment Protection (Water Quality) Policy (2003). The appropriate water quality criteria in Schedule 2 of the Policy are for the protection of aquatic ecosystems (fresh water) and agricultural (livestock) use. Water in the mineralised region around the proposed mine may contain elevated metal and organic pollutants, and in its pre-mining state surface and groundwater would not meet the appropriate water quality criteria.</p> <p>Terramin has initiated a baseline monitoring program for winter 2006, subject to Council and property owners' permission to install monitoring bores and sampling stations, which will establish the natural (or background) level of salts and metals in ground and surface water.</p> <p>Terramin expects that the proposed control measures will ensure that all water leaving the site will fall within <math>\pm 2SD</math> of background mean levels, Section 17.21. This measure will allow for natural variability in metal pollutants and ensure that mining operations will meet the Water Quality Policy objectives: Section 2.2 Part 2: Policy objectives</p> <p><i>"The purpose of the Water Quality Policy is to achieve the sustainable management of the waters of the State by protecting and enhancing water quality while allowing economic and social development"</i>.</p> <p>Whilst there is no plan to discharge water from the property, Terramin will implement a management control measure to ensure that any natural runoff water quality is not compromised. The action level will be set lower than the proposed 2 standard deviations' tolerance to provide sufficient warning of system failure.</p>
Potential for contamination by unsealed exploration holes in effluent ponds area.	Terramin will cap all exploration holes in the area of the effluent ponds. The process is planned to start in week 3 of March.
Need to consider requirements of Water Allocation Plan for mine dewatering and apply for water license.	Terramin has engaged AWE to ensure that the requirements of the Water Allocation Plan are met. AWE is currently preparing submissions to the DWLBC for a water licence.
EPA to confirm suitability of monitoring program.	The general location of sampling points, frequency of sampling and indicators to be measured were addressed in the draft MARP and will be revised with new information from the baseline

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	survey and in consultation with the SA EPA.
Sealing of raise bores through aquifers should be an approval condition.	Terramin will any raise bore holes to prevent any saltwater ingress that could contaminate soil or damage vegetation.
Risk associated with mine dewatering from effluent pond water seepage.	A hydrological model for the site is currently being upgraded to investigate the effect of dewatering on regional hydrology and potential seepage from Council Sewage Effluent Ponds. Appropriate engineering solutions will be implemented if mining results in seepage from the Council Sewage Effluent Ponds that contaminates groundwater.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Modify outcome to "No adverse impact to the supply of water to existing users and water dependent ecosystems".	<b>Agree.</b> The outcome will be modified in the MARP as requested.
Review risk assessment to include risk of watercourse pollution from dragout.	<b>Agree.</b> A risk assessment of watercourse pollution from dragout will be included in the final MARP.
Criteria to be revised to specify monitoring bore locations and frequency to be at least annual, with data to be supplied to DWLBC.	<b>Agree.</b> Groundwater monitoring criteria will be revised in consultation with PIRSA and stakeholders. Terramin proposes to install 6 new monitoring wells in April and monitor a list of relevant parameters on a quarterly frequency for groundwater and monthly for surface water in the first year. This will be revised in consultation with PIRSA after a review of the first year's data.
Criteria to be revised to describe frequency and location of surface water monitoring and dragout monitoring.	<b>Agree.</b> Surface water monitoring criteria have been revised, additional monitoring sites identified to address potential impacts from dragout, a suite of relevant parameters identified and a monitoring frequency will be based on rain events with minimum monthly monitoring during the first year to extend data base.
Include detail of control measures to be employed (e.g. bunding, sealing raise bores).	<b>Agree.</b> Terramin intends to include appropriate bunding and other measures to prevent runoff or groundwater from being contaminated. More specific information will be available in the final MARP document.

<b>Outcome 17.3 – Erosion</b>	
<i>“Stabilise current disturbed areas and prevent sediment from leaving the site”</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
No comments received.	No issues were raised on the management actions proposed by Terramin in the MARP to remediate and stabilise the currently disturbed areas.
<b>Action Requested by PIRSA</b>	<b>Terramin’s reply</b>
No Action Item	PIRSA has not raised additional action items for this proposed outcome.
<b>Outcome 17.4 – Topsoil</b>	
<i>“Ensure soil quality is protected”</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Need to clarify what depth top and sub soil will be collected and stored	Soil will be classified as topsoil and subsoil, according to paedology - both will be managed differently. Subsoil will mostly be used for fill while topsoil will be used for revegetation.
Need to monitor soil stockpiles to avoid sterilisation	Terramin intends to stockpile subsoil and topsoil separately within practical and physical constraints. Monitoring of soil stockpiles will take place via regular photos of fixed sites. Seed-bank sterilisation is a potential outcome of topsoil storage. This risk will be managed by ensuring regular turn over of stored topsoils, as well as ensuring the total depth of stored material is less than 3m. However, given the extensively modified floral assemblage in the area, as documented in Appendix J: Flora Assessment, the maintenance of a seed bank may actually produce ongoing weed problems. Maintenance of a viable seed-bank of native vegetation is desirable; maintenance of a weed seed-bank is not. Investigations into the proportion of viable indigenous seeds in the topsoil will drive further management plans and be incorporated into the revegetation scheme.
<b>Action Requested by PIRSA</b>	<b>Terramin’s reply</b>
Review risk assessment to include risk of seed sterilisation of topsoil stockpiles.	<b>Agree.</b> Will include risk assessment in final MARP.
Criteria to be revised to specify monitoring of soil stockpiles.	<b>Agree.</b> The topsoil stockpiles will be monitored to ensure that erosion is under control and soil not sterilised. Seed vigour will not be monitored because Terramin considers any measures to conserve seed in the topsoil from the current pastures will be counter to the weed management program; however propagules of native species (exotic and weed species free) will be sown over



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	rehabilitated surfaces.
Include detail of depth (topsoil and subsoil) and areas of soil to be stockpiled.	<b>Agree.</b> Will include soil storage detail in final MARP
Include details of source of soil for Tailings Storage Facility closure.	<b>Agree.</b> Will include source of soil for Tailings Storage Facility in final MARP
<b>Outcome 17.5 - Vegetation clearance</b>	
<i>"Avoid loss of biodiversity through clearance of native vegetation. Significant environmental benefit (SEB) will be provided to increase the biodiversity"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Flora species of conservation significance do occur in lease area - need to survey and clarify species present	<p>Locations of dry land <i>Melaleuca lanceolata</i> were noted on aerial photographs and in the Flora assessment (MARF Section 17.5 and Appendix J); these trees were identified, photographed and included in the draft MARF.</p> <p>Other significant species identified in the flora assessment were native grasses that were planted in previous revegetation efforts along boundaries and as windbreaks; these were recorded in the vegetation survey by Matt Rose, MARF Section 3.6. These plants are not growing in areas of anticipated construction or mining activity; their continued survival will be enhanced by the planned revegetation efforts for the lease area.</p> <p>Further vegetation surveys are being planned for Spring 2006 to resolve the species of some plants that flower in spring.</p> <p>If trees are evaluated as environmentally significant, they will be protected from mining activities by fencing and signage if warranted. Seeds will be collected and germinated to provide seedlings for the revegetation program and as an insurance against accidental or natural loss of the trees.</p>
If 2 Melaleuca trees are removed or any previous revegetation plantings, SEB must be paid	Vegetation of significant environmental benefit (SEB) will be protected by ensuring that mine and infrastructure planning will recognise their location and plan accordingly. Further protection measures will be assessed and if warranted the trees will be fenced and signs erected. If removal ultimately becomes unavoidable SEB will be calculated in accordance with the Native Vegetation Council and applied as recommended.
Need to clarify if any clearance will occur for	Clearance of land for the construction of infrastructure is inevitable; this land is currently

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installing infrastructure (fig 35)	<p>used by a quarry, a landfill and the remaining is covered by introduced pasture and weeds species. Some native vegetation including melaleucas was identified and documented in the draft MARP along fence lines.</p> <p>Terramin does not anticipate the need of removing the majority of this vegetation. The SEB for any native vegetation that may unavoidably have to be removed will be calculated. Contingency planning includes collecting and propagating seeds for revegetation.</p> <p>Terramin will leave the site with as much of the existing native flora as possible and ensure that their propagules have been used in the revegetation program.</p>
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Need more detailed survey on flora present in area to identify all flora of conservation significance.	<b>Agree.</b> A second vegetation survey will be undertaken in the spring of 2006 to enable more precise species identification.
Criteria may need revision after more detailed survey completed.	<b>Agree.</b> It is not anticipated that the identification of a few plants that could not be identified down to their species level in the first survey will generate any new significant findings. However, should it be warranted the criteria will be reviewed in the MARP.
Include risk from salt water vapour from vents	<b>Agree.</b> Terramin does not anticipate any significant risks from salt in water vapour from vents because they will be located in highly disturbed land. This risk assessment will be included in the MARP
<b>Outcome 17.6 - Silt &amp; stormwater control</b> <i>"Prevent contamination of storm water leaving site"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
No contaminated water to leave site	<p>The mine will operate a closed loop for process water; stormwater that comes in contact with potentially contaminated surfaces will be redirected to the mine water circuit and not released from the property other than by evaporation from storage ponds.</p> <p>Uncontaminated stormwater will be directed with bunding around the operational areas into the natural drainage systems.</p>
More monitoring details of stormwater runoff from tailings dam	Terramin will have an environmental monitoring program that will include any runoff from around the Tailing Storage Facility and stockpiles to ensure that the closed system is working

	<p>to design specifications. The monitoring program will also include upstream and downstream sites to verify that these streams receive no contamination from the mine.</p> <p>A baseline monitoring is planned for the winter of 2006, it is anticipated that streams will be monitored monthly following significant rainfall events for environmental reporting purposes. There will be no stormwater runoff from the Tailing Storage Facility or other storage areas; to verify this during the operational stage, runoff from around the site will be monitored continuously at strategic locations with pH and conductivity meters for management purposes.</p> <p>Any water leaving the site will comply with current EPA water quality policy, or no higher than 2 standard deviations of stormwater entering the site (i.e. within natural background variations).</p> <p>Samples taken during significant rainfall events will be monitored for Pb, Zn, As, Cd, Fe, Mn, pH, TDS, organics and surface water level for flow determinations if required.</p>
<p>Need to demonstrate stormwater diversion around Tailings Storage Facility will be sufficient to cope with storm</p>	<p>The current drainage plans for the area surrounding the Tailings Storage Facility consist of a perimeter drain around the Tailings Storage Facility. The proposed catchment area to the head of the Tailings Storage Facility is minimal, and thus any surface water arriving on the Tailings Storage Facility or from its limited catchment will become part of the mine water circuit.</p> <p>The Tailings Storage Facility will be designed to withstand the expected volume of rainfall from a 1:100 ARI five day storm event to occur on one day (this is a very conservative engineering design standard). The flow from stormwater diversion will be diverted to a sump to trap sediments and silt, and then returned to the environment.</p>
<p>Need to address stormwater runoff of stockpiles</p>	<p>Stormwater will be diverted by a combination of bunds and drains around the portal, ore stockpiles, plant and any structure that may be a potential source of contamination. All potentially contaminated water will report via holding sumps to the process water circuit.</p> <p>Silt traps and sumps will be used at strategic locations to maximise silt capture within the property. Conceptual locations were shown in Appendix O to the MARP; detailed planning will carry these principles.</p> <p>The design of ROM stockpiles will include a liner and bunding at the toe of the stockpile so</p>

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	<p>that all water will be captured and directed the tailings thickener - process water circuit.</p> <p>Sulphidic wastes will be temporarily stockpiled on a lined pad and runoff water collected and returned to the tailings thickener – process water circuit. All potential AMD material will be returned underground as space becomes available through mining.</p>
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Revise Outcome to "No water contaminated as a result of mining operations to leave lease area or result in contamination of soil at closure within lease area".	<b>Agree.</b> This outcome will be achieved by constructing engineered drains and silt traps to prevent potentially contaminated silt and storm water runoff. A monitoring program will provide a feedback mechanism to management to ensure the systems are operating as designed and to reassure the stakeholders that this outcome is being met.
Criteria to be water discharged from site to be compliant with current EPA water quality policy, or to be no higher than current background levels.	<b>Agree.</b> These criteria will be accepted by Terramin. To allow for natural variability the two standard deviations above background mean will be considered as exceeding background level, as incorporated in 17.2 of the draft MARP.
Need to acquire data on current quality of surface water leaving site.	<b>Agree.</b> Is currently being addressed by AWE
Review criteria to include some onsite monitoring near Tailings Storage Facility and stockpiles.	<p><b>Agree.</b> There will be no runoff from the Tailings Storage Facility and runoff from the stockpiles will be collected and transferred to the tailings thickener-process water circuit.</p> <p>Water runoff from property will be monitored to ensure that the control measures are working as planned.</p>
Stormwater diversion infrastructure to be designed to cope with largest known historical storm event.	<b>Agree.</b> Terramin has designed the stormwater diversion infrastructure to meet the largest storm event on record which occurred on 25 January 1941 at 142mm of rain.
Include detail of control measures to be employed to demonstrate capable of coping with largest known historical storm event.	<b>Agree.</b> Terramin will provide design calculations in the MARP to demonstrate the ability of stormwater diversion infrastructure to meet the largest historic storm event.

**Outcome 17.7 - Waste disposal/hazardous substances**

*“Prevent contamination and pollution from the management of waste products and spillages”*

<b>Issue</b>	<b>Action to be taken by Terramin</b>
<p>Detail hazardous waste management process to give confidence that risk can be managed</p>	<p>All potentially hazardous materials will have individual handling and storage protocols (safe operating procedures) based on their physical and chemical form and including all recommendations on the Manufacturer's MSDS sheets, e.g. Xanthate:</p> <p>Handling: Use safe work practices to avoid eye or skin contact and inhalation. Observe good personal hygiene. Prohibit eating, drinking and smoking in contaminated areas. Wash hands before eating. Remove contaminated clothing and protective equipment before entering eating areas.</p> <p>Storage: Store in cool, dry, well ventilated area, removed from direct sunlight, oxidising agents (e.g. peroxides, hypochlorites), acids (e.g. sulphuric acid), heat sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Large storage areas should have appropriate ventilation.</p> <p>Security systems will be implemented to ensure that all safe storage and handling systems are operating as specified.</p> <p>No employee or contractor will be permitted to handle these materials unless they have been certified by a Terramin approved trainer. In most cases this will be the Health and Safety Officer.</p> <p>The Draft MARP provides a contingency plan for emergency situations in Section S. The handling and storage of hazardous material will be according to relevant legislation or manufacturers directions. The implementation of an Environmental Management System will define the procedures required for acceptable handling and storage procedures.</p>
<p>Recycling strategies should be documented, including opportunities to recycle waste material currently onsite.</p>	<p>Recycling and disposal of material during all phases of mining will comply with the relevant legislation. A recycling policy will be implemented for all recyclable materials brought on site. Assessment of recycling options will be made for materials currently on site. Local recycling facilities will be utilised where practicable. All non-recyclable waste will be disposed of in an appropriate manner. No waste from off site to be disposed of on site.</p>

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Action Requested by PIRSA	Terramin's reply
Revise outcome to "No contamination and pollution either on or off site caused by waste products and hazardous materials".	<b>Agree.</b> Outcome revised in MARP by changing the word "Prevent" to "No".
Review criteria to include recycling where possible.	<b>Agree.</b> Recycling where possible has been added to the criteria in the MARP.
Include more detail on hazardous chemicals to be used and management strategies.	<b>Agree.</b> A list was presented in the draft MARP, an updated list of all process chemicals with reference to the manufacturer's MSDS sheets will be provided in the MARP.
No waste from off the site to be disposed of on site.	<b>Agree</b> to this condition.
Need to plot existing licensed landfill on all maps of mine site.	<b>Agree,</b> will include in final MARP.
<b>Outcome 17.8 - Acid mine drainage</b> <i>"Prevent contamination of surface water, groundwater, and soils by acid mine drainage"</i>	
Issue	Action to be taken by Terramin
Doubt leakage/contamination (groundwater and surface water) can be managed (risk rating is high)	<p><i>Tailing Storage Facility:</i></p> <p>The engineering risk assessment (as opposed to "perceived" risk – "doubt") in the draft MARP rated leakage to groundwater from the unlined Tailings Storage Facility as high, the residual risk after the initial tailings dam design was rated as low by ATC. The new Tailings Storage Facility design with an HDPE will have even less likelihood of leakage than the previous design. No detectable infiltration is expected into the underlying groundwater. Therefore the residual engineering risk rating is anticipated to remain at the least rating of "low" – the classification system does not recognise a "no risk" category. However, the new design will also reduce the perceived risk rating to "low".</p> <p>The structural design of the Tailings Storage Facility will meet the standards set by the ANCOLD Guidelines and the additional requirements set by PIRSA and EPA in "Guidelines for the Management of Tailings at the Proposed Angus Zinc Project, Strathalbyn, South Australia".</p> <p>The final design of the Tailings Storage Facility will demonstrate the ability of the structure to achieve the proposed outcome to the satisfaction of PIRSA, DWLBC and EPA. Wall</p>

	<p>stabilisation is an integral part of design and construction. Terramin plans to revegetate the retaining walls soon after construction, and ensure that the vegetation is well established at closure.</p> <p>To ensure the Tailings Storage Facility is located at least 100m from the 100 ARI flood level, Terramin have engaged the services of Tonkin, recognized as experts in the flood modelling field, to assist in determining the most appropriate placement of the Tailings Storage Facility.</p> <p><i>AMD from underground mine and general operational areas:</i>                  Terramin has commissioned EGi (an internationally recognised geochemical consulting firm) to conduct a geochemical study on the underground mine and material to be temporarily stored on the surface. The potential to generate acid and the kinetics of both waste rock and tailings will be evaluated. Recommendations from EGi will be incorporated in the final MARP and if modifications are required to the environmental management plan they will be initiated prior to mining.</p> <p>All alternative locations for the storage of potentially acid generating material have been and will continue to be considered, including the effluent ponds and the potential for underground storage. Underground storage will be able to provide a stable setting for AMD material.</p> <p>In preparing the MARP, storage of tailings in the area of effluent ponds was investigated and considered geotechnically unsuitable because the area is prone to inundation and environmentally inappropriate because it is a wetland area for native species.</p>
<p>Risk of embankment failure</p>	<p>The risk of embankment failure is a major consideration for the development of the Tailings Storage Facility. As such, a variety of worst case scenarios were considered for the final Tailings Storage Facility design, including flooding and earthquake conditions. The material selected for the Tailings Storage Facility walls will meet engineering criteria and be geotechnically suitable.</p>
<p>Potential for seismic failure - must withstand 7 on Richter scale for 1 minute.</p>	<p>To ensure the stability of engineered structures Terramin has, and is continuing to address the potential risks associated with both seismic activity and reactive soils. Engineered structures were developed under stringent modelling assumptions for seismic activity (including Operating Basis Earthquake 1 in 100 Annual Exceedance Probability; Maximum Design Earthquake 1 in 1000) and reactive soils. The design of the Tailings Storage Facility to appropriate standards is being undertaken by Australian Tailings Consultants, (ATC) who are recognized as global experts in the field. ATC and their consultants are currently</p>

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	<p>undertaking a seismic risk assessment for the proposed structure as required by ANCOLD Guidelines. The results will be included in the risk assessment section of the MARP.</p>
Potential for reactive soils to cause failure	<p>All materials used in the construction of pads and the Tailings Storage Facility walls will be selected on strict engineering criteria to provide the desired geotechnical stability.</p> <p>In addition a liner will be placed at the base of the ROM pads and the Tailings Storage Facility to prevent the potential for leakage caused by cracking clays.</p>
Design to be worlds best practice - specify design parameters and include monitoring facilities	<p>The Tailings Storage Facility is being designed to ANCOLD guidelines, which are the operational standard in Australia. Terramin is also incorporating additional site specific criteria developed by PIRSA and its consultants which make these Tailings Storage Facility criteria the most stringent known in Australia. Terramin consultants ATC have incorporated all these criteria in the design and included additional design measures, particularly in the water storage capacity, making this Facility one of the most over-designed in the World.</p> <p>Groundwater monitoring bores will be placed in strategic locations around the Tailings Storage Facility to record water levels and water quality parameters relevant to detecting acid generation. A baseline surface and groundwater monitoring program is planned and should, subject to council and property owners' approval, commence in April 2006.</p> <p>The results of the initial baseline survey were reported in the draft MARP, a more comprehensive set of water quality parameters currently being monitored will be reported in the MARP or the first environmental report to the EPA.</p>
Risk of damage due to flooding underestimated (should be 500m from 100ARI flood level of Burnside Creek).	<p>Terramin is currently working towards the placement of the Tailings Storage Facility above the 1:100 ARI flood levels for Burnside Creek - [Tonkin Consultants are currently confirming this]. The placement of the Tailings Storage Facility relative to potential flooding areas will be more than 100m from 1:100 ARI flood levels.</p>
Demonstrate Cyanide and daughter products do not pose threat to humans or fauna.	<p>The projected levels of cyanide in the process at the Angas project will be very low, as provided in the draft MARP. The final MARP is likely to show lower levels because the cyanide and breakdown product concentrations in the thickened tailings will be lower than originally projected. This is the result of the thickening process recovering a high percentage of process water that includes cyanide. The current projected total cyanide in thickened tails is 2 parts per million. Terramin is currently negotiating with a buyer of concentrates, which if successful will not use any cyanide in the process.</p>



<p>Investigate alternate locations for Tailings dump.</p>	<p>Alternative locations for the placement of Tailings Storage Facility were investigated by Terramin and its consultants. The current location was selected because it is geotechnically stable, has a minimal environmental footprint and is located more than 100m from the 100 year flood level (currently being modelled by Tonkin Consulting).</p> <p>Other sites considered include sites further down in the valley, the Alexandrina Council Effluent Ponds and underground storage as backfill mixed with cement. These options failed the stringent criteria imposed by Terramin, with the exception of underground storage as backfill; this option will not have sufficient capacity but will be used in conjunction with the Tailings Storage Facility to place as much tailings underground as practically possible.</p> <p>A subsequent request by PIRSA on behalf of the Alexandrina Council, the EPA and DWLBC to use the Strathalbyn Effluent Ponds was received by Terramin, who's reply was that the site was investigated but not selected because it was considered to be prone to flooding (it is a local wetland) and was identified by the site flora and fauna survey as an environmentally sensitive area. Terramin has offered to discuss this further with the relevant authorities; a reply was not forthcoming at the time of preparing this submission.</p>
<p>AMD risk from temp storage of waste rock need to define "non-sulphidic" waste.</p>	<p>An AMD classification system is currently being developed by EGi. It is likely to be based on sulphide material in the waste rock. Extensive calcareous deposits that overlay the ore body will also be geochemically characterised for its acid neutralising capacity. There will also be relatively inert material that contains no significant reactive sulphur. The acid neutralising and inert material are defined as "non-sulphidic" waste. EGi will if advisable recommend any improvements to the current acid drainage management and Terramin will examine if these can be incorporated.</p> <p>Terramin has already designed the Tailings Storage Facility and Stockpiles on the presumption that they will be acid generating, incorporating HDPE base layers and diverting water that comes in contact with potentially acid generating material back to the thickeners for acid modification and reuse in the process water.</p> <p>Terramin has strategic plan to use the acid neutralising overburden (rock and soil) for constructing pads, bunds and in other acid neutralizing roles, provided this material also meets the geotechnical criteria for the intended use.</p>
<p>Tailings Storage Facility to be designed to EPA</p>	<p>Section 7.1 of the EPA landfill guideline states that semi-solid sludge is not to be stored in a</p>

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<p>"Guidelines for Solid waste landfills" and managed and de-commissioned in accordance with "Landfill Environmental Management Plan" (LEMP)</p>	<p>licensed landfill. Therefore a specific design is required to store tailings. PIRSA has developed and issued site specific guideline in "Guidelines for the Management of Acid Mine Drainage at the Proposed Angas Zinc Project, Strathalbyn, South Australia". These guidelines include relevant components of the recently released EPA draft guidelines for landfill management. Terramin will ensure that these conditions are the minimum criteria in the final Tailings Storage Facility design.</p> <p>Geotechnical testing is ongoing, and the likely formulation of thickened tailings is undergoing wind tunnel tests to confirm predictions regarding wind erosion. AWE and ATC have completed geophysical and hydrological testing on the potential Tailings Storage Facility sites to confirm geotechnical and hydrological assumptions.</p> <p>The final design of the Tailings Storage Facility will demonstrate the ability of the structure to achieve the proposed Outcome to the satisfaction of PIRSA, DWLBC and EPA.</p>
<p><b>Action Requested by PIRSA</b></p>	<p><b>Terramin's reply</b></p>
<p>Revise outcome to "No contamination of natural drainage systems, ground water and soils either on or off site, during operation and post closure term, caused by permanent disposal or temporary storage of mine ore or waste material".</p>	<p><b>Agree.</b> Terramin has revised this outcome by the NO DISCHARGE policy. During operations, potentially contaminated water and soil will be prevented from reaching the natural drainage systems by installing and maintaining HDPE lined bases and engineered drainage system to return all potentially contaminated water to the process circuit.</p> <p>The closure plan will ensure that the Tailings Storage Facility and all operational areas, both above and below ground will not become a potential source of contamination. The backfilling and flooding of the underground mine, the use of HDPE liners to encapsulate the Tailings Storage Facility and strategically placed acid neutralising materials will prevent any further generation of acid.</p> <p>Terramin will validate this closure plan through the current geochemical study by EGi (an internationally recognised geochemical consulting firm) and will explore new and better acid prevention measures throughout the mine life to ensure that the world's best practice is identified and used for the Strathalbyn Mine.</p> <p>EGi are currently assisting Terramin to refine their AMD management program for all potential sources and potential pathways, these outcomes will be incorporated in the final MARP. Terramin will ensure that these outcomes will be achieved through the proposed monitoring program and with ongoing verification studies.</p>

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<p>Revise risk assessment to include comprehensive risk assessment for all pathways of AMD into environment including abnormal situations such as embankment failure due to seismic event, flooding, and reactive soil.</p>	<p><b>Agree.</b> Terramin has commissioned geochemical and seismic consultants to undertake comprehensive studies of the risks associated with AMD and the stability of the Tailings Storage Facility, to verify the acid generation control measures will work as designed throughout the life of the mine and ensure that the site is left in a low risk status at closure.</p> <p>On completion of these studies a new risk assessment will be conducted to investigate all potential AMD sources and identify all pathways including abnormal situations such as embankment failure due to seismic events, flooding and reactive soils. The results will be incorporated in the final MARP.</p>
<p>Revise criteria to include comprehensive monitoring plan, including monitoring of temporary storage of waste rock land post closure monitoring of Tailings Storage Facility.</p>	<p><b>Agree.</b> Terramin will implement a monitoring program for all potentially contaminated sites post closure, the details will be determined in consultation with PIRSA and based on the results of the operational phase monitoring program.</p> <p>An environmental monitoring program that includes the temporary waste rock storage and Tailings Storage Facility will be incorporated in the revised MARP.</p>
<p>Terramin to nominate standards and principles for design of Tailings Storage Facility, and demonstrate these will achieve outcomes. If not proposing to adopt EPA recommendations (for wet tailings: Guideline 509/04 <i>Wastewater and evaporation lagoon construction</i>, If thickened tailings: Guideline for <i>Landfill facilities for domestic, commercial and industrial solid waste</i> (currently in draft format)) then must demonstrate to satisfaction of PIRSA, EPA and DWLBC, and Planning SA that standards to be adopted are superior to these, prior to lease grant.</p>	<p><b>Agree.</b> The first component of this issue is redundant since PIRSA and EPA has developed a site specific Tailings Storage Facility Guideline. Terramin accepts these new guidelines. The final design will be presented to PIRSA and Terramin will demonstrate in the MARP that the final Tailings Storage Facility design uses the PIRSA guidelines as the minimal design standards and exceeds these in significant areas such as water storage capacity and safety.</p>
<p>Must demonstrate final Tailings Storage Facility design will meet outcome and monitoring criteria to be to satisfaction of PIRSA, DWLBC, EPA.</p>	<p><b>Agree.</b> The Tailings Storage Facility engineering design will be audited by Golders and Metago against the specified criteria to ensure the outcomes and monitoring criteria are met to the satisfaction of PIRSA and its stakeholders. The outcomes of the Tailings Storage Facility design and auditing results will be incorporated in the MARP document.</p>
<p>100 year flood level must be modelled and included in MARP.</p>	<p><b>Agree.</b> Terramin has commissioned a study to model and map the 100 year flood levels. Initial results indicate that the Tailings Storage Facility will be more than 100m from the 100 year flood level. Results will be incorporated in the final MARP.</p>

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Alternate locations to be considered (including on effluent ponds site and underground disposal) and demonstrate preferred location will achieve outcomes.	<b>Agree</b> to this condition. See response to Community Consultation.
Must have appropriate EPA licence for Tailings Storage Facility.	<b>Agree.</b> Terramin understands that the specific PIRSA Tailings Guidelines will satisfy the EPA conditions and will therefore design accordingly.
Ensure Tailings Storage Facility is located at least 100m from the 100 ARI flood level.	<b>Agree.</b> Terramin is currently constrained by the Mining Lease boundary and regional geotechnical properties in where to locate the Tailings Storage Facility. Terramin is currently undertaking studies to map the 100 year flood level, after which it will be in a better position to determine if it can meet this criteria. Final outcomes will be communicated with PIRSA and incorporated in the MARP.
Separate LEMP not required - aspects will be included in MARP.	<b>Agree.</b>
<p><b>Outcome 17.9 – Ventilation</b>  <i>“Prevent public nuisance impacts from noise and fumes emanating from the vent fan and prevent adverse impacts on vegetation surrounding the fan”</i></p>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Doubts dust will be controlled	<p>Terramin does not anticipate dust from the ventilation system; however mine dust management protocols are being developed to ensure dust production is managed to meet the NEPM standard. These protocols will include measures such as revegetation to control dust generation and provide a wind break, incorporating dust extractors in the crushers, install a vehicle wash down bay, watering of exposed operational surfaces, particularly during windy conditions and the construction of additional dust barriers where indicated during the operational stage.</p> <p>Monitoring of dust levels will be an integral component of the monitoring program. The method of measurement for air quality will be that proposed by the EPA. Baseline dust level monitoring was initiated in August 2005 and this monitoring is currently being continued by Tonkin Consultants to determine existing dust levels.</p>
Doubts Odours will be controlled	Terramin does not anticipate nuisance odours from the ventilation system but mine site protocols are being developed to meet the EPA standards. Limit for maximum change of

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	<p>odour from a baseline level is 2 odour units higher than an agreed reference point, or CS<sub>2</sub> below 0.042 parts per million.</p> <p>Terramin has commissioned Tonkin Consultants to undertake an odour study at Perilya Mine Broken Hill (which has similar mineralogy and uses the same floatation reagents). This information will be used to develop an Odour Model for the Strathalbyn Mine.</p> <p>Current understanding of the process chemicals used at Strathalbyn indicates no significant odour emissions will occur; Terramin undertakes to implement whatever engineering or management actions required ensuring that the odour levels do not exceed the EPA guidelines.</p>
<p>Need to model gas emissions from exhaust fans and demonstrate noise acceptable</p>	<p>Gas / odour emissions and noise modelling presented in the Draft MARP are currently being refined by Tonkin (dust and meteorological consultants) and Bassett (acoustic specialists). The outcomes will be presented in the MARP.</p> <p>Fumes from mine ventilation are expected to be minimal, based on modelling and meteorological conditions. All complaints regarding fumes will be addressed as part of Environmental Management protocols. Terramin will comply with all air quality parameters agreed to with the EPA. Noise modelling is being undertaken by Bassett Acoustic, final results will be presented in the MARP.</p>
<p>Monitoring for noise, soil and air quality should be more frequent than annual</p>	<p>Terramin will continually monitor the environmental performance of the mine and plant against the prescribed conditions for the protection of human and environmental health. Independent monitoring of environmental conditions will be conducted by PIRSA and the EPA. Terramin will also undertake independent auditing (by an EPA approved auditor) to validate the monitoring program.</p>
<p><b>Action Requested by PIRSA</b></p>	<p><b>Terramin's reply</b></p>
<p>Delete outcome and address risks under appropriate outcomes for noise, dust, odour and vegetation.</p>	<p><b>Agree.</b></p>

<b>Outcome 17.10 – Traffic</b>	
<i>"Prevent accidents, dust and the spread of pest/diseases associated with mine traffic"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Traffic danger, close to schools etc (impact on cycling)	The concentrate trucks will not be going through Strathalbyn or past any schools in that town. There are no cycle tracks in the vicinity of the mine entrance. The new location and the proposed upgrading of the entrance area will meet Transport SA road safety standards and will not add to the inherent risk of traffic in the area.
Noise	In the draft MARP traffic noise was not found to exceed the guideline noise levels. Terramin is currently reinvestigating the overall projected noise levels including traffic noise.
Damage to roads	Apart from the general wear and tear that all traffic contributes, Terramin does not foresee any situation where Terramin trucks will add to this. All contractors to Terramin will operate registered trucks which contribute to road maintenance. Terramin undertakes to repair and maintain all roads on its property.
Dragout	Terramin is committed to ensuring that dragout onto public roads is prevented. The management approach is to install a truck wash down bay approximately 100m from the public road. The road from the wash station to the public road will be sealed.
No dust from trucks (cover load - Tarpaulin may not be sufficient).	Terramin will prescribe that contractors responsible for delivery of ore products will use suitable covers on the transport vehicles as a contract condition.
No trucks through town or on town roads including chemical transport trucks as well as concrete trucks.	Terramin will ensure that trucks will not pass through Strathalbyn by implementing contractual conditions to ensure that all suppliers and transport operators using heavy vehicles (class 10 and above) will not pass through the town, unless prior permission is received in writing from PIRSA.
Clarify hours of vehicle movements.	It is currently proposed that concentrate trucks will operate between 6:30am and 10:00pm.
Could extend 80km/hr speed limit to mine entrance to increase safety.	Terramin will welcome and support this outcome.
Changing road access improves safety, but increases noise for residents.	Restricted truck times and EPA guidelines will ensure that noise levels will not be an increased nuisance to local residents.

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Pollution from increased diesel exhaust	Road registered B-double trucks (who must comply with current state and Government regulations including exhaust emissions) are currently allowed to and do use the Gazetted B-double route along the Callington-Strathalbyn Road. Terramin intends to report all emissions to the National Pollution Inventory (NPI). It will conform to any state and national diesel emission regulation.
Consider use of railway for transport instead of trucks.	The potential to utilise the existing railway line as a transport route for ore has been considered. Terramin have examined the effectiveness of this option compared to road transport, and have decided that less risk is posed by road transport. This is due to the level of handling effort in road transport of ore to a suitable train siding, loading onto trains, and then another set of double handling between rail and road once the ore arrives at the train destination. The risk for accidental losses and potential environmental damage is greatly increased by the train carriage option.
Prescribe conditions which preclude disconnection of B-double trailers to allow trucks thru town.	Terramin will be using contractors to transport concentrate. It does not wish to impose additional conditions on its contractors, when they are not transporting Terramin concentrate. However, it will support the Council if it decides to prohibit this activity in Strathalbyn by stipulating in their contracts Council regulations must be obeyed.
Existing Callington road not suitable for B-doubles- requires widening.	Terramin will abide by current road ratings. Terramin is not in a position to change road ratings; it understands and will observe Transport SA regulations.
Entrance on to Callington Rd should have a C junction and deceleration lane.	Terramin will install any appropriate alterations to the road as instructed and permitted by Transport SA.
Entrance to mine should cater for 2 way traffic, and be sealed.	Terramin will install any appropriate alterations to the road as instructed and permitted by Transport SA.
Where will tyre wash down pad be located and how will contaminated water and dust be disposed of?	The tyre wash down station will be located 100m from the entrance to the public road. The water from this wash down station will be contained and returned to the mine process water circuit.
Suggested B-Double traffic be restricted to reasonable hours.	Current operating times are between 6:30 am and 10:00 pm; Terramin will consult with the Community Consultation Group on these times during the operational phase.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>

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Revise outcome to "No accidents, noise, dust and dragout impacts offsite caused by traffic from or to mine site ".	<p><b>Agree.</b> Terramin will meet this outcome by including strict conditions for compliance with SA Road Traffic Regulations in all contractual arrangements, and implement an auditing process to ensure that all contractors comply with these conditions.</p> <p>All vehicles leaving the property will pass through a wash-down bay; this will ensure that dragout impacts will not occur.</p>
Review criteria to include monitoring of road condition, accidents and near misses, dragout.	<p><b>Agree.</b> Road condition around the Terramin Strathalbyn Mine will be monitored. The monitoring program will confirm that measures to maintain road conditions, prevent accidents, avoid near misses and dragout are within the stated criteria.</p>
No heavy vehicles to be taken through Strathalbyn town roads, unless approved by PIRSA.	<p><b>Agree.</b> Terramin will meet this outcome by implementing contractual conditions to ensure that all suppliers and transport operators using heavy vehicles (class 10 and above) will not pass through the town of Strathalbyn unless prior permission is received in writing from PIRSA.</p>
Heavy vehicle movement offsite limited to agreed hours.	<p><b>Agree.</b> Terramin will ensure that all contractors work within the agreed hours.</p>
All concentrate trucks to be covered to prevent dust impacts, and wheels washdown to prevent dragout.	<p><b>Agree</b> all concentrate trucks will have a suitable cover.</p>
Mine road/ Callington Road intersection to be upgraded and maintained to Transport SA specifications.	<p><b>Agree</b> to upgrade the intersection of the mine entrance and Callington Road to Transport SA specifications.</p>
Investigate possibility of extending 80km/hr speed restriction zone to cover mine entrance.	<p><b>Agree</b> Terramin will support any Council or Transport SA decisions to change the speed to an 80 km zone to reduce noise and risk of accidents around the entrance to the mine.</p>
Demonstrate alternate transport options not practical e.g. railway	<p><b>Agree</b> Terramin has investigated other transport options and given a brief description of reasons for selecting the proposed transport option in the response to the community consultations issues above. This will be revised in the final MARP.</p>



<b>Outcome 17.11 – Noise</b>	
<i>"Prevent public nuisance impacts from noise emanating from the operating site"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Noise need to characterise tone, pitch etc operation	Terramin have currently engaged the services of Bassett Acoustic, recognised experts in the field of noise modelling, to perform further investigations into the noise that will be generated by the operation.
Noise limit for night time (40db) too high wants no noise at night	The EPA standard for allowable noise will be employed as the standard for noise which is 47 dB during the day and 40 dB at night. This volume will be measured at the outside wall of the nearest non-Terramin owned residence. Other noise monitoring points will be specified after consultation with Community Advisory Committee. These locations may be reviewed from time to time.
Definition of "daytime" is not 7am to 10pm.	The EPA noise policy states 7.00 a.m. to 10.00 p.m. is used to categorise "day".
What days of week will mine operate	The operating hours for mining will be 24 hours/day, 7 days/week. However, in recognition of community needs Terramin will only operate the crushing plant for 12 hours day to reduce the level of noise at night.
Noise during daytime to be comparable with existing rural noise levels	All planning and operational efforts will be made to ensure noise levels will be similar to existing noise levels at the boundary of the mining lease. Terramin is implementing management strategies to ensure that noise levels at the lease boundary are in compliance with the EPA prescribed noise levels.  Management measures will include the development of noise abatement bunding, revegetation schemes to establish noise barriers, the construction of cladding to contain noise around the plant, sound proofing strategic equipment and the use of silencers on exhaust fans and machinery where practicable.
Doubts that noise can be controlled to stated/acceptable limits	Every effort is being made to ensure the noise target will be met. Bassett Acoustics are nationally recognized acoustic experts, and their input is critical to noise modelling as well as making recommendations on ensuring noise abatement technology is fit for purpose.
Doubts that EPA able to enforce noise limits	The EPA has a strong track record in South Australia of acting on public complaints, especially with regard to the operation of industry. Terramin will comply with all recommendations by the EPA regarding operational conditions.

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<p>Need to consider shift workers, not all are 9-5</p>	<p>Terramin's noise policy, enforced by EPA regulations is based on average conditions. It is possible that even within the prescribed limits of noise generation some people will feel affected by the mine process.</p> <p>Terramin understands the need to contain noise levels and is implementing several measures (see previous response) to ensure that noise levels will be modulated to background levels within a short distance of the plant, therefore it is not envisaged that shift workers in the area will be affected by noticeable incremental noise.</p>
<p>Suggest 55 or 43db during day and 45-40db at night, to account for schools.</p>	<p>The EPA prescribed noise limits are within or lower than those suggested by the respondent.</p>
<p>Noise limits not clear</p>	<p>Terramin will comply with the prescribed limits for noise. The current limits are prescribed by the EPA Noise Policy are: 47dB during the day, and 40 dB at night. Details provided in the draft MARP will be upgraded to include the recent improvements.</p>
<p>Noise at night now from music, mine won't be any worse</p>	<p>The noise produced by licensed premises may unduly influence the amenity of an area. This is not under the direct control of the EPA noise policy, or the proposed mine. The mining and construction proposed by Terramin are controlled by and will operate within the relevant EPA Noise Policy.</p>
<p>Limit crushing plant to 7am to 7pm Mon-Sat, no crushing Sun and Public Holidays.</p>	<p>Terramin recognises the need to limit noise generation and has taken several measures to control the level of noise. Terramin does not recognise the impositions of when it can conduct its business provided it meets all noise and other requirements, any more than other industries in the district. However, Terramin will in the spirit of cooperation with the community only operate the crushers between 7am and 7pm or similar 12 hour time frame in consultation with the Community Consultation Group.</p>
<p>Noise limits suggested in MARP not appropriate WHO guidelines recommend 50db during day, 45 at night (some people will still be adversely affected by these levels e.g. shift workers, elderly).</p>	<p>The World Health Organisation sleep disturbance criteria values for noise are higher than those proposed for the area, which has been classified as rural. As such, Terramin will comply with the lower of the two standards. This is in line with Terramin's policy of ensuring that local residents are not disadvantaged by the proposed development.</p>
<p><b>Action Requested by PIRSA</b></p>	<p><b>Terramin's reply</b></p>
<p>Outcome adequate, but change "Prevent" to "No".</p>	<p><b>Agree</b> to change this in the final MARP</p>

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Revise Criteria to EPA noise policy (40dB at night, 47dB during day) at outside wall of nearest residence (non Terramin owned) as interim standard.	<b>Agree</b> , Terramin is currently undertaking noise modelling to ensure that this criterion is met. Final outcomes will be communicated with PIRSA and incorporated in the MARP.
Noise monitoring points to be specified and in consultation with Community Advisory Committee from time to time.	<b>Agree</b> , Terramin will communicate and incorporate suggestions from the Community Advisory Committee on this condition.
<b>Outcome 17.12 - Blasting</b> <i>"Prevent public nuisance impacts from vibration caused by blasting"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Damage to buildings	Buildings will be protected by the adoption of the vibration velocity "damage" criteria recommended in the Australian Standards Explosives Code, AS 2187.2-1993. Terramin will monitor the influence of blasting using the appropriate technology, including vibration monitors. The monitoring points for detection of noise and vibration will be determined in consultation with the Community Advisory Committee. These locations may be reviewed from time to time. Terramin assumes that by complying with the ANZECC standards, the risk of structural damage to local residences will be averted.
Need to warn residents of blasting	Terramin will consult with the Community Advisory Committee to identify the most appropriate method of notifying residents of blasting activities.
Limit blasting to after 7:30am, (or 7am-7pm) not 24hr nor 7days a week, no blasting Sundays or Public Holidays.	Terramin will consult with the Community Advisory Committee to identify the most appropriate time. Blasting has overriding safety constraints in particular blasting must coincide with shift change to ensure that all personnel are evacuated from the mine during a blast.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Revise outcome to "No public nuisance impacts from airblast and vibration caused by blasting.	<b>Agree</b> this will be revised in the MARP.
Revise criteria to ANZEC guidelines: (Vibration max 10mm/sec, 5% 5-10mm/sec, airblast max 120dB, 55 115-120dB. Blasting only 0900-1700	<b>Agree</b> , Terramin have considered the vibration limits requested by PIRSA and agree to the criteria as stated: Vibration max 10mm/sec, 5% 5-10mm/sec, airblast max 120dB, 55 115-120dB. Blasting only 0900-1700 Mon-Sat, no Blasting Sundays or Public Holidays.

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Mon-Sat, no Blasting Sundays or Pub Hols) - (or consider vibration limit for non working hours that will not be felt by residents).	
Monitoring points to be specified and as agreed with Community Advisory Committee from time to time.	<b>Agree</b> to implement monitoring stations at strategic points to be identified in consultation with the Community Advisory Committee.
MARP to be revised to include blasting impact modelling.	<b>Agree</b> the MARP will be revised to include the outcomes of the Blast Impact Model.
Consider notification process to residents for blasting.	<b>Agree</b> An appropriate notification process will be developed in consultation with the Community Advisory Committee.
<b>Outcome 17.13 - Public health nuisance</b> <i>"Prevent public health and nuisance impacts from the ingestion of dust and harmful substances and odour dust associated with mining activities"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Doubts /lack of detail over dust control measures	<p>Dust control measures to be implemented as part of the environmental management plan include cladding around dust prone areas, dust extractors fitted to the crushers, a revegetation program and watering of unsealed surfaces during dry and windy conditions.</p> <p>Baseline dust level monitoring was initiated in August 2005, and this monitoring is currently being continued by Tonkin Consultants. Terramin intends to meet the EPA guideline for total suspended particle (TSP) concentrations in the air of a maximum of 90 micrograms/ m<sup>3</sup>, or no higher than that measured at the agreed off site control location. The baseline dust monitoring locations were selected by the Dust Specialist.</p>
No guarantees there will be no health impacts from chemicals or dust	Terramin guarantees that there will be no incremental health risk to Strathalbyn residents by exposure to chemicals or dust from the mining operation. This guarantee will be supported by an extensive environmental monitoring program for dust and chemicals used in mine operations.
Lead dust in rainwater tanks	The modelling performed for the draft MARP did not identify any additional risk from the deposition of lead dust. To verify this outcome, Terramin will monitor representative rainwater tanks in the area before and during mining operations. Terramin has been advised that metals such as zinc and cadmium from metal roofs will be higher than tiled roofs

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	<p>therefore the monitoring program will include representatives of each type of roof.</p> <p>The issue of lead uptake by children in areas surrounding the lead smelter in Pt Pirie were raised as a public concern in community meetings. Terramin advises that the proposed mining activities will not include smelting, the process that converts lead sulphides into the bioavailable form (oxides). Lead sulphides (galena) occur naturally in the environment.</p>
Health impacts from ventilation of underground workings	<p>Mine exhaust vent will be located between the ridge and the road. A map showing the final location will be provided in the MARP, fans will be located underground to reduce noise and dust.</p>
No odour off site	<p>Terramin has engaged the services of Tonkin Consultants to develop an odour model based on real values obtained from a similar process in Broken Hill. The main purpose of the odour model is to predict the potential distribution and intensity of any odour plume. The EPA limit for maximum change of odour from a baseline level is 2 odour units higher than an agreed reference point, or CS<sub>2</sub> below 0.042 parts per million.</p> <p>Terramin will implement management strategies to ensure that odour emissions meet the EPA criteria, and confirm that the proposed development does not expose local neighbours to unacceptable odours.</p> <p>A relative reference point will be selected well away from the council effluent ponds which are expected to generate significant odour units that would influence Terramin's monitoring program.</p>
Suggest EPA standard limit of 2 odour units	<p>Terramin will ensure air quality parameters as prescribed by the EPA are adhered to by routine surveillance of the plant and Tailings Storage Facility. Reports of odour from the mine personnel or the community will be address immediately.</p> <p>Subject to confirmation by the Odour Model, Terramin does not envisage an issue with odour from the mining operation. However, given the proximity of the Council Effluent Ponds and Landfill, the EPA limits of 2 odour units may be hard to achieve in the locality even if there were no mining activities. If appropriate, Terramin will develop a method of sampling and isolating odour sources, alternatively assume that the primary source of odour from the mine is CS<sub>2</sub> and measure the level of this gas.</p>
Doubt/ more detail on how odours from tailings dam	<p>No odours are expected to occur from the tailings dam. The Odour Model will confirm this</p>

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can be managed	assumption. Odours associated with this type of mining are associated with xanthates breaking down to the gas CS <sub>2</sub> . This reaction can be managed through changing the type of flocculants used, changing pond pH by the addition of lime and the removal of organics such as kerosene, diesel and detritus. Terramin tailings will have no organic material.
Dust to be contained on site	The containment of dust to onsite will be achieved by a variety of management plans and procedures; see previous response.
Need for baseline blood and environmental lead level data	The Health Department advises that there is no need to perform a baseline survey of blood lead levels. Environmental baseline soil lead levels are naturally high above the proposed ore body but this is mostly galena a low risk form. Terramin is not a smelter and will not generate the same lead issues as those found around old (uncontrolled) lead smelters.
Impacts on organic vegetable growing	Certified organic vegetable production will not be adversely affected by the presence of the mining operation. The main causes of soil pollution from heavy metals are irrigation with contaminated water, the application of contaminated solid wastes and the use of former industrial land contaminated by spilled oil and industrial wastes. Terramin will not be discharging into the environment.
Transport and use of toxic chemicals (e.g. Xanthate)	An inventory of all MSDS for the chemicals used and stored on the mining lease will be prepared as part of the environment management system. Hazardous materials brought onto and used onsite will include: zinc sulphate, SE Xanthate, SIB Xanthate as well as copper sulphate. Other potentially hazardous material may include sodium metabisulphate or sodium cyanide, dependant on the final extraction method chosen.  All potentially hazardous material to be brought onsite will be handled, used and stored according to the manufacturer's MSDS. The instructions for storage and usage for each chemical will be strictly followed. Appropriate training will be undertaken by all contractors and employees to ensure handling and use of potentially hazardous material is as prescribed. Safety audits will be undertaken on a regular basis on a frequency of no less than once a year.
Monitoring of dust levels on boundary of operation	Six gravimetric dust sampling locations have been specified on the mining lease boundary. Two high volume samplers are currently running on a six day cycle to collect background to monitor TSP and dust lead data these will be strategically relocated to during the construction phase in consultation with the EPA.  The limit for lead concentration in dust is set by the NEPM standard; lead < 0.5 micrograms/

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	$m^3$ (no exceedences of this concentration), $PM_{10} < 50$ micrograms/ $m^3$ (up to 5 exceedences per year).
Monitor $CS_2$ levels - to be below 0.042parts per million (WA EPA)	Terramin agree to ensure that the concentrations of aerosols developed by the operation are within the limits prescribed by the SA EPA.
Risk of zinc metal or oxide dust ingestion	The risk of ingestion of metal or oxide dusts for the surrounding community will be no greater than currently exists. Terramin will ensure that levels of all EPA prescribed contaminants fall within acceptable limits at all times. Environmental Management and Occupational Health and Safety Plans are being developed to protect the health of employees and contractors working onsite.
Higher stress levels for residents due to noise, traffic, fear of contaminated rainwater	Terramin will alleviate community concerns regarding contamination by having an Environmental Management Plan that ensures transparency through annual reporting to the EPA to confirm that all management measures are meeting the stated outcomes.  All public complaints/concerns regarding noise, water quality, odour and dust will be recorded and addressed in a timely manner. Terramin intends to communicate with the general community through the Community Advisory Committee and envisages this as a medium to alleviate any mine related community stress.
Compensate affected landowners with double glazing, air-conditioning, filters for rainwater tanks	Terramin does not anticipate the need to provide compensation in these forms, because it intends to comply with the stringent EPA noise, air and water quality guidelines.
No compensation if objectives not met - no confidence in ability of regulators to enforce requirements.	Terramin will comply with the legislation regarding compensation as required by law. Any compensation for breaches of appropriate standards is prescribed by relevant legislation e.g. the Mining Act. The role of governmental regulators in enforcing requirements for environmental performance is enshrined in legislation.
Lead concentration limit to be NEPM std: lead<0.5ug/m3 (no exceedences per yr) and (PM10) <50ug/m3 (5 exceedences per yr).	Terramin will comply with the limits for environmental conditions as prescribed by the SA EPA, as outlined in the MARP. Current modelling and metallurgical trials suggest that these conditions will be met.
Need for odour / HCN modelling	Odour modelling is currently being developed by Tonkin Consultants. This is being developed in adherence to the requirements for modelling prescribed by the EPA.
Need to demonstrate no risk from hydrogen cyanide	If Cyanide is to be used in the process, the risk assessment in the final MARP will be

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volatilisation for flotation process.	upgraded to include any potential for volatilisation of HCN. It is unlikely that HCN will be generated as the pH of the pulp is around 9 for lead floatation and 10 for zinc floatation.
Dust/emissions risk should also assess potential for PM10, CO, SO <sub>x</sub> , VOCs, NO <sub>x</sub> and asbestos.	Terramin will comply with the limits for environmental conditions as prescribed by the SA EPA and the NEPM standard for these parameters. Terramin does not anticipate any significant risks from particulates, excessive combustion emissions or asbestos. The risk assessment in the final MARP will be upgraded to include these parameters.
Risk is HIGH extensive monitoring required using modern technology	Terramin and the external consultants employed in the MARP process have identified 20 out of 80 aspects of the mining process that are potentially high risk. All aspects, regardless of assessed risk level, have been carefully considered. Control processes will be put in place to deal with all risk identified; measures to control risk will include the elimination of risk, substitution for a safer process, the implementation of engineering processes to reduce risk and the application of administrative controls. All monitoring programs that will be implemented will employ the most appropriate technology available for the task, including the use of NATA accredited laboratories.
Need to assess PM2.5 risk and set appropriate standards	Terramin will comply with the particulate limits for environmental conditions as prescribed by the SA EPA. There are no standards for PM2.5 but Terramin will if indicated by the standard monitoring equipment, use the recommended NEPM for PM <sub>2.5</sub> of 25 micrograms/ m <sup>3</sup> (daily average) and 8 micrograms/ m <sup>3</sup> (annual average).
If adverse weather conditions, close down operations temp	Terramin does not envision any adverse weather conditions occurring that have not been included under the modelling conditions used to engineer the plant. However, Terramin places the highest priority on safety and all necessary measures will be taken to protect the lives of its employees and the community if an unforeseen weather pattern occurs.
More detail on ore composition required	The heavy metals in ore are in the sulphide form as outlined in Section 5.3 of the MARP.
Baseline monitoring of blood lead levels not required	Terramin accept the decision from the Health Department that baseline monitoring of blood lead levels is not required.
Need to ensure lead bearing dust is not transported offsite by workers	Lead dust will not be transported offsite by workers due to the implementation of environmental management plan. This plan is will incorporate standard mining industry practice for Occupational Health and Safety, which include measures such as clothes change and showering prior to leaving the site.



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Baseline dust monitoring required	A baseline dust monitoring is currently being implemented prior to the construction and operational phase. This information will be used in the environmental management plan to monitor performance against background conditions.
Effluent ponds are incorrectly referred to as "grey water ponds", but present risks to public health due to pathogen content.	Effluent ponds are recognized to carry a potential risk from pathogenic infection, usually occurring through direct contact with impacted material. Terramin does not intend to use water from the effluent ponds and is currently undertaking a survey to assess if leakage from the ponds could possibly seep into the underground mine or contaminate mine water.
Appendix P (Blood lead Management Guidelines) is incomplete requires revision.	Terramin to address in the final MARP and in consultation with the Department of Health.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Revise outcome to "No public health, loss of amenity and nuisance impacts to local residents from air emissions, dust and odour generated on site".	<b>Agree</b> this outcome will be revised in the final MARP.
Consider baseline monitoring of rainwater tanks and establishing monitoring criteria.	<b>Agree</b> , Terramin will sample and test water from representative rainwater tanks in the potential impact area and a control site in a non-impact area for future reference.
Consider baseline monitoring of existing dust levels.	<b>Agree</b> , a dust baseline survey is currently underway; results will be included in the MARP.
Dust concentrations to meet EPA advised limits and using EPA preferred monitoring technology.	<b>Agree</b> to this condition. Terramin is currently conducting baseline dust monitoring based on NEPM dust criteria and using the methodology used by the EPA. The preliminary results will be included in the final MARP.
Dust monitoring points and acceptable dust levels to be specified in consultation with the Community Advisory Committee from time to time.	<b>Agree</b> , Terramin will consult with PIRSA and the Community Advisory Committee to select appropriate sites based on the results of the baseline studies.
Review air emissions risk to include all possible health and nuisance effects including daughter products (eg HCN, CS <sub>2</sub> , ZnO, PM <sub>10</sub> , PM <sub>2.5</sub> etc)	<b>Agree</b> to review air emissions risk to include all possible health and nuisance effects within practical and acceptable industry standards.
Detail management strategies and demonstrate outcome able to be met.	<b>Agree</b> , Terramin will review the management strategies in the draft MARP and update it to include the recent changes, particularly the implementation of the NO DISCHARGE policy

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	and provide more detail and show how the proposed outcomes will be achieved.
Review Appendix P	<b>Agree</b> to review Appendix P in the final MARP
Include missing section 7.1 in revised MARP.	<b>Agree</b> editorial changes to the final MARP will include renumbering to include Section 7.1
<b>Outcome 17.14 – Fire</b> <i>"Prevent fires onsite, and if unavoidable, control to ensure no off site impacts"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Risk posed by concentration of flammable/explosive chemicals	Storing flammable chemicals carries a high risk, but engineering measures to negate this risk are well established for example urban petrol stations. Terramin will reduce this risk by storing as little flammable or explosive chemicals on site as absolutely necessary and will implement all the engineering measures developed for the storage and handling of such chemicals. This will be reviewed and if necessary updated in the final MARP.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Outcome adequate, but change "Prevent" to "no"	<b>Agree</b> to this change in the final MARP
Review risk assessment to include risk posed by storage of flammable and explosive chemicals.	<b>Agree</b> this was done in the initial risk assessment but it will be reviewed and if necessary updated in the final MARP.
<b>Outcome 17.15 – Seismic</b> <i>"Prevent damage to public infrastructure, injuries/deaths and pollution of the environment resulting from seismic induced catastrophic failure of mine infrastructure"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Risk of seismic action and reactive soils	Terramin has, and is continuing to address the issues and potential risks associated with both seismic activity and reactive soils, especially with the potential for failure of engineered structures. Engineering structures are being developed under stringent modelling assumptions for seismic activity (e.g. Operating Basis Earthquake 1 in 100 Annual Exceedence Probability; Maximum Design Earthquake 1 in 1000), and reactive soils, as well as significant potential meteorological events (e.g. 1 in 100 year storm events).
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Delete outcome, covered under Acid Mine Drainage	<b>Agree;</b> this outcome will be removed from the final MARP.

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outcome	
<b>Outcome 17.16 - Vertical openings/Site security</b>	
<i>"Prevent public injuries/deaths resulting from unauthorised entry to the mine site"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
No comments received	
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Outcome adequate, but change "Prevent" to "no".	<b>Agree</b> to make this change in the final MARP.
<b>Outcome 17.17 - Geotechnical stability</b>	
<i>"Prevent damage to public infrastructure and injuries/deaths resulting from pillar failures both during and after mine closure"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Risk of effluent pond collapse due to mining - who will be liable for repair of damage?	The underground mine will be under the current Strathalbyn effluent ponds. The geotechnical investigations currently underway suggest that a 30m vertical pillar will provide enough stability to ensure no surface collapse. A Geotechnical Report will be completed on the final crown pillar design.
Risk acid generating tails will weaken cemented tailings underground	Terramin plans to trial tailings and cement mixtures to ensure that their engineering properties meet the highest safety standards.
Callington-Goolwa Rd integrity must be protected	Terramin is preparing engineering reports investigating the most appropriate approach to developing the lease. The under-road excavation Terramin will provide engineering structures and geotechnical support to ensure the integrity of the overlying roadway is maintained.
Potential for surface subsidence of Tailings Storage Facility if located over ore extraction areas	The Tailings Storage Facility will not be located over the underground mine. Backfilling of stopes was described in Section 6.6 p 65. Geotechnical stability issues were addressed in Section 17.21 - p102 Appendix T. It is Terramin's intention and current mine practice to undertake routine geotechnical assessments of the stability of the underground mine.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Outcome adequate, but change "Prevent" to "No"	<b>Agree;</b> this change will be made in the final MARP.

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Review monitoring criteria to demonstrate no voids left underground that could allow surface subsidence to occur.	<b>Agree</b> to review these monitoring criteria to include geotechnical measures to demonstrate underground stability.
<b>Outcome 17.18 - Visual impact</b> <i>"Minimise visual impact of site and operations"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Lighting at night to focussed down, or operations enclosed - so as to not be visible from town.	The lighting at the head of the portal and around the plant will be directed in such a way that it does not unduly influence the scenic amenity of the town.
Screening of tailings dam from town - if vegetation to be used, when will this be effective.	Terramin anticipate that planting of vegetation to screen the Tailings Storage Facility will commence as soon as practical after construction. Terramin has engaged a local revegetation consultant to plan the revegetation program with the objective of achieving a cover as soon as is naturally possible.
Locate plant in existing quarry, not on exposed sthn hillside, or locate away from town.	All alternatives for locating the plant have been investigated to ensure minimum disruption to local amenity.
Need to clarify how large and visible the stockpiles will be.	Terramin intends to maintain a low profile with the ore and waste rock stockpiles. These are not expected to have visual impact. More detail will be provided in the final MARP.
Visual aspects of large ugly trucks on road	Terramin intends to use local contractors to transport concentrate to Port Adelaide, the trucks will be indistinguishable from ordinary trucks currently utilizing the roads. In addition Terramin has agreed to the request of not allowing concentrate trucks to pass through Strathalbyn.
Plant visible to local residents - which roads will be used to determine if visible or not?	The observation points for determination visual impacts will be made in consultation with the Community Advisory Committee. Building structures will have a low profile design, and be painted in eucalyptus green or similar earth tones. Vegetation screens and natural hills will also provide ample screening from all main roads and most rural roads.
Tailings dam not to be increased in height from initial approval	Terramin agree to comply with all approval provisions. The approval process for the Tailings Storage Facility is guided by several government departments, including PIRSA and EPA. Terramin will not exceed any of the conditions agreed to with the appropriate regulators during the development of the Tailings Storage Facility.

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Buildings to be painted in earth tones	Terramin agree to comply with all approval provisions, including painting all structures in appropriate colours and tones (currently looking at eucalyptus green) to ensure that local visual amenity is not unduly influenced by the presence of the structures on this site.
If plantings are used to screen, use local species to increase biodiversity in region	Terramin plan to utilize local indigenous native plants for the revegetation of the mining lease. The exact species composition will be developed in consultation with local revegetation specialists and recommendations from DEH.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Revise outcome to "Improve visual impact and amenity of site"	<b>Agree</b> , this change will be made in the final MARP.
Review criteria to demonstrate improving appearance of site only, not to be no worse than current"	<b>Agree</b> , criteria in the final MARP will be selected to demonstrate the improvement of site appearance.
Review criteria to include night lighting impacts.	<b>Agree</b> , criteria for night light impacts will be included in the final MARP.
Monitoring points on public roads to be specified and as agreed with Community Advisory Committee from time to time.	<b>Agree</b> to this change and the final MARP will be upgraded to reflect this.
Structures to be painted in non-reflective earth tones.	<b>Agree</b> to use non-reflective earth tone – eucalyptus green paint will be the colour of choice wherever practical.
Vegetation screens to be local native species where practical.	<b>Agree</b> , Terramin has commissioned a revegetation consultant to provide a list of appropriate native species and a cost estimate to implement the revegetation program.
Include more detail on visual impacts arising from final infrastructure design and develop management plan.	<b>Agree</b> more detail will be provided on visual impact in the final MARP.
Night lighting to be designed to avoid light spillage to adjacent areas.	<b>Agree</b> to implement this design criterion.

<b>Outcome 17.19 – Fauna</b>	
<i>"Prevent impact of site operations on native fauna"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Threats to wildlife in general area and in Tucker's swamp area (especially frogs - sensitive to low level toxins). Swamp is breeding area for vulnerable birds. Need to consider implications of groundwater impacts on wetlands.	The general threat to wildlife will be mitigated by the provision of local indigenous plant revegetation procedures. Progressive revegetation will enhance local biodiversity through the planting of indigenous flora, and by the provision of habitat for indigenous fauna. Such habitat is currently absent for the most part on the mining lease area.  Part of the Terramin commitment to environmental management of groundwater is to ensure groundwater and surface waters are not contaminated by any of the operating or construction processes.
River black fish (protected), Mountain Galaxis, Carp Gudgeon in Angas river and not mentioned in MARP.	These species were not recorded during the site survey, this does not mean that they are not present therefore Terramin will include these submissions on the species list and attribute sources.
Risks to birds and fauna (especially rare and vulnerable) from cyanide, heavy metal toxins etc in Tailings Storage Facility.	There will be no water in the Tailings Storage Facility for most of the year. Cyanide if used at all will not be at toxic levels in tailings (predicted to be around 2 parts per million in tailings. Pond pH is anticipated to be alkaline during mine operations and therefore toxic metal levels in puddles would not be expected.
Fauna survey required especially migratory birds.	A literature search and another fauna survey will be commissioned this may need to allow for seasonal variation to record a wider range of species.
One weed species of national significance has been identified on site -weeds need to be managed.	The introduction of weeds will be significantly less than current land use practice where stock and stock feed are imported. Terramin will implement a weed management program based on the weeds species found.
Need to ensure infrastructure areas are designed to avoid traps for ground dwelling fauna.	Consideration to prevention of entrapment of ground dwelling fauna will be made in all infrastructure design. Part of the environmental management plan will include checking and reporting any incidents where native fauna are threatened by any building or process associated with the proposed development. Terramin will erect fencing to prevent large animals from wondering onto the property.
Need to implement phytophthora management	Phytophthora is a soil borne pathogen, which can be transmitted by vehicles travelling through contaminated sites. The main vehicles leaving and entering the property will use

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	sealed public roads. A vehicle wash bay designed to remove potential lead bearing dust will also provide significant protection from phytosphora.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Revise outcome to "No net negative impact of site operations on native fauna in lease area and in adjacent areas".	<b>Agree</b> to this change.
More detail required on fauna present in area.	<b>Agree</b> this will be provided in the final MARP.
Need to include risks from weed propagation.	<b>Agree</b> to include an investigation of this risk.
Review criteria to include weed/phytosphora management criteria.	<b>Agree</b> to include criteria for weed and phytosphora management.
More detail required on weed and phytosphora management strategies.	<b>Agree</b> to include detail regarding the management strategies for weeds and phytosphora.
<b>Outcome 17.20 - Stakeholders</b>	
<i>"Maintain good relationships with local community and minimise other negative impacts on public amenity and values"</i>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Will restrict future growth and development of town, impact existing business	Terramin anticipates that mining will increase the local population with new workers for the construction and operation phases and will increase demand on local produce and services. The associated economic benefits of such a significant employer in the area should have flow-on benefits for local existing businesses.
Impact on quality of life (non specific)	The Strathalbyn mine is a small operation which will contribute significant quantities of zinc and lead to common everyday applications such as the automotive (batteries), building (galvanising) and skin care (sun screen) industries.  The mine will provide direct employment in the region, which will add value and quality to the life of those currently unemployed from recent lay-offs caused by the downturn in the manufacturing and wine industries.  The small increase in population will have on-flow effects on the service industry in

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	<p>Strathalbyn such as retail shops, schools, churches and medical services.</p> <p>Terramin is putting a significant effort into protecting the environment; the benefits of the proposed development will outweigh any perceived impacts of mining.</p>
May cause labour shortage for other business (e.g. vineyards)	<p>Mine employees are generally drawn from a different skill based pool. Vineyards generally employ seasonal workers and tap a transient work force; the wine industry is currently experiencing a down turn therefore any additional work in the district will help moderate the impacts.</p>
Lower property values	<p>Terramin anticipate that property values in the region will increase, directly because of the premium being paid for property by the mine and due to the increased demand for accommodation by mine workers and any associated flow on business.</p>
Impacts on electricity and water supplies SA water and ETSA to confirm infrastructure sufficient	<p>Terramin does not anticipate any impacts on the supply of electricity, more details will be provided in the final MARP. A conceptual water recycling circuit was presented in Appendix K of the MARP. This conceptual plan has been modified to allow for the higher water recovery anticipated from using "thickened" tailings storage. Current hydrological modelling indicates that around 5 -7 l/s of groundwater will come from dewatering the underground mine. This combined with recycled water particularly from the thickeners will meet all process needs.</p>
Effect on heritage/wine/food tourism	<p>The proposed mine at Strathalbyn is to be located in an existing quarry and is adjacent to a landfill and the Strathalbyn sewage effluent pond. Terramin argues that the proposed land use will not be out of place with the current land use.</p> <p>Terramin is developing a transparent environmental monitoring and reporting program that will enable the community to assess the outcomes and build confidence in the operation of the proposed mine.</p> <p>Strathalbyn was the location for Australia's second mine; mining is actually part of the heritage of the region. Terramin does not expect to affect heritage, the quality of wine or food or detract from the tourism industry. On the contrary it anticipates that its employees will support the heritage and will contribute to the growth of the current local industries.</p>
Better to mine now rather than later, before town expands	<p>Mining is driven by demand for its products, at present the demand for zinc and lead is very high, therefore mining at this time will ensure the best returns for this natural resource are</p>



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	achieved. The proposed mining development will be a part of the community and will contribute to its development in a sustainable manner.
Positive impacts on commerce, employment, education, health/hospital services, transport in the town	Terramin will show preference to local service providers based on quality and price competitiveness.
Positive effect on community sponsorship.	Terramin has provided a commitment to direct resources towards the development of local community groups and activities.
Will improve ugly site	Terramin are committed to providing a natural habitat to a site that is currently degraded, especially with respect to local flora and fauna. The planned revegetation program will enhance the attractiveness of the site above its current state.
Vermin control will improve environment for native flora/fauna in area	As the site currently stands, some of the motor vehicle wrecks and a degraded grazing area provide habitat for introduced flora and fauna, which have the potential to inhibit or degrade the biodiversity of native plants and animals. The removal of the feral habitats, as well as the planned revegetation program, will significantly improve biodiversity.
Mains water supply on Callington Rd will be upgraded.	Terramin has no authority on mains water supply; by using available water from mine dewatering and runoff from stockpiles, and recycling process water Terramin aims to become self-sufficient with water for processing purposes.
May address environmental impacts of existing effluent ponds	The local council is currently responsible for the management of human and environmental health risks associated with the effluent ponds. Terramin is willing to cooperate with the Alexandrina Council in improving the environmental conditions around the effluent ponds.
Employment only short term	Terramin anticipate a mine life of 5-7 years, and will require a fulltime workforce for that period. Short term contracts and employment will also occur during the construction and closure phases of the project.
No certainty new jobs created will attract new residents	Terramin already has a workforce of both local and non-local residents and anticipates that this trend will continue into the operational period. Several Adelaide based engineers will probably move to Strathalbyn on mine start-up.
Impact on Strath Model aircraft club - what happens to them?	No anticipated effect on model aircraft club. The mine is physically separated from the club by pastures. The mine lease will have no large buildings, and will not influence the ability

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	of the model aircraft club to operate as it currently does. It is unlikely that any remotely controlled devices in use in the lease area or radio frequencies will interfere with the frequencies used for model aircraft operation.
Use of effluent ponds for water source may leave recreation grounds without water	Terramin does not currently see any value in the use of the effluent pond water for use in the mining process, owing to the risk posed to human and environmental health from the pathogens present in the pond water. All planning regarding the water required for mining operations is based on the presumption that water will be accessible from other cleaner sources. As such, Terramin does not see other users of the water of the region being disadvantaged in any way.
Will the new substation the mine is proposing give benefit to residents (i.e. more secure supply?)	Terramin does not anticipate any impact on local electricity grid, more details on power supply and affect on local community will be provided in the final MARP
Terramin promised sponsorship to clubs other than sport, but have only sponsored football club.	Terramin has made a commitment to contribute to the social life of the region. This commitment is ongoing, and other applications for sponsorship will be considered.
New residents may not contribute to social life in town due to long shift work.	The contribution by Angas employees to the social life of the region will depend on individual circumstances, as would occur with any new resident who chooses to re-locate to the region.
Process to inform and deal with landowner access issues not good	Terramin has made every effort to ensure open dialogue with local residents is maintained. More information sessions and individual consultations regarding access issues are ongoing. A local consultative committee has been established by PIRSA and terms of reference are currently being formulated.
Need for more consultation including formation of consultative committee esp. closure issues	<p>PIRSA is in the process of forming a Community Advisory Committee. The preliminary terms of reference for this committee have been prepared for consideration by Community Advisory Committee.</p> <p>In line with Terramin's commitment to achieving the desired environmental outcomes, planning for mine closure is at an advanced conceptual stage. Closure Planning is required by regulatory bodies such as PIRSA and EPA at an early stage in the permitting process. Terramin will engage the Community Advisory Committee throughout the mine life particularly in the process of closure planning.</p>
Want measurable objectives (not world's best	The MARP cites a number of quantifiable environmental objectives for the mine. Specific

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practice).	criteria for a number of environmental aspects are prescribed by government agencies; Terramin has agreed to adhere to these criteria.
Severe penalties for not meeting objectives.	Penalties for not meeting environmental objectives and breaches of condition are prescribed in relevant legislation.
Want problems prevented, not punished after they occur	The application of putative measures enforced following a breach of any condition of the mining lease or affiliated environmental monitoring, will generally represent a financial penalty as well as a duty to repair. Terramin believe such outcomes are negative from both an environmental and economic basis. As such all processes and engineering are being designed from the ground up to meet, at a minimum, the environmental responsibilities of the company.
Site already degraded due to presence of landfill, quarry and effluent ponds	Terramin recognise the nature of the site as it currently stands, and as part of the closure planning process will ensure that after remediation, the environment will be significantly improved relative to its current condition.
Location of mine in quarry will minimise off site impacts	<p>The access to the underground mine, vent shafts, plant and building structures will be placed within the quarry footprint, with the exception of the Tailing Storage Facility.</p> <p>Terramin is currently investigating other locations that may provide even greater social and environmental advantages and minimise off site impacts. The underground mine can not be relocated from the ore body; however, if a better site for the above ground structures is located and subject to purchase of property and planning approval, Terrain will consider relocating these structures.</p>
Management of issues critical to maintain amenity, given close proximity to Strathalbyn	Terramin recognise the importance of the planning process to ensure that the visual amenity of the region, which is crucial to the nature of the town of Strathalbyn, is maintained. All efforts are being made to ensure that the mine and associated plant fit as unobtrusively as possible into the existing environment. Measures such as extensive revegetation using native plants as screening and painting any built structures in neutral tones (as advised by Planning SA) are being pursued.
Section 7.1 on power supplies missing.	Terramin to make appropriate amendments to the final MARP
No evidence that grid capacity is sufficient	Terramin has been advised that there is sufficient capacity but will confirm this in the final MARP.

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<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Rename "social impacts".	<b>Agree</b> to title change
Delete outcome and replace with "No net impact on social amenity and economy of Strathalbyn community".	<b>Agree</b> to this condition. Terramin believes that it will have a net positive impact on social amenity and the economy of Strathalbyn and assumes that these are desirable outcomes.
Develop criteria to measure social amenity and economic impact of mine, in conjunction with Community Advisory Committee.	<b>Agree:</b> Terramin will, in conjunction with the Community Advisory Committee develop the required criteria and include details in the MARP. However, Terramin anticipates these criteria will include the monitoring and recording of elements of social amenity "i.e. noise, dust and odour" and confirm that these elements are all within regulatory guidelines and, therefore, not impacting adversely on residents.  Economic benefit will include measurement of jobs wages, payments to local suppliers of goods and services and the flow-on effects of these outlays to local enterprises.
Document all social and economic benefits of proposal.	<b>Agree</b> to document social and economic benefits in the final MARP. Preliminary assessment suggests direct economic benefits will arise from job creation, services and around \$6 million in wages that will be spent in region.
Establish outcomes relating to water and electricity supply.	<b>Agree;</b> Terramin will place control measures to ensure that its operations will not cause an overload to the electricity grid or reduce main water pressure by using more than its agreed allocation.
Must where possible and practical, engage local contractors and suppliers, and preferentially employ local residents.	<b>Agree;</b> Terramin has already employed local residents and will continue to do so.
Demonstrate no impacts on electricity and water supply.	<b>Agree</b> Terramin will become self-sufficient in water supply for the processing plant and is currently undertaking an engineering review of the electricity supply, details will be provided in the final MARP
Must form and maintain Community Advisory Committee, with terms of reference as specified by PIRSA.	<b>Agree</b> Terramin agree to participate in a Community Advisory Committee to be formed with terms of reference as specified by PIRSA

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Review adequacy of emergency services to cope with an emergency onsite	<b>Agree</b> to meet with the Emergency Services to evaluate their capability to meet an emergency related to mining activities.
<b>Closure</b>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Long term liability of tailings dam (may end up with the community to fix and monitor)	<p>As part of the planning process, Terramin has developed a Mine Closure Plan. In the nine months since the original draft plan, consultation has indicated the need for ongoing monitoring of the site. Terramin is currently negotiating with the EPA and other relevant bodies regarding the specific details of such monitoring. The EPA has suggested the potential for an environmental bond to be lodged, as well as financial provisions for monitoring over an extended period.</p> <p>Terramin intends to close the Tailings Storage Facility at the end of mine life in a stable, safe and environmentally responsible manner. To achieve this Terramin intends to landform the tailings to be water-shedding and apply a geofabric above the thickened tailings to prevent water passing through the tailings. This will be covered with a layer of soil and revegetated. The soil cover and revegetation program will be trialled during mine operations so that refinements to the final Tailings Storage Facility cover can be made prior to closure. Monitoring will continue for a reasonable period of time to confirm the integrity of the closure structures, as determined in consultation with the relevant regulatory agencies.</p>
Long term residual, liability re health effects	As with the construction and operational phases, Terramin has agreed to meet environmental objectives that ensure public and environmental health are maintained during and after the closure phase for the mine. Terramin will ensure that all requirements prescribed by the relevant agencies are adhered to.
Will vegetation grow on tailings dam given contamination	On closure the Tailings Storage Facility will be capped with an impermeable layer to prevent movement of water in and out of the tailings, and a soil cover layer. Revegetation will consist of planting native shrubs and grasses which should prosper on the soil cover. Native grasses are important habitat for small indigenous fauna currently precluded from existing land uses.
Rehab required beyond working life of mine	The Mine Closure Plan has provisions for the monitoring and rehabilitation beyond the working life of the mine. The closure phase monitoring will continue for as long as is required to demonstrate that the site is in a stable, non-polluting condition. This is a

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	requirement for the release of the environmental Bond.
Potential to lower value/damage land post rehabilitation	The minimum requirement for rehabilitation of land as currently prescribed by government agencies is that the land is returned to its state equivalent to that in existence prior to the initiation of operations. The current mine closure plan will lead to an environment that exceeds these minimum requirements.
Post mine land use not clear (reopening as waste disposal may not be allowed)	<p>The site has been divided into four separate domains based on geological, ecological, operational and current land use. The current closure plan is based on these divisions:</p> <p><u>The North Domain</u>, which includes some areas of revegetated land, will be restored as close as possible to its current state.</p> <p><u>The Buffer Domain</u>, which currently has residential premises as well as some cropping systems in place will remain relatively untouched during the operational phase, and as such any remediation will be minimal.</p> <p><u>The Central and Southern Domains</u> are the two areas where the topography, catchment characteristics and vegetation cover may be modified. Minimum remediation requirements will be to remove all mine structures seal the mine portal and vent shaft, reshape the landform and revegetate before returning the site to its original land use.</p> <p>The final land use after remediation will be developed in consultation with the current land owners, the Community Advisory Committee, local and state government and stakeholders.</p>
Establish trust fund to compensate for impacts	As part of the environmental management directives of Terramin and the prescriptions made by appropriate licensing bodies, including the SA EPA, it is likely that an environmental bond will be established at the outset of the project which will be used to ensure licensing requirements for returning a site to an agreed condition are achieved.
Need to demonstrate Tailings Storage Facility will be stable and non polluting	Terramin's consultants are finalising the design of the Tailings Storage Facility, this will be followed by a risk based assessment using the criteria developed by PIRSA engineers specifically for the Angas Mine to demonstrate the integrity of the Tailing Storage Facility and that it will meet the desired outcomes. The environmental monitoring program will demonstrate that the Tailings Storage Facility is stable and non-polluting.
3yr post closure monitoring program may not be sufficient, need to model appropriate monitoring period	Terramin agrees to the ongoing monitoring of the site as part of the closure process, as prescribed by relevant agencies. It is envisaged that monitoring will continue until the site has stabilised. Terramin has engaged geochemical and hydrogeological consultants to model the time delay for any potential contamination from the underground mine or Tailings

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	Storage Facility to reach the monitoring bores. The duration of the post closure monitoring program will be objective/criteria based and depend on the time lag for any contamination to appear plus a considerable margin for error. If 3 years is not sufficient Terramin undertakes to extend the monitoring period.
Proposed closure plan complies with Development Plan policies.	Terramin are pleased to note Planning SA comment that the draft Mine Closure Plan complies with the relevant policies. Terramin aim to comply with all of the requirements for planning and development prescribed by statutory bodies.
LEMP for Tailings Storage Facility required to be developed, may require monitoring/bond for up to 25yrs.	Terramin will continue to consult with the relevant bodies to ensure all of the necessary licensing requirements for all aspects of the mining operation are developed as required. Terramin will abide by the requirements of PIRSA and the EPA in their "Guidelines for the Management of Acid Mine Drainage at the Proposed Angas Zinc Project, Strathalbyn, South Australia".
Need to specify what native species will be used in rehab	The native species that may be included in site rehabilitation are those described by Natural State during a flora survey of the site. Terramin has engaged this consultant to develop a revegetation program for each domain and to take into consideration the final land form and soil type.
Need to monitor for soil erosion post closure	Terramin acknowledge the potential risk to the environment posed by soil erosion. Considerable engineering effort has been directed into designing stable land forms using appropriate soil materials, compaction where required or revegetation. All these efforts will prevent soil erosion. This will be verified post closure by the use of photo-point surveys of erosion prone areas. Terramin undertakes to remediate and revegetate any minor erosion if it occurs and will continue to do so until the site is declared stable.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Include outcomes for closure, e.g.: "Upon mine closure, the site (including the Tailings Storage Facility) is to be left in stable, non polluting state". "Upon mine closure, the site to be returned to current land use, consistent with the Strathalbyn development plan and determined in conjunction with the Community Advisory Committee".	<b>Agree</b> Terramin intends to leave the Tailings Storage Facility and any mine disturbed land in a stable non-polluting state and intends to demonstrate the effectiveness of the closure plan by monitoring after mine closure.  Terramin will propose a closure plan in the MARP, which will be subject to further development through the Community Advisory Committee.

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Completion criteria and timeframes for monitoring to be developed in conjunction with EPA and PIRSA	<b>Agree</b> Terramin will propose completion criteria and timeframes for the full environmental monitoring program including post-closure monitoring in the final MARP, but will continue the consultation process with the EPA, PIRSA and the Community Advisory Committee through the operating life of the mine.
BOND not to be refunded until PIRSA, EPA satisfied completion criteria are met.	<b>Agree</b> to an environmental bond but Terramin requests that clear responsibilities and achievable milestones are established in consultation with PIRSA and its stakeholders.
<b>Other Issues</b>	
<b>Issue</b>	<b>Action to be taken by Terramin</b>
Potential for further future leases, or operation beyond 7 years, conversion to open cut, establishment of smelter.	Open cut mining and a smelter are much larger scale projects than the defined ore body could support. Even if this was feasible all development proposals would have to be addressed on their own merits. Open cut mining or the building of a smelter would not be viable and will not occur.
Greenhouse gas emissions from power usage.	Terramin has a policy for using energy efficient equipment where available. The exact details of the methods to achieve energy savings to limit greenhouse gas emissions will be provided in the environmental management plan being developed.
Uncertainty over size	Terramin does not envisage the need to expand the above ground facilities in size. Future exploration may uncover new resources but any extensions beyond that proposed in the MARP will need further approval.
Environmental monitoring to be conducted by independent authority	PIRSA and EPA will implement additional monitoring over and above those monitoring programs implemented by Terramin. All monitoring of environmental objectives by Terramin will meet the minimum standards for analytical techniques required by the relevant regulatory body.  The location and timing of environmental monitoring sampling will be agreed to between Terramin and the relevant regulatory body, and in consultation with the Community Advisory Committee.
Monitor at High school on Callington Rd - could be used as part of curriculum.	There is scope to develop this concept; Terramin would be interested in exploring this possibility further, subject to strict quality control and safety measures.



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<p>Risk of pollution if electricity supplies fail.</p>	<p>Under the NO DISCHARGE policy electricity failures have been considered in the engineering design. For example the Tailings Storage Facility has been designed with over capacity in the event of pump failure during an extreme storm event. The storage capacity is for twice the runoff that would occur if the worst 5 day rain event recorded in Strathalbyn history was to fall in one day, and this excludes a one metre freeboard around the facility to allow for wave action.</p>
<p>MARP should better characterise proximity to housing, (Burnside area) schools , hospital etc (section 3.3)</p>	<p>This suggestion for showing the location of schools, hospital etc will be included in the final MARP.</p>
<p>Climate data at mine (esp. wind directions) may differ from Strathalbyn due to local topographic effects or fails to account for predicted climate change</p>	<p>Local topographic and microclimate difference will be negligible over such a short distance as that between the racecourse Bureau of Meteorology station and the mine. The overriding meteorological information required for the design stage is the mean direction and strength of wind, and precipitation intensity and duration. These are expected to be relatively similar over the small distance between the mine and the Bureau of Meteorology station. Terramin will install a weather station on site for environmental management and reporting purposes.</p> <p>Climate change models are currently not robust enough to provide reliable information on a local scale; however, Terramin has designed critical structures such as the Tailings Storage Facility to withstand extreme climatic conditions experienced within the climate region.</p>
<p>Emergency services must be supplemented to respond to accident on site.</p>	<p>Terramin intends to support the local Emergency Services. The exact form of this support will be developed in consultation with the local emergency services.</p>
<p>Risk assessment inadequate - too many are still rated "medium" after control measures, (especially social impacts); some have not rating due to lack of information, and risks should be assessed independently.</p>	<p>The original risk assessment was based on qualitative evaluations of likelihood and consequence. The level of acceptable risk is based on social and company expectations. The hierarchical procedure of the risk assessment method used is particularly conservative.</p> <p>Terramin has implemented control measures on previously higher levels of risk and changed its plans accordingly. It was this process that led to the changes incorporated in the NO DISCHARGE policy and these additional engineering measures required.</p>
<p>Increased lead impacts on residents of Port Pirie.</p>	<p>Most if not all of Terramin's concentrate is destined to overseas markets where it will be smelted to produce lead and zinc. No processing of Terramin concentrates will occur at the Angas Mine site.</p>

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More baseline environmental sampling required (not specified)	Initial baseline water quality data was presented in the MARP (Section 6.5 Table 5) but an extended program is being implemented to measure more water quality parameters in both the existing and proposed wells. Terramin has already undertaken a baseline noise survey which was reported in the draft MARP and is in the process of collecting background dust data which will be reported in the final MARP.
Contingencies for premature closure or sell off part way through.	Once the environmental bond has been lodged with the State Government, Terramin will be unable to reclaim the bond until the closure outcome is achieved as required.
<b>Action Requested by PIRSA</b>	<b>Terramin's reply</b>
Lease operations limited to processing only ore recovered on the lease area.	<b>Agree</b> to this outcome.
If size of operation increases beyond 2.5Mt reserves, MARP will be required to be reviewed.	<b>Agree</b> to this condition. Terramin intends to keep PIRSA informed of all significant exploration developments.
Community Advisory Committee to consider value of establishing environmental monitoring location in high school (e.g. EPA "Airwatch")	<b>Agree</b> to this outcome, provided all safety and quality standards meet those prescribed by the relevant authority.
PIRSA & EPA to conduct independent environmental monitoring as required.	<b>Agree;</b> Terramin will assist both PIRSA and the EPA to meet this outcome.
Review risk assessment in conjunction with Community Advisory Committee.	<b>Agree</b> to this outcome, provided that suitably qualified representatives of the Community Advisory Committee address their area of expertise.
Bond to be required to cover full cost of rehabilitation liability at any time - must be reviewed at least every year.	<b>Agree</b> to this condition. In recognition of its planned progressive mine rehabilitation it requests that PIRSA consider setting achievable milestones and closure targets and reviewing environmental outcomes on an annual basis.
Include more detail on proximity to housing, (Burnside area) schools, hospital etc (section 3.3).	<b>Agree;</b> Terramin will include these locations in the final MARP.
Investigate any other local wind or rainfall data that may be available including historic flood levels.	<b>Agree;</b> Terramin will investigate and include the outcome in the final MARP.

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Compensation rights for residents if outcomes not met.	<b>Agree</b> to this condition. Terramin recognises the right of any individual or group to seek compensation through a court of law.
Require \$20 million public liability insurance.	<b>Agree</b> to this insurance requirement.
Require Terramin to undertake independent audit of achievement of outcomes, by independent expert acceptable to PIRSA, and as requested by PIRSA.	<b>Agree</b> to undertaking audits of performance against the stated outcomes by independent experts approved by PIRSA as requested.