

APPENDIX L

GENERAL OVERVIEW OF ENVIRONMENTAL IMPACTS



Snapper Mineral Sands Project Environmental Assessment



APPENDIX L
SNAPPER MINERAL SANDS PROJECT

GENERAL OVERVIEW OF ENVIRONMENTAL IMPACTS

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L1 INTRODUCTION

The Snapper Mineral Sands Project (the Snapper Mine) involves the construction and operation of a mineral sands mine located approximately 10 kilometres (km) to the south-west of the existing Ginkgo Mineral Sands Project (the Ginkgo Mine) and approximately 170 km south of the Broken Hill Mineral Separation Plant (MSP) (Figure L-1). The Snapper Mine includes the development of the Snapper Mine deposit, together with an extension/sharing of existing Ginkgo Mine infrastructure (Figure L-2).

This General Overview of Environmental Impacts (General Overview) has been conducted as part of the Environmental Assessment (EA) to address the following Director-General's Requirement (DGR) for the Snapper Mine issued by the Director-General of the Department of Planning (DoP) on 17 August 2006:

The Environmental Assessment must include

- *a general overview of the environmental impacts of the project, identifying the key issues for further assessment, and taking into consideration the issues raised during consultation.*

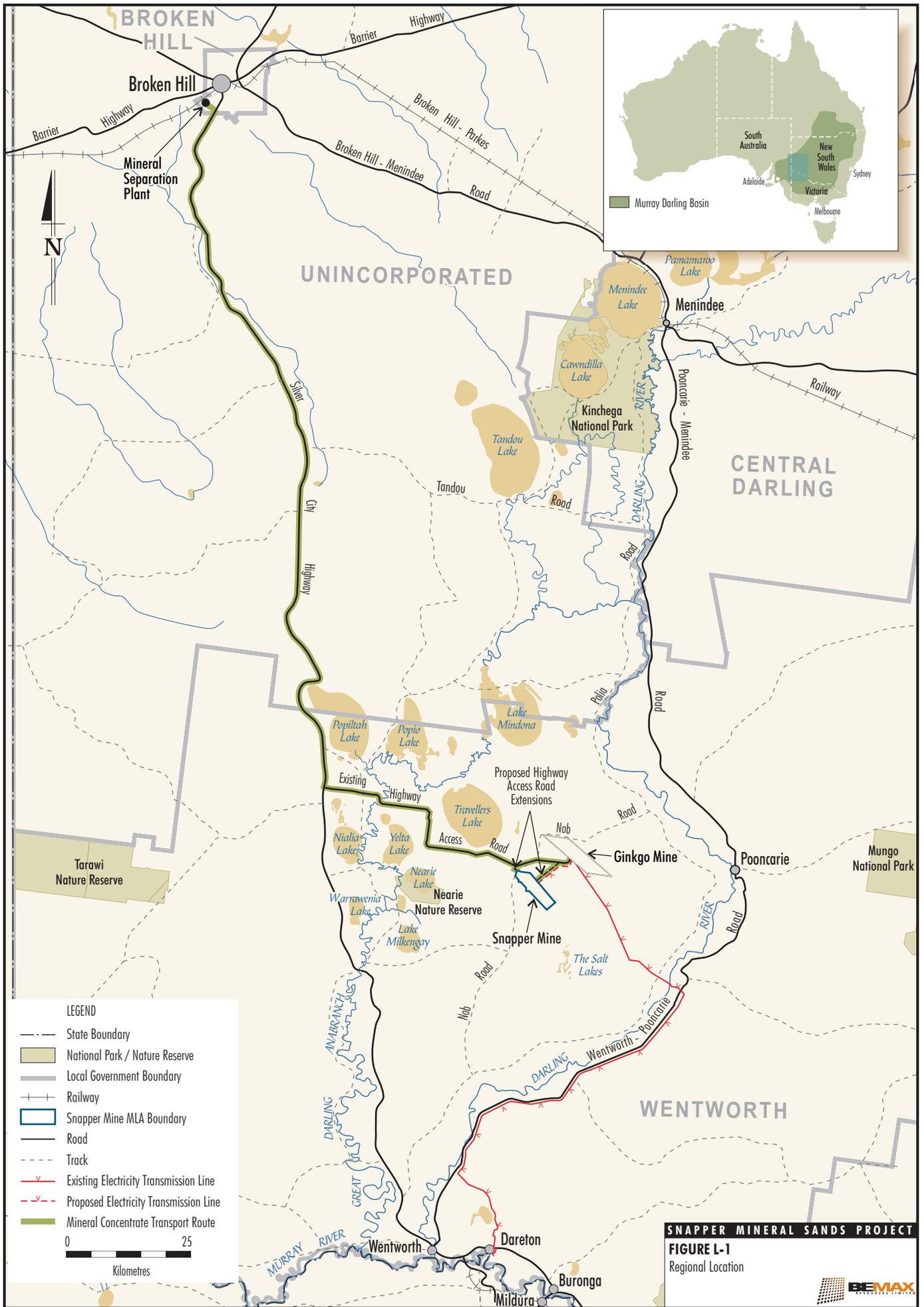
The key issues raised during consultation are outlined in Section 3 of the EA and were considered during preparation of this General Overview.

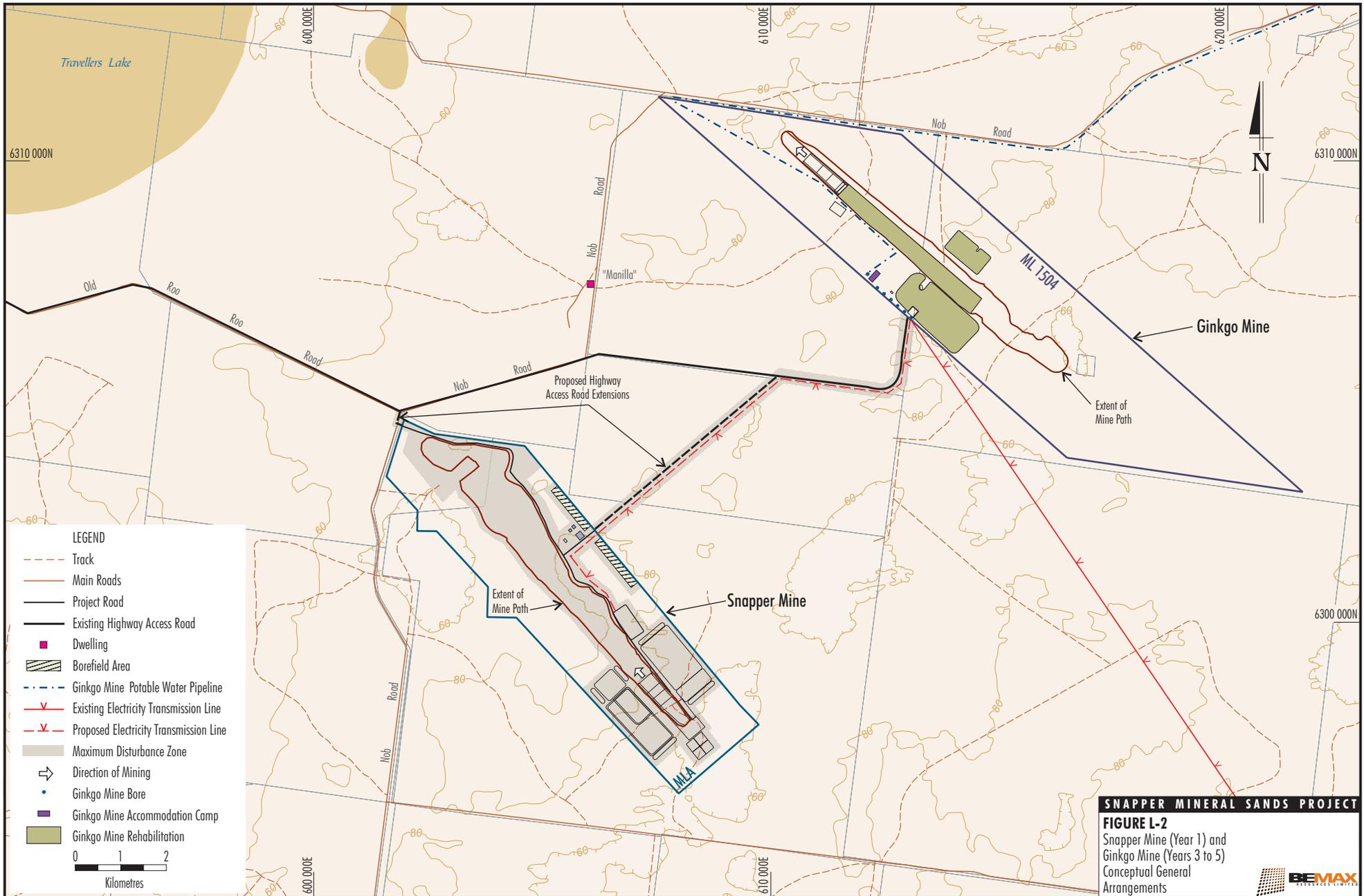
L1.1 OBJECTIVE AND SCOPE

The objective of this General Overview is to identify any key issues which may require assessment and which have not been included in the scope of the EA.

This report should also be read in conjunction with the following studies conducted for the EA (i.e. EA Appendices):

- Hydrogeological Assessment – Snapper Mineral Sands Project (Golder Associates, 2007) (Appendix A).
- Cultural Heritage Assessment – Snapper Mineral Sands Project (Landskape, 2007) (Appendix B).
- Road Transport Assessment – Snapper Mineral Sands Project (Traffix, 2007) (Appendix C).
- Fauna Assessment – Snapper Mineral Sands Project (Western Research Institute and Resource Strategies, 2007) (Appendix D).
- Flora Assessment – Snapper Mineral Sands Project (FloraSearch and Resource Strategies, 2007) (Appendix E).
- Noise Assessment – Snapper Mineral Sands Project (Holmes Air Sciences, 2007) (Appendix F).
- Air Quality Assessment – Snapper Mineral Sands Project (Holmes Air Sciences, 2007) (Appendix G).
- Rehabilitation Materials Assessment – Snapper Mineral Sands Project (BEMAX Resources Limited [BEMAX], 2007) (Appendix H).
- Process Waste Materials Assessment – Snapper Mineral Sands Project (BEMAX, 2007) (Appendix I).
- Socio-Economic Assessment – Snapper Mineral Sands Project (Gillespie Economics, 2007) (Appendix J).
- Preliminary Hazard Analysis – Snapper Mineral Sands Project (BEMAX, 2007) (Appendix K).





L1.2 STUDY METHODOLOGY

The methodology employed during the preparation of this General Overview was as follows:

- Identify the potential environmental impacts associated with the Snapper Mine.
- From the potential impacts identified, determine of the key issues associated with the Snapper Mine.
- Confirm that the key issues identified have been included in the scope of the Snapper Mine EA.
- Identify whether further assessment is required (i.e. beyond the current scope of the Snapper Mine EA).

The above methodology was implemented during a General Overview workshop in October 2006. Details of the workshop participants and their relevant qualifications and experience are provided in Table L-1.

**Table L-1
General Overview Workshop Team**

Name	Company and Position	Qualifications and Relevant Experience
Joe Bannister	BEMAX – Development Manager	BE; Grad. Dip. IT; 15 years experience in project management/mineral sands development/environmental planning.
Paul Humphris	BEMAX – Manager Health Safety and Environment	Grad. Dip. OHS; Assoc. Dip. EM; 25 years experience in health and safety/environmental planning.
Greg Lamb	BEMAX – Environmental Officer	B.Sc.; 7 years experience in mineral sands development/environmental management/environmental planning.
Peter Cribb	Resource Strategies – Principal	B.Ag.Sc. (Land Resource Management); 15 years experience in project management and mine environmental management.
Juleen Blunt	Resource Strategies – Environmental Project Manager	BE (Mining); MEM (Sustainable Development); 6 years experience in project management, mine planning and mine environmental management.
Jamie Gleeson	Resource Strategies – Environmental Project Manager	B.Sc. (Ecology), Hons. (Botany); 5 years experience in mine environmental management.

L1.2.1 Identification of Potential Environmental Impacts

The identification of potential issues involved the use of analytical “tools” appropriate for identifying potential environmental impacts. The tools used were:

- Overview Session – established the context and team scope before the issues were brainstormed.
- Brainstorming Session – used to draw out the main issues using the understanding, relevant experience and knowledge of the team. A key word association process was used based on work by Edward de Bono to generate a wide range of data on losses, controls and general issues related to the subject areas.
- Logic Tree/Affinity Diagrams – used to group and look in more detail at particular environmental impacts.

Brainstorming Session

The brainstorming session was based around the broad questions presented below. These questions were derived from *What is the level and scope of assessment for Major Projects? Preliminary Assessment* (the Guideline) (adapted from DIPNR, 2005).

How is the proposal likely to affect:

- *The physical or biological aspects of the environment?*
- *Natural or community resources?*
- *Environmentally sensitive areas?*
- *Areas allocated for conservation purposes?*
- *Areas sensitive because of community factors?*

The Guideline provides the abovementioned questions to “Identify the Issues”, and are intended to provide “A full range of identified issues and impacts associated with a particular project at the proposed location(s) for further analysis and evaluation” (DIPNR, 2005).

The notes from the brainstorming session are provided in Attachment LA.

Logic Tree/Affinity Diagrams

Logic tree analysis was utilised at the completion of the brainstorming session to group and look in more detail at particular environmental impacts. The team first identified the key groups for potential environmental impacts, followed by logical components within each of the key groups listed below:

- noise;
- air quality;
- land;
- transport;
- socio-economics; and
- water (groundwater and surface water).

The way in which each group is broken down is shown in the diagrams presented in Attachment LB. Each of the limbs of the logic tree were converted to a textual description and added to the results of the brainstorming session.

L1.2.2 Identification of Key Issues

The potential impacts identified in the *Identification of Potential Issues* step (Attachment LA) were filtered to determine the key issues relevant to the Snapper Mine. This was undertaken by considering:

- the extent of the impacts;
- the environmental sensitivity of the site; and
- the nature of the impacts.

The experiences and knowledge of the workshop team and results from trials and experiences at the Ginkgo Mine were drawn on to determine the key issues of the Snapper Mine.

The key issues identified from the list of potential impacts (Attachment LA) are provided in Section L3.

L1.2.3 Determining Further Assessment Required

The key issues identified in the *Identification of Key Issues* step were analysed to determine whether they were addressed by the EA scope, and if not, whether further assessment is required.

The scopes of the Snapper Mine EA specialist studies were considered to confirm whether the key issues identified in the General Overview had been incorporated and provisioned for.

L2 SNAPPER MINE OVERVIEW

Construction of the Snapper Mine would commence approximately between Years 3 to 5 of the Ginkgo Mine life. The mining operation would comprise the following:

- clearance of vegetation and stripping of soils on a campaign basis ahead of the advancing mine operation;
- overburden stripping, slurring and direct placement;
- predominantly dredge mining of ore by a conventional floating bucket wheel dredge located in the dredge pond;
- adjustment of dredge pond levels to maintain dredge access to the ore;
- supply of water from the borefields;
- disposal of water to the water disposal dam when lowering dredge pond levels;
- secondary mining of ore by conventional mobile equipment (i.e. dozers and/or scrapers), depositing ore in front of the dredge;
- ore concentration in the primary gravity concentration unit to produce heavy mineral concentrate (HMC);
- stockpiling of HMC;
- supply of desalinated water from the reverse osmosis (RO) plant for HMC salt washing;
- HMC separation via the Wet High Intensity Magnetic Separators (WHIMS) circuit either at the Snapper Mine or at the MSP, to produce three types of mineral concentrates (i.e. ilmenite-rich, leucoxene-rich and non-magnetic [rutile-rich and zircon-rich] concentrates);
- stockpiling of mineral concentrates;
- transport of HMC and/or mineral concentrates to the MSP;
- placement of wastes from the primary gravity concentration unit (i.e. sand residues) at the rear of the dredge pond as mining advances;
- treatment of process water to remove fines material (i.e. particles less than 53 microns in diameter) from the ore;
- transport and placement of backloaded process waste from the MSP;
- replacement of overburden on top of sand residues; and
- staged replacement of soils and progressive rehabilitation.

The combined development of the Snapper and Ginkgo Mines would maintain up to 650,000 tonnes per annum (tpa) feed rate of mineral concentrate to the MSP during the life of the two mines.

The general arrangement of the Snapper Mine at Years 1, 14 and post-mining is shown on Figures L-3 to L-5.

The Snapper Mine has been designed to integrate with Ginkgo Mine ancillary infrastructure and facilities where practicable. For example, major ancillary infrastructure for the Snapper Mine comprises extensions/sharing of the existing Ginkgo Mine electricity transmission line (ETL), highway access road (HAR) and the Ginkgo Mine accommodation camp (Figure L-2).

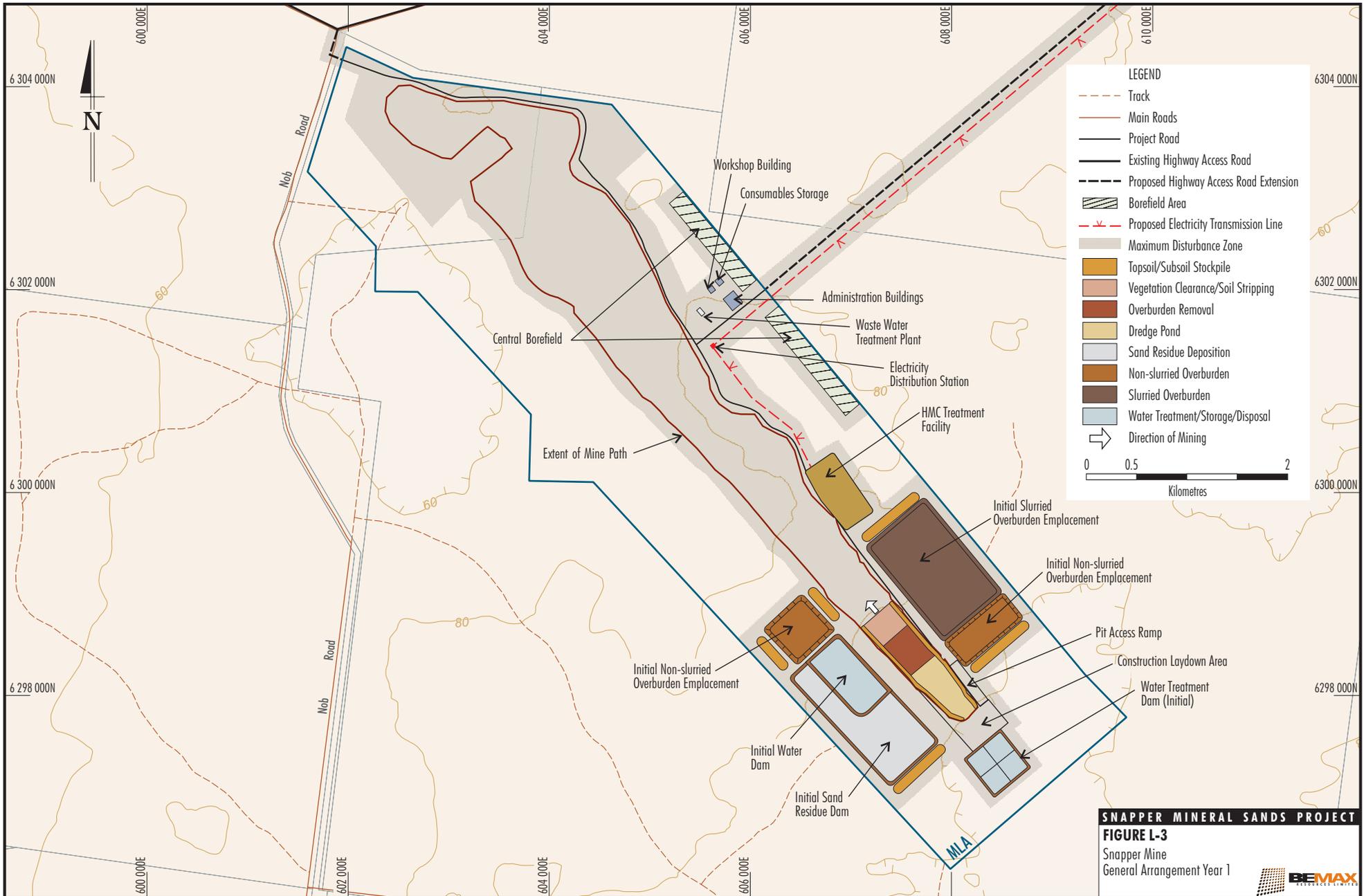
L3 KEY ISSUE IDENTIFICATION AND ANALYSIS

The key issues identified during the General Overview workshop are provided in Table L-2.

**Table L-2
Key Issues of the Snapper Mine**

Characteristics of the Snapper Mine¹	Key Issues
<i>How is the Snapper Mine likely to affect the physical aspects of the environment or introduce Pollution or Safety Risk Factors?</i>	Loss of vegetation and fauna habitat from surface disturbance.
	Potential impacts from transport, handling and disposal of backloaded MSP process waste.
	Potential impacts from dust and noise generation.
	Potential impacts to groundwater including: <ul style="list-style-type: none"> • potential mounding from water disposal dam; and • potential impacts on surface features.
<i>How is the Snapper Mine likely to affect the biological aspects of the environment?</i>	Indirect impacts on vegetation and fauna habitat including: <ul style="list-style-type: none"> • potential seepage (from sources such as dams and slurried overburden emplacements) impacting on vegetation; and • potential discharge from groundwater mounding.
	Rehabilitation accounting for saline material.
<i>How is the Snapper Mine likely to affect natural or community resources?</i>	Potential groundwater impacts on surrounding stock water users.
	Potential impacts on regional community infrastructure.
	Potential impacts associated with increased traffic levels.
<i>How is the Snapper Mine likely to affect the community?</i>	Regional economic impacts.
<i>How is the Snapper Mine likely to affect areas sensitive because of community factors?</i>	Potential impacts on heritage sites.
<i>How is the Snapper Mine likely to affect environmentally sensitive areas?</i>	Potential impacts to flora and fauna resulting from changed hydrogeological conditions within land reserved as national park or historic site or dedicated as nature reserve or declared as wilderness under the <i>National Parks and Wildlife Act, 1974</i> .

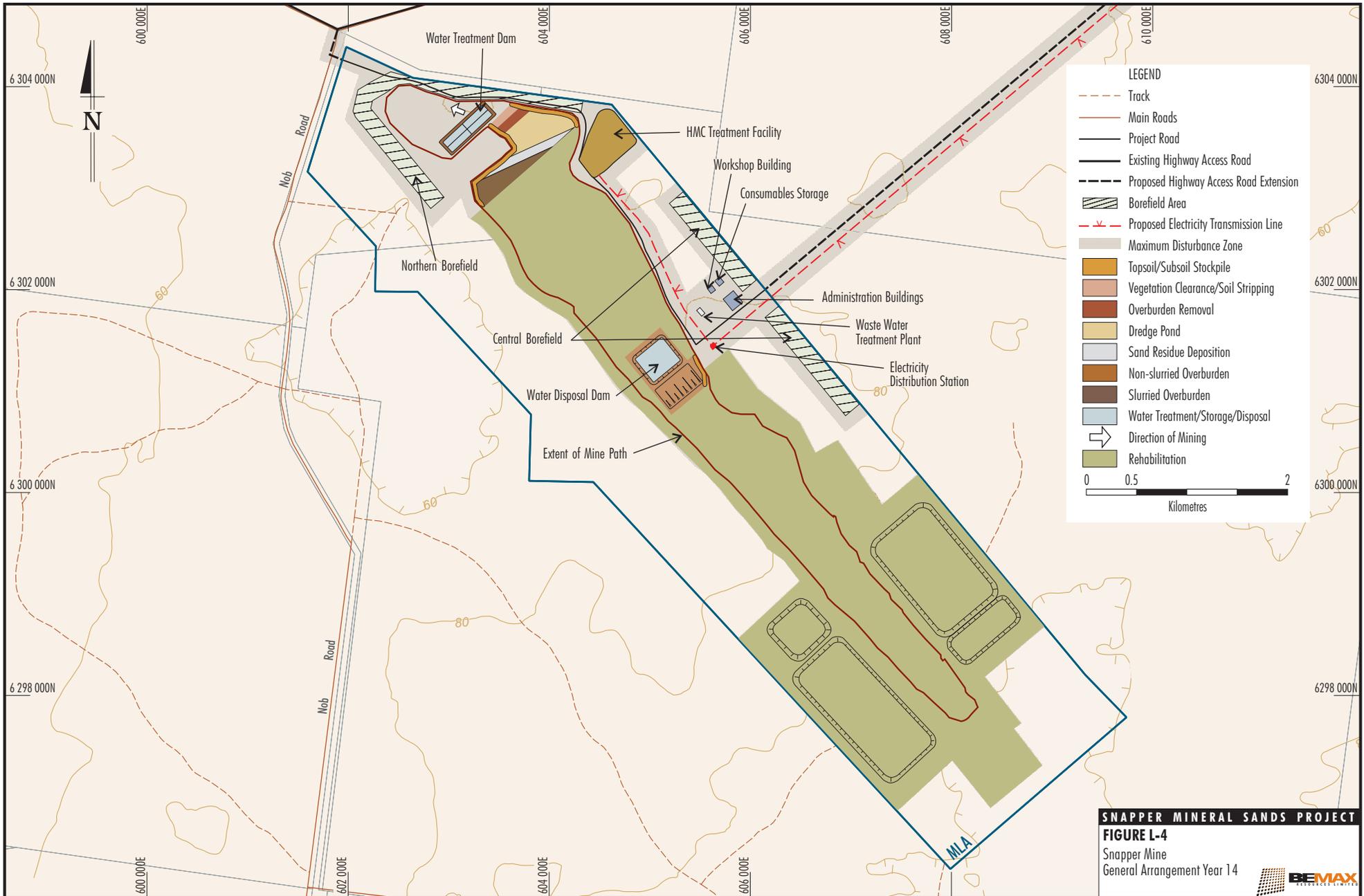
¹ Adapted from DIPNR (2005)



SNAPPER MINERAL SANDS PROJECT

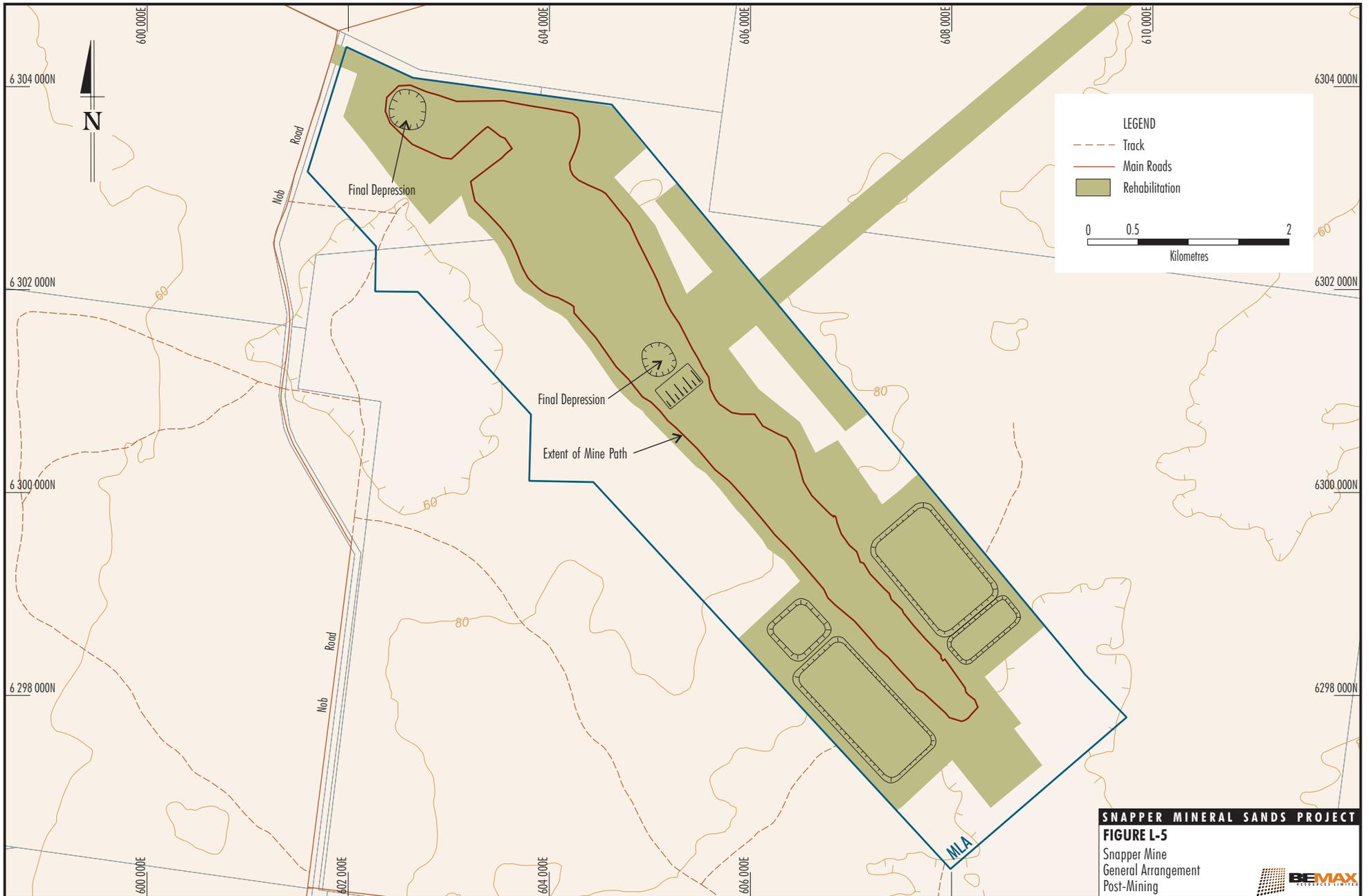
FIGURE I-3
Snapper Mine
General Arrangement Year 1





SNAPPER MINERAL SANDS PROJECT
FIGURE L-4
 Snapper Mine
 General Arrangement Year 14





SNAPPER MINERAL SANDS PROJECT
FIGURE I-5
 Snapper Mine
 General Arrangement
 Post-Mining



Each of the key issues listed in Table L-2 was compared against the scope of the Snapper Mine EA specialist studies to confirm whether they were addressed by the EA scope. The results of this comparison are presented in Table L-3.

**Table L-3
Further Assessment Required on Key Issues**

Key Issues	Included in Assessment Scope? (Y/N)	Assessment Required
Loss of vegetation and fauna habitat from surface disturbance.	Y (Appendices D and E)	No further assessment required
Potential impacts from transport, handling and disposal of backloaded MSP process waste.	Y (Appendix I)	No further assessment required
Potential impacts from dust and noise generation.	Y (Appendices F and G)	No further assessment required
Potential impacts to groundwater including: <ul style="list-style-type: none"> potential mounding from water disposal dam; and potential impacts on surface features. 	Y (Appendix A)	No further assessment required
Indirect impacts on vegetation and fauna habitat including: <ul style="list-style-type: none"> potential seepage (from sources such as dams and slurried overburden emplacements) impacting on vegetation; and potential discharge from groundwater mounding. 	Y (Appendices A, D and E)	No further assessment required
Rehabilitation accounting for saline material.	Y (Appendix H)	No further assessment required
Potential groundwater impacts on surrounding stock water users.	Y (Appendix A)	No further assessment required
Potential impacts on regional community infrastructure.	Y (Appendix J)	No further assessment required
Potential impacts associated with increased traffic levels.	Y (Appendix C)	No further assessment required
Regional economic impacts.	Y (Appendix J)	No further assessment required
Potential impacts on heritage sites.	Y (Appendix B)	No further assessment required
Potential impacts to flora and fauna resulting from changed hydrogeological conditions within land reserved as national park or historic site or dedicated as nature reserve or declared as wilderness under the <i>National Parks and Wildlife Act, 1974</i> .	Y (Appendices A, D and E)	No further assessment required

All of the key issues identified in the General Overview and listed in Table L-3 were considered to be incorporated within the EA scope. Therefore, no further assessment beyond the scope of the EA is required.

L4 REFERENCES

Department of Infrastructure Planning and Natural Resources (DIPNR) (2005) *Guideline: What is the Level and Scope of Assessment for Major Projects? Preliminary Assessment.*

ATTACHMENT LA
BRAINSTORMING NOTES

**Table LA-1
Brainstorming Notes**

Characteristics of the Snapper Mine	Potential Issues
<p>How is the Snapper Mine likely to affect the physical aspects of the environment or introduce Pollution or Safety Risk Factors?</p>	
<p>Ground Surface Disturbance</p>	<p>Construction of:</p> <ul style="list-style-type: none"> • initial sand residue dam; • initial overburden emplacements; • initial water dam; • initial water treatment dam; • other infrastructure, plant and equipment; • mine path (including water disposal dam and on-going water treatment dams); • access roads; • electricity transmission line (ETL); • borefields; • stockpiles (mineral concentrates, topsoil, subsoil and overburden); • fencing; • heavy mineral concentrate treatment facility; • rehabilitation trial areas; • administration/workshop area; • laydown area; and • highway access road (HAR). <p>Resulting in potential for:</p> <ul style="list-style-type: none"> • changes to surface drainage; • loss of vegetation; • changes to visual character; • impacts on flora and fauna; • erosion; • changes in landuse; • changes to soils; and • habitat loss.
<p>Hazardous Materials Transport</p>	<p>Potential increase in use/storage of:</p> <ul style="list-style-type: none"> • diesel; • oil; • lubricants; • Backloaded Mineral Separation Plant (MSP) process waste; • waste oils; • domestic wastes; • degreasers; • water treatment (flocculants); • chlorine (reverse osmosis [RO] plant); and • sodium metabisulphite (RO plant). <p>Resulting in increased potential for:</p> <ul style="list-style-type: none"> • spills/contamination; • loss of containment; • on-site transport accidents; • impacts on groundwater and surface water; and • impacts on flora, fauna and soils. <p>Potential impacts reduced by:</p> <ul style="list-style-type: none"> • dedicated bunded areas; and • spill response procedures.

**Table LA-1 (Continued)
Brainstorming Notes**

Characteristics of the Snapper Mine	Potential Issues
Waste Generation/Disposal	<p>Generation of:</p> <ul style="list-style-type: none"> • sand residues; • overburden (both slurried and non-slurried); • RO plant hypersaline water; • waste oils; • putresible wastes; • effluent; • domestic wastes; • saline slurry, including settled fines within water treatment dam; • workshop wastes; • scrap tyres; and • waste batteries. <p>Resulting in increased potential for:</p> <ul style="list-style-type: none"> • spills/contamination; • loss of containment; • on-site transport accident; • off-site transport accident; • impacts on groundwater and surface water; and • impacts on flora, fauna and soils. <p>Out-of-path disposal and in-path disposal resulting in potential:</p> <ul style="list-style-type: none"> • land contamination; • water contamination; and • changes in landform. <p>Potential for spills resulting in impacts on:</p> <ul style="list-style-type: none"> • flora; • fauna; and • soils. <p>Potential for on-site disposal of domestic wastes.</p> <p>Potential increase in greenhouse gas emissions from:</p> <ul style="list-style-type: none"> • diesel engines; • vegetation removal; and • electricity usage. <p>Potentially radioactive levels of :</p> <ul style="list-style-type: none"> • backloaded MSP process waste; • replaced sand residues; and • final landform.
Dust, Odour, Noise, Vibration	<p>Potential dust impacts from:</p> <ul style="list-style-type: none"> • topsoil stripping; • overburden stripping; • transport; • mineral concentrate and topsoil/subsoil stockpiles; • wind erosion; • haul roads; • overburden emplacements; • sand residue dams; • Wet High Intensity Magnetic Separator (WHIMS) plant stockpiles; • water treatment dams; • wind blown concentrate; • wind blown backloaded MSP process waste; • construction; and • surrounding landowners.

**Table LA-1 (Continued)
Brainstorming Notes**

Characteristics of the Snapper Mine	Potential Issues
Dust, Odour, Noise, Vibration (Continued)	<p>Resulting in potential impacts to:</p> <ul style="list-style-type: none"> • flora and fauna habitat; and • surrounding landowners. <p>Potential impacts reduced by:</p> <ul style="list-style-type: none"> • crusting effect on surface landforms. <p>Potential odour impacts from:</p> <ul style="list-style-type: none"> • diesel fumes (there are no major sources). <p>Potential noise impacts on surrounding landowners from:</p> <ul style="list-style-type: none"> • mobile equipment (trucks, scrapers, etc.); • dredge (lifting and dropping spud); • transport; • wet plant; • booster pump stations; • tails stacker on wet plant; • reversing alarms on mobile equipment; • horns from excavators; • potential crushing for road base; and • electrical drives on dozer traps. <p>Potential vibration impacts from:</p> <ul style="list-style-type: none"> • mobile equipment; and • potential crushing for road base.
Water Quality/Quantity	<p>Potential impacts on surface water quality (through sheet flow contamination) from:</p> <ul style="list-style-type: none"> • sediment runoff; • contamination of the dredge pond from oil spills, etc; • potential saline pipeline ruptures; • tails spills (potential reduced by toe drains around tailings dams); • surface water runoff from backloaded MSP process waste stockpile reporting to reject water pond and then to dredge pond; • potential spill event from backloaded MSP process waste transport accident and runoff into surface waters; and • failure of surface water dams. <p>Potential impacts to surface water quantity:</p> <ul style="list-style-type: none"> • change in catchment characteristics for surface water runoff. <p>Potential impacts to groundwater quality:</p> <ul style="list-style-type: none"> • contamination of the dredge pond from oil spills, etc.; • potential spill from diesel storage seeping to groundwater; • potential radioactive impacts; • saline slurry seepage to groundwater; and • spills/failures from all dams (including initial sand residue dam, water disposal dam, initial water dam). <p>Potential drawdown impacts on groundwater quantity resulting in:</p> <ul style="list-style-type: none"> • potential impacts to surrounding groundwater users (stockwater, etc.); • potential drawdown on fresh water lenses; • potential impacts on surrounding features (e.g. The Salt Lakes); • potential impacts on Chalky Well; and • potential impacts on the Darling River.

**Table LA-1 (Continued)
Brainstorming Notes**

Characteristics of the Snapper Mine	Potential Issues
Water Quality/Quantity (Continued)	<p>Mechanisms for drawdown are from net losses from:</p> <ul style="list-style-type: none"> • evaporation; • water taken off-site in concentrate; and • evaporation losses from any stockpile/dam containing slurried material. <p>Potential horizontal (lateral) and vertical seepage from:</p> <ul style="list-style-type: none"> • start up dam; • tails dams; • all dams; and • slurried overburden. <p>Resulting in potential impacts on:</p> <ul style="list-style-type: none"> • surrounding vegetation (too far away to affect stockwater supplies). <p>Potential groundwater mounding due to dredge pond level increase resulting in potential:</p> <ul style="list-style-type: none"> • impacts to surrounding groundwater users; and • discharge potential.
Water Use/Storage	<p>Potential impacts to:</p> <ul style="list-style-type: none"> • stockwatering - see above; • stockwater lenses from drawdown - see above; and • Darling River from water use. <p>Construction and use of initial water dam and water disposal dam resulting in potential for:</p> <ul style="list-style-type: none"> • changes to landforms; • seepage; and • overtopping of saline water storages.
<i>How is the Snapper Mine likely to affect the biological aspects of the environment?</i>	
Vegetation and Fauna Habitat Clearance	<p>Potential impacts to vegetation and habitat include:</p> <ul style="list-style-type: none"> • vegetation clearance from surface disturbance areas (listed above); • habitat loss; • fragmentation of habitat; • potential dust impacts on flora and habitat; and • increased risk of fauna vehicle strike.
Fauna Access to Saline Water Storages	<p>Potential impacts include:</p> <ul style="list-style-type: none"> • fauna drowning.
Weeds, Pests and Disease	<p>Potential increased spread of weeds through:</p> <ul style="list-style-type: none"> • disturbance; • vehicle movement; and • construction phase (reduces habitat quality). <p>Resulting in increased potential for:</p> <ul style="list-style-type: none"> • reduced habitat quality; and • native flora displacement. <p>Potential impacts reduced by:</p> <ul style="list-style-type: none"> • weed control. <p>Potential increased spread of pests (e.g. mice, cats, goats) through:</p> <ul style="list-style-type: none"> • increase in personnel, food, etc. <p>Resulting in increased potential for:</p> <ul style="list-style-type: none"> • impacts on flora and fauna; and • increased risk of disease through increased interaction between personnel and frogs.

**Table LA-1 (Continued)
Brainstorming Notes**

Characteristics of the Snapper Mine	Potential Issues
Revegetation/Rehabilitation	<p>Rehabilitation/revegetation strategies include:</p> <ul style="list-style-type: none"> • all disturbance areas including potential spill areas to be rehabilitated; and • use of endemic species in revegetation based on results from Ginkgo. <p>Potential rehabilitation/revegetation issues for consideration:</p> <ul style="list-style-type: none"> • potential for inadequate growth media (material balance); • suitability of soil types for rehabilitation; • land contamination clean-up of infrastructure areas; • erodibility of soil types; • stability of landforms (erosion); • inefficient removal and stockpiling of topsoils; • potential impact on topsoil structure during removal and stockpiling (ameliorative measures for maintaining topsoil structure required); • species sourcing through seed collection and local nursery; • impact of feral goats on rehabilitated areas; and • dimensions of final depression and mounded landform required. <p>Potential salinity impacts on rehabilitation/revegetation influenced by:</p> <ul style="list-style-type: none"> • depth of cover; • vegetation tolerance; • primary root zone; • capillary rise of saline material; and • lateral seepage effect on vegetation.
Bushfire	<p>Increased risk of bushfire through operations causing impacts such as:</p> <ul style="list-style-type: none"> • stock losses; • infrastructure damage; • impacts to surrounding landowners; • loss of stockfeed; • impacts on flora and fauna; and • increased fuel (vegetation). <p>Potential impacts reduced by:</p> <ul style="list-style-type: none"> • agreement with local Rural Fire Service; and • basic fire training provided to all staff.
<i>How is the Snapper Mine likely to affect natural or community resources?</i>	
Community Services and Infrastructure	<p>Potential impacts to the community:</p> <ul style="list-style-type: none"> • increased power requirements; • increased stress on Broken Hill airport; • increased traffic (impacts on road network); • increase in population during construction phase; • expectation for increased business in Pooncarie; • local employment; • apprenticeships; • local Aboriginal employment programme; • greater than approximately 80% of workforce local; • improving skills base; • majority of construction workforce local (including Broken Hill and Wentworth/Mildura); • continued and increased business opportunities (e.g. BSL transport contractor); • increase in land values due to land compensation scheme; and • increase in average incomes.

**Table LA-1 (Continued)
Brainstorming Notes**

Characteristics of the Snapper Mine	Potential Issues
Community Services and Infrastructure (Continued)	<p>Increased workforce resulting in potential impacts on:</p> <ul style="list-style-type: none"> • business; • accommodation/housing; • hospitals; and • schools, etc.
Natural Resource Use	<p>No effect on groundwater and surface water are expected as a result of the Snapper Mine.</p> <p>Beneficial use of ore resource to the benefit of the State and Company.</p> <p>Potential impacts to natural resource use include:</p> <ul style="list-style-type: none"> • loss of grazing land; and • loss of vegetation.
Future Mineral Deposits	<p>Future exploration and benefits of the Snapper Mine:</p> <ul style="list-style-type: none"> • on-going regional exploration partly funded by the Snapper Mine; • increase in the viability of nearby deposits (re-use of established infrastructure [e.g. ETL, roads]); and • increase in knowledge base for mining in region.
Demographics	<p>Potential changes to the demographics include:</p> <ul style="list-style-type: none"> • retention/increase of local population; • lowering of average age; and • improving the local skills base.
Transport	<p>See <i>Hazardous Materials Transport</i> above.</p> <p>Potential changes to transport structure:</p> <ul style="list-style-type: none"> • improving access to region; • increase in traffic (i.e. increase in public safety risk); • continued/increased business for transport providers; • increased stress on Broken Hill airport; • continued maintenance of constructed runway; • continued use/maintenance of constructed roads; • construction of HAR extensions; and • increased traffic levels and therefore maintenance on mineral concentrate route.
New Linear Project (Powerline, Road or Rail)	<ul style="list-style-type: none"> • ETL extensions.
<i>How is the Snapper Mine likely to affect the community?</i>	
Employee Migration	<ul style="list-style-type: none"> • see above; and • potential drainage of farm labor.
Regional Workforce and Employment Opportunities	<ul style="list-style-type: none"> • see above; and • development of regional mines likely to sustain workforce.
Population Densities and Development Patterns	<ul style="list-style-type: none"> • minimal impact - local employment; and • see above with regard to employee retention.
Private Property Access	<p>Alterations to private property access:</p> <ul style="list-style-type: none"> • improved access to private property; and • increased safety of road intersections. <p>Potential reduced stock movement/access resulting from:</p> <ul style="list-style-type: none"> • potential split of private property by access road along ETL; and • Project fencing.
Visual	<p>Potential visual impacts from:</p> <ul style="list-style-type: none"> • northern component from Nob Road; • overburden emplacements from Nob Road; • night lighting/glow from treatment facility and stackers; and • relatively flat terrain, therefore limited view points.

**Table LA-1 (Continued)
Brainstorming Notes**

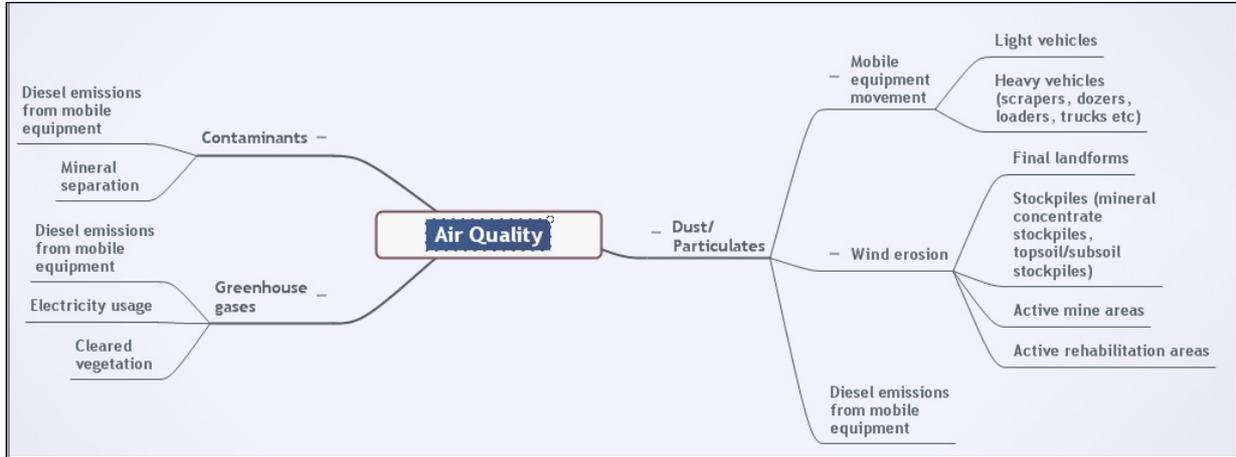
Characteristics of the Snapper Mine	Potential Issues
Sunlight/Visual Amenity	N/A.
Amenity of Publicly Owned Land	N/A. No publicly owned land within vicinity - nearest publicly owned land is part of Nob Road which is Crown Land.
Land Use, Neighboring Access and Housing	<p>Potential beneficial impacts to the surrounding landowners include:</p> <ul style="list-style-type: none"> increased asset base for landholders through royalties and therefore increased selling potential; increased property prices before and during the Project due to increased employment opportunities; potential alternative employment for immediate landholders and surrounding landholders; and increased property access and therefore property values.
Traffic	See <i>Hazardous Materials Transport</i> and <i>Transport</i> above.
Health and Safety	<p>Potential health and safety benefits from the Snapper Mine include:</p> <ul style="list-style-type: none"> increase in health skills to support community; active mine area is fenced and secured; and increased road signage and road quality. <p>Potential increased safety risks from the Snapper Mine include:</p> <ul style="list-style-type: none"> increased traffic (assessed in PHA).
How is the Snapper Mine likely to affect areas sensitive because of community factors?	
Aboriginal Community	<p>Potential disturbance to:</p> <ul style="list-style-type: none"> Aboriginal Heritage sites. <p>Potential opportunities for the Aboriginal community including:</p> <ul style="list-style-type: none"> Aboriginal traineeship in consultation with Barkindji Elders Committee.
Areas with Degraded Amenity	N/A.
Areas of High Aesthetic or Scenic Value	<p>Potential groundwater impacts to areas of high aesthetic value:</p> <ul style="list-style-type: none"> Darling River; and The Salt Lakes.
How is the Snapper Mine likely to affect ecologically sensitive areas?	
Land protected or preserved under <i>State Environmental Planning Policy No 14 - Coastal Wetlands</i> or <i>State Environmental Planning Policy No 26 - Littoral Rainforests</i> .	No land protected or preserved under <i>State Environmental Planning Policy No 14 - Coastal Wetlands</i> or <i>State Environmental Planning Policy No 26 - Littoral Rainforests</i> is known to occur within or proximal to the Snapper Mine area ¹ .
Land reserved as national park or historic site or dedicated as nature reserve or declared as wilderness under the <i>National Parks and Wildlife Act, 1974</i> .	Potential impacts to flora and fauna resulting from changed hydrogeological conditions within Nearie Nature Reserve, situated to the west of the Snapper Mine area.
Aquatic reserves declared under the <i>Fisheries Management Act, 1994</i> .	No declared aquatic reserves under the <i>Fisheries Management Act, 1994</i> occur within or proximal to the Snapper Mine area.
Land reserved or dedicated within the meaning of the <i>Crown Lands Act, 1989</i> for the preservation of flora, fauna, geological formations or for other environmental protection purposes.	No land reserved or dedicated within the meaning of the <i>Crown Lands Act, 1989</i> for the preservation of flora, fauna, geological formations or for other environmental protection purposes occurs within or proximal to the Snapper Mine area.
Land declared as wilderness under the <i>Wilderness Act, 1987</i> .	No land declared as wilderness under the <i>Wilderness Act, 1987</i> occurs within or proximal to the Snapper Mine area.

¹ The Snapper Mine area comprises the Snapper Mine Mining Lease Application (MLA) area and the ETL and HAR extensions.

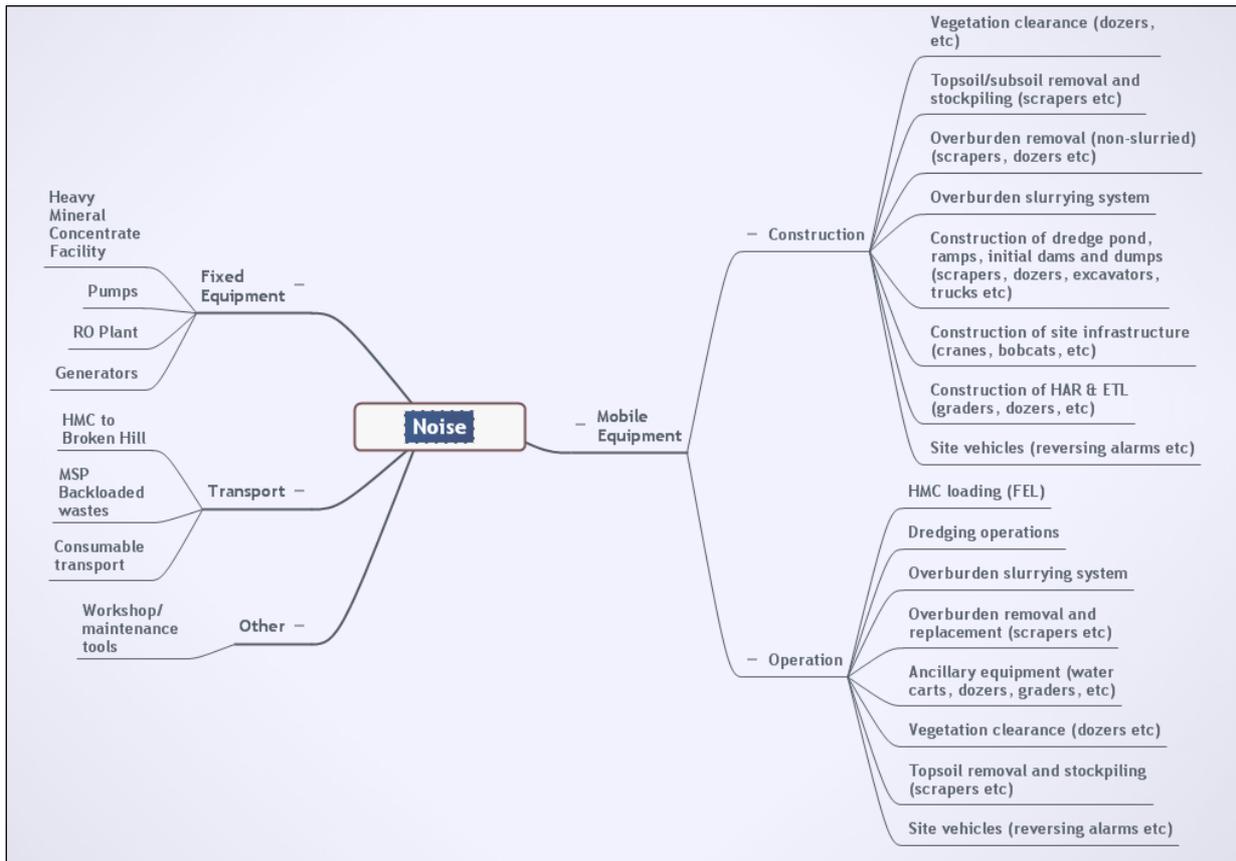
ATTACHMENT LB

LOGIC TREES/AFFINITY DIAGRAMS

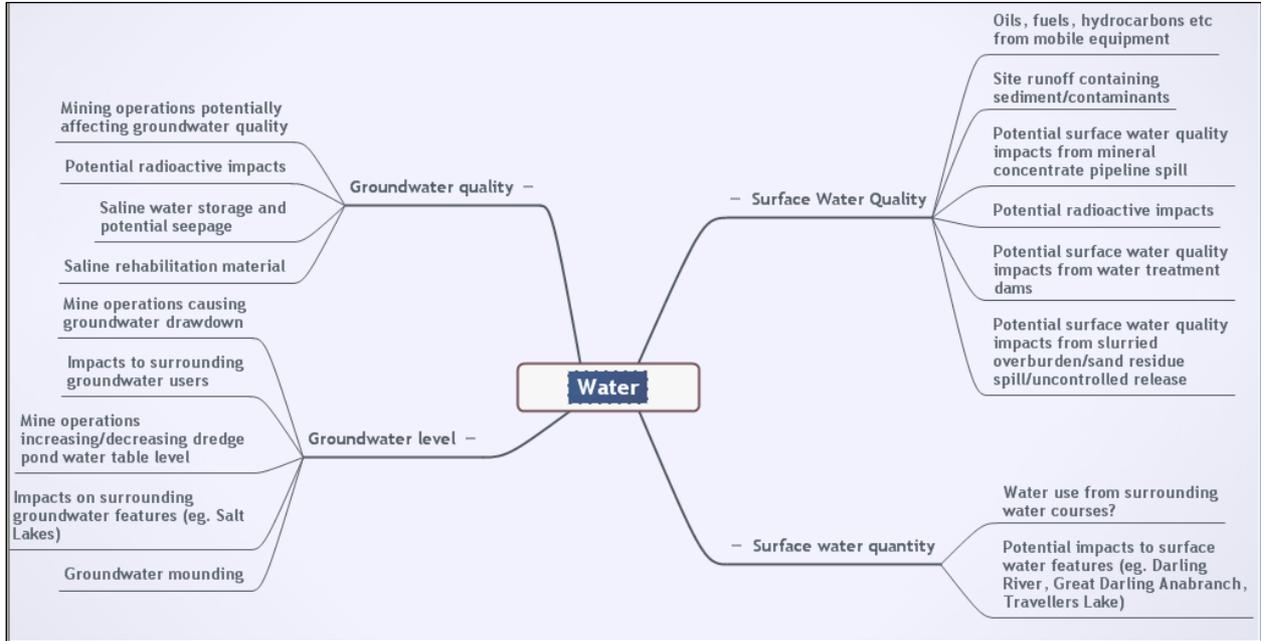
**Figure LB-1
Air Quality Logic Tree Analysis**



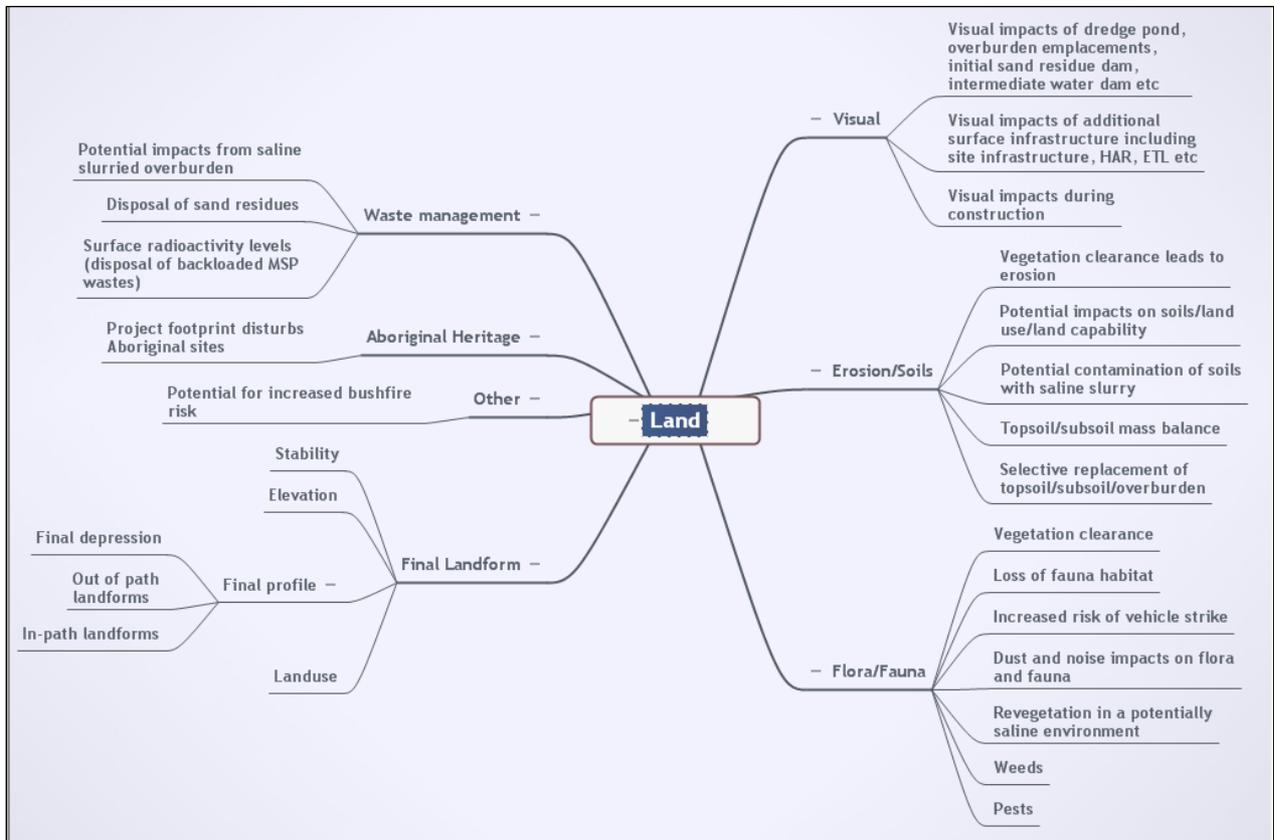
**Figure LB-2
Noise Logic Tree Analysis**



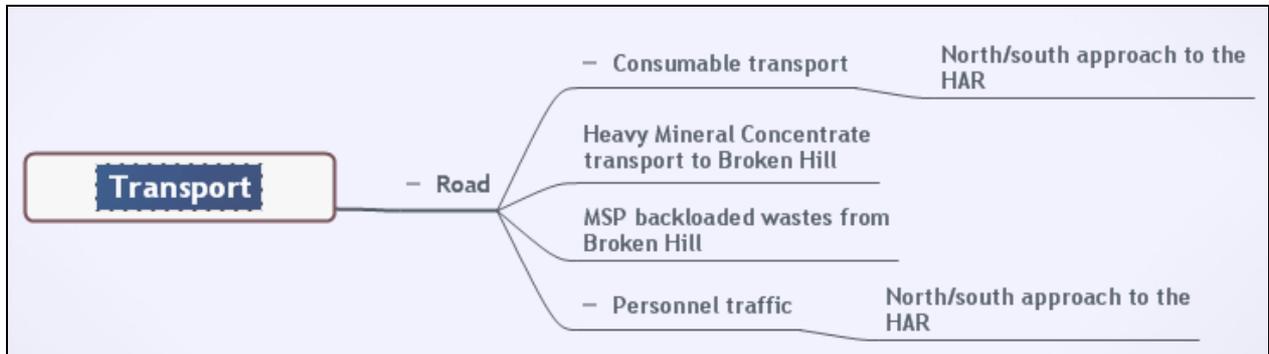
**Figure LB-3
Water Logic Tree Analysis**



**Figure LB-4
Land Logic Tree Analysis**



**Figure LB-5
Transport Logic Tree Analysis**



**Figure LB-6
Socio-economic Logic Tree Analysis**

