SNAPPER MINERAL SANDS MINE

WATER MANAGEMENT PLAN

FEBRUARY 2008

Document No. WMP-R01-C

PREFACE

This Water management Plan (WMP) has been prepared to meet the requirements of the Snapper Mine Development Consent Conditions 2-5 of Schedule 3. Where there is any conflict between the provisions of this WMP and the applicable statutory requirements (i.e. licenses, permits, consents and relevant laws) the statutory requirements are to take precedence.

It is the responsibility of Bemax to refer to the latest versions of statutory instruments or guidelines that are referenced in this WMP, but have not been appended.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

Bemax Resources Ltd (Bemax) is the proponent of the Snapper Mineral Sands Project (the Project). The Project is located approximately 50 km west of the township of Pooncarie in western New South Wales (NSW) and approximately 10 km to the south-west of the Ginkgo Mine. The Project includes the Snapper Mine Lease, and short extensions to the mineral concentrate transport route and electricity transmission line (Figure 1).

1.1 OBJECTIVES AND PURPOSE

This Water Management Plan (WMP) has been developed as a requirement of Development Consent Condition 2 of Schedule 3 for the Project (Table 1). The WMP details procedures for the management of surface water within the Snapper Mine area from the construction and subsequent operation of the Project.

The WMP is structured as follows:

Section 1: Introduction - Outlines the objectives and structure of the plan.
Section 2: Outlines design criteria for sediment control structures.
Section 3: Identifies activities that could cause erosion and outlines mitigation measures.
Section 4: Details erosion and sediment control measures employed for the development.
Section 5: Details lateral seepage measures for dam structures.
Section 6: Summarises performance monitoring and reporting requirements.
Section 7: Provides a list of documents referenced in the plan.

Table 1 presents the Development Consent Conditions relevant to the WMP and indicates which section of the plan addresses each condition.

Table 1
Development Consent Conditions Relevant to the WMP

Development Consent Condition			**Where Addressed**
Schedule 3	**SOIL AND WATER**		
2	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must:		
	(a)	be prepared in consultation with the DECC and DWE by suitably qualified expert/s whose appointment/s have been approved by the Director-General;	
	(b)	be submitted to the Director-General for approval prior to carrying out any development on the site; and	
	(c)	include:	
		• Erosion and Sediment Control Measures;	All Sections
		• Surface Water Management Measures; and	All Sections
		• Borefield Management Measures.	BIMP
3	The Erosion and Sediment Control Measures must:		
	(a)	be consistent with the *Managing Urban Stormwater: Soils and Construction* manual (Landcom, 2004 or its latest version);	Section 2
	(b)	identify activities that could cause soil erosion and generate sediment;	Section 3
	(c)	describe measures to minimise soil erosion and the potential for the transport of sediment;	Section 3
	(d)	describe the location, function, and capacity of erosion and sediment control structures; and	Section 2 and 4
	(e)	describe what measures would be implemented to monitor and maintain the integrity of the structures over time.	Section 6

Development Consent Condition			Where Addressed
Schedule 3	**SOIL AND WATER**		
4	The Surface Water Management Measures must:		All Sections
	(a)	describe the salinity management measures on site including the design measures proposed to be used to minimise any lateral seepage of brackish water from the initial water dam, initial emplacement containing the overburden slurry, and initial sand residue dam which could contaminate adjacent soils and cause vegetation dieback;	Section 5
	(b)	describe measures to manage dust suppression water along the HAR;	Section 6
	(c)	include a program to monitor the effectiveness of these measures, with specific reference to vegetation and soil performance criteria; and	Section 6
	(d)	describe the measures that would be implemented if any exceedances of the performance criteria are detected.	Section 6
5	The Borefield Management Measures must include:		BIMP
	(a)	a site water balance;	
	(b)	data to benchmark the natural variation in groundwater levels and quality prior to any development on site within the predicted drawdown impact zone (identified in the EA);	
	(c)	groundwater impact trigger levels for relevant landholder bores (e.g. Chalky Well);	
	(d)	a program to monitor the groundwater impacts of the project;	
	(e)	the procedures that would be implemented if the groundwater impact trigger levels are exceeded; and	
	(f)	measures to mitigate and/or compensate landholders who are adversely affected by the groundwater impacts of the project, including the provision of alternative water.	

BIMP – Borefield Impact Management Plan

The borefield management measures described in Condition 5 will be addresses in a separate Borefield Impact Management Plan (BIMP). The existing Ginkgo BIMP will be updated to include the cumulative impacts of both the Ginkgo and Snapper mines.

2 DESIGN CRITERIA

In accordance with Condition 3 (a) of the Snapper Mine Development Consent, erosion and sediment control structures (e.g. sedimentation dams or other siltation control devices) will be constructed to contain or treat surface water runoff from all areas disturbed by mining including overburden dumps, topsoil stockpiles, unsealed roads and areas cleared of vegetation. Sedimentation dams will be designed:

- to provide, to the satisfaction of the DWE, a minimum dam capacity appropriate to the area draining to each dam.
- so that the maximum flow velocity through the dams meets DWE guidelines;
- to prevent short circuiting; and
- if inflow is likely to contain oil or other deleterious floating matter a baffle will be installed at the outlet to prevent discharge of that matter.

General design criteria for the erosion and sediment control structures to be utilised for the Project are presented below. Typical details are presented in *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004), *Design Manual for Soil Conservation Works Technical Handbook No. 5* (Soil Conservation Service of NSW, 1982) and *Urban Erosion and Sediment Control Handbook* (CALM, 1992).

Relevant DWE guidelines make reference to these manuals which focuses on the minimisation of erosion and prevention of sediment off site during the construction phase of land and building development, and provides for the design of soil conservation structures, including dams, banks and channels used to divert and control runoff that may cause erosion.

Design Average Recurrence Interval

The design average recurrence interval (ARI) to be used to size individual components of the erosion and sediment control structures presented in this WMP will be in accordance with Table 2.

Rainfall

Rainfall intensity for the sizing of the erosion and sediment control structures will be determined as outlined in *Australian Rainfall and Runoff* (Institute of Engineers Australia, 1987, Revised 2001) and *Design Manual for Soil Conservation Works Technical Handbook No. 5* (Soil Conservation Service of NSW, 1982).

Runoff

Peak flow calculations for components of the erosion and sediment control structures will be made using a combination of the Statistical Rational Method (SRM) and the Deterministic Rational Method (DRM) as outlined in Chapter 1 Section 2.2 of *Design Manual for Soil Conservation Works Technical Handbook No. 5* (Soil Conservation Service of NSW, 1982).

The SRM estimates time of concentration as a function of catchment size, and the coefficient of runoff is determined as a function of catchment size, locality and annual exceedance probability (AEP). This method will be used on “natural” or untreated catchments to estimate peak discharge. The DRM will be used to estimate peak discharge from treated catchments. Time of concentration for the DRM will be estimated using flow routing procedures which estimate flow time for individual structures. The runoff coefficient for the DRM is a function of land use, relief, depression storage effects, infiltration and soil factors, and the design AEP, and will be modified using an area correction factor based on catchment size.

Table 2
Suggested Design Average Recurrence Intervals for Erosion and Sediment Control Measures in Urban Areas
Adapted from Urban Erosion and Sediment Control (Hunt, J.S. ed, 1992)

Control Measure	Estimated Design Life	
	0 – 12 Months	> 12 Months
	Design ARI (Years)**	
Diversion Bank	1 – 10	*
Level Spreader	1 – 10	*
Waterway	1 – 10	*
Sediment Basin Primary Outlet	1 – 5	*
Sediment Basin Emergency Outlet	10 – 20	*
Sediment Trap	1 – 5	*
Outlet Protection	1 – 20	*
Grade Stabilisation Structure	1 – 20	*
Detention Basin Primary Outlet	1 – 5	*
Detention Basin Emergency Outlet	10 – 20	*
Waterway Diversion	1 - 2	*

Source: *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004)

* Full design required in accordance with major/minor concept (AR&R, 1987, revised 2001)

** Designs should generally comply with the upper limit and the ranges specified in the table, unless the consequences of failure are considered low.

Sediment Dams

Sediment dams will be designed in accordance with procedures detailed in *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004).

The C_{10} coefficient of runoff used in the Rational Method to estimate average discharge in designing sediment dams would be calculated using Table 3.2 in *Urban Erosion and Sediment Control Handbook* (CALM, 1992) and equations 14.11 and 14.12 in *Australian Rainfall and Runoff* (Institute of Engineers Australia, 1987, Revised 2001).

Diversion Bank Channels and Grassed Waterways

Diversion bank channels and grassed waterways will be designed in accordance with details provided in *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004) and Chapter 2 of *Design Manual for Soil Conservation Works Technical Handbook No. 5* (Soil Conservation Service of NSW, 1982). Diversion bank diversion criteria are presented in Table 2 above.

3 ACTIVITIES AND IMPACTS

Activities that have the potential to cause soil erosion and generate sediment at the Snapper Mine include:

- Vegetation clearing and topsoil stripping;
- Stockpiling of topsoil;
- Construction of roads and infrastructure;
- Construction of overburden emplacements.

The potential impacts of the Project on surface water systems are limited due to the location of the mine site away from any surface water systems. The Darling River and Great Darling Anabranch are significant regional surface water features which, at their closest points, are located some 20 km north-east and 20 km north-west of the mine site, respectively.

There are no well-defined drainage channels within the MLA area and surrounds. Some overland flow does occur during prolonged rainfall events and surface waters accumulate in topographic depressions and then evaporate or seep into the groundwater table over time.

3.1 MITIGATION MEASURES

Management strategies proposed to reduce the potential impacts of the Project on surface water resources include the following principles:

- Minimising disturbance area's;
- Containment and recycling;
- Progressive Stabilisation and Revegetation of Disturbed Areas; and
- Erosion and Sediment Control;

Minimising Disturbance Areas

Areas disturbed by mining will be kept to a minimum. The site will be segregated into undisturbed runoff areas and operational runoff areas through the use of bunding.

Containment and Recycling

Operational areas will be separated from upslope surface water flow through the use of diversion bunds and runoff in operational areas will be intercepted and diverted to sediment retention structures or sumps. Waters stored in these sumps will be managed by priority reuse for dust control watering.

Project roads and hardstand areas that are to be watered with saline groundwater for dust suppression purposes will be bunded and all runoff contained within evaporation/sediment sumps for reuse. Groundwater salts collected in these sumps will be periodically removed and deposited with sand residues behind the dredge pond.

Progressive Stabilisation and Revegetation of Disturbed Areas

Areas disturbed by Project activities will be progressively rehabilitated. Rehabilitation will involve re-profiling, where necessary, to provide long term slope stability. It is anticipated that once rehabilitation is well established, surface runoff will be of comparable quality to undisturbed areas.

Active treatment systems in the form of temporary sediment retention storages, silt fences and passive measures such as vegetation buffers will be employed as interim erosion and sediment control measures during the rehabilitation process.

Erosion and Sediment Control

Erosion and sediment control measures will be designed in accordance with Project water management principles and are documented in the Section 4.

Section 4 provides for the sequencing of construction works to minimise the area of disturbance at any given time, in conjunction with the implementation of progressive rehabilitation.

4 EROSION AND SEDIMENT CONTROL MEASURES

4.1 SURFACE WATER MANAGEMENT PROGRAM

The surface water management program for the Snapper Mine site will comprise:

- upslope diversion drains/bunds to direct runoff from undisturbed catchments upslope of the disturbance areas; and
- erosion and sediment controls to direct runoff from operational areas to sediment dams.

Stormwater diversion systems will be installed at the commencement of the construction period and will include both permanent and temporary structures. Permanent structures will continue to operate post-closure, while temporary structures will be required until rehabilitated areas are stabilised.

4.2 CONSTRUCTION STAGE

The initial construction stage of the development will involve the excavation of a construction pit to allow the subsequent construction of the dredge and wet plant. The Water and Sand Residue Dam, Water Treatment Dam and Slurried Overburden Emplacement facilities will be constructed with material excavated from the construction pit, and excess overburden material from the construction pit excavation will be placed in an Initial Non-Slurried Overburden Emplacement. The general arrangement of the Snapper Mine is shown in Figure 2.

4.3 DEVELOPMENT AND MINING STAGES

Dredge and floating wet plant construction will take approximately 12 months, with assembly occurring in the construction pit on a pad located approximately 1 m above the water table. The dredge and floating plant will be transported to the pad in component parts and assembled. When construction of these components is complete the pad will be flooded with water from the Water and Sand Residue Dam to create a dredge pond. The dredge and floating plant will subsequently be floated, ready to commence dredge mining. The initial construction pit excavation will be extended to the full size of the dredge pond during the final stages of construction to facilitate future mining (Figure 2).

The mining stage of the development reflects steady state mining operations as at the middle of calendar year 2009.

4.4 EROSION AND SEDIMENT CONTROL STRUCTURES

The erosion and sediment control structures that will be implemented during each stage of the development are listed and discussed below for the following Project components:

- initial laydown area;
- construction pit;
- water and sand residue dam;
- non-slurried overburden emplacement;
- slurried overburden emplacement;
- mining area;
- site access roads;
- site office and workshop;

- heavy mineral concentration facility

Initial Laydown Area

An area will be stripped to accommodate the temporary site office and workshop facilities for the duration of the construct stage of the development. Dirty water will be directed to a local retention structure located in the vicinity of the laydown area. The area will have bund to divert clean stormwater away from the disturbed and contaminated land surfaces.

Construction Pit

Subsequent to initial vegetation clearance, a construction pit will be excavated to an approximate depth of 40 m to allow the assembly of the dredge and floating plant close to the water table. The construction pit will be developed by excavating approximately 3 million cubic metres (m^3) of overburden using scrapers over a 4-6 month period. This overburden will be used to construct the Water and Sand Residue Dam, Water Treatment Dam and Slurried Overburden Emplacement facilities adjacent to the mine path. Excess overburden material from the construction pit excavation will be placed in an Initial Non-Slurried Overburden Emplacement. The construction pit will effectively act as its own retention structure. The perimeter of the construction pit will be stripped an additional 20 metres to accommodate an access track. The access track will be bunded to divert clean stormwater away from the disturbed and contaminated land surfaces.

Water and Sand Residue Dam

An initial start-up water dam will be constructed with overburden materials from the construction pit. The storage will cover an approximate area of 80 ha with embankments an average of 5-10 m in height. The embankments and floor of the storage will be lined with clay to minimise water losses. This structure will also act as a sand residue (tailings) dam during the initial stages of mining. The water and sand residue dam facility will be designed with enough excess capacity to accommodate the additional storage requirements associated with a peak rainfall event.

The water and sand residue dam facility will be surrounded with a catch drain and bunding structure. This structure will retain dirty water that may run-off the embankments, which will be directed to the overburden retention structure. The retention structure will be designed to accommodate the storage requirements associated with the entire area of the water and sand residue dam facility. The catch drain and bunding structure will also act to divert clean stormwater away from the disturbed and contaminated land surfaces (Figure 3).

Non-Slurried Overburden Emplacement

Excess overburden material from the construction pit excavation will be placed in an Initial Non-Slurried Overburden Emplacement. The Initial Non-Slurried Overburden Emplacement will cover an area approximately 45 ha. The overburden emplacement will be surrounded with a catch drain and bunding structure. This structure will retain dirty water that may run-off the embankments of the overburden emplacement, which will be directed to the overburden retention structure. The overburden retention structure will be designed to accommodate the storage requirements associated with the entire area of the initial non-slurried overburden emplacement.

The catch drain and bunding structure will also act to divert clean stormwater away from the disturbed and contaminated land surfaces.

When the overburden emplacement is completed, a retention structure will be constructed on the top of the emplacement to accommodate the storage requirements associated with the catchment area corresponding to the top of the overburden emplacement. This will minimise the potential flow to the overburden retention structure, reducing the catchment area to the batters of the overburden emplacement (Figure 2).

Slurried Overburden Empacement

The slurried overburden emplacement will be constructed to contain sandy overburden material and will be constructed with overburden materials from the construction pit. The storage will cover an approximate area of 70 ha with embankments an average of 5-10 m in height. The embankments and floor of the storage will be lined with clay to minimise water losses. The slurried overburden emplacement facility will be designed with enough excess capacity to accommodate the additional storage requirements associated with a peak rainfall event.

The slurry dam facility will be surrounded with a catch drain and bunding structure. This structure will retain dirty water that may run-off the embankments, which will be directed to the retention structure. The catch drain and bunding structure will also act to divert clean stormwater away from the disturbed and contaminated land surfaces (Figure 3).

The slurried overburden emplacement will be shaped and capped with up to 3m of clay overburden. When the slurried overburden emplacement is completed, a retention structure will be constructed on the top of the emplacement to accommodate the storage requirements associated with the catchment area corresponding to the top of the overburden emplacement. This will minimise the potential flow to the overburden retention structure, reducing the catchment area to the batters of the slurried overburden emplacement.

Mining Area

The mining area (dredge pond) will effectively act as it's own retention structure. The perimeter of the construction pit will be stripped an additional 20 metres to accommodate an access track. The access track will be bunded to divert clean stormwater away from the disturbed and contaminated land surfaces.

Site Access Roads

Access roads will be bunded to divert clean stormwater away from the disturbed and contaminated land surfaces. Access roads will be watered with saline groundwater for dust suppression purposes if required. Sediment sumps will be placed at regular intervals alongside all access roads, to ensure that all dirty runoff is contained within the sediment sumps for reuse. Groundwater salts collected in these sumps will be periodically removed and deposited with sand residues behind the dredge pond.

Site Office and Workshop

An area will be stripped of topsoil to accommodate the site office and workshop facilities for the duration of the Project. Dirty water will be directed to a local retention structure located in the vicinity of the site office and workshop area. The area will be bunded to divert clean stormwater away from the disturbed and contaminated land surfaces.

Heavy Mineral Concentration Facility

An area will be stripped of topsoil to accommodate the heavy mineral concentration facility for the Project. Dirty water will be directed to a local retention structure located in the vicinity of the facility. The area will be bunded to divert clean stormwater away from the disturbed and contaminated land surfaces (Figure 3).

5 LATERAL SEEPAGE MANAGEMENT MEASURES

The water and sand residue dam and the slurried overburden emplacement will be constructed adjacent to the start up pit to contain saline groundwater and sand residues for the initial period of mine establishment until the dredge pond is developed to design size.

The storage of saline groundwater in the initial water dam and sand residues and slurried overburden containing entrained groundwater could potentially result in the leakage of saline waters to the surrounding environment and damage to adjoining vegetation. A geochemical assessment of sand residues indicates that sand residues are NAF and will not generate environmentally harmful leachate when exposed to surface oxidation processes.

Seepage analyses were carried out to identify seepage management practices that will be incorporated in the dam design so that seepage of saline groundwater does not impact on the environment.

The proposed seepage control measures for the water and sand residue dam and the slurried overburden emplacement are conceptualised in Figures 4 & 5 and are summarised below:

- The dam facilities will include a clay liner approximately 360 millimetre (mm) thick. The clay liner would be compacted to 98% of standard maximum dry density (SMDD) in three layers to provide for a maximum permeability of $1x10^{-8}$ metres per second (m/s), which would minimise seepage through the base of the emplacement. The clay liner would be covered with approximately 200 mm of clean sand material (track rolled) to prevent cracking or drying out of the liner prior to deposition of slurried overburden.

- The low permeability embankment would be constructed of clay, sandy clay, gravely clay and selected stockpiled material and placed in 300 mm layers. The embankment would be compacted to 98% standard maximum dry density with the moisture content at placement chosen to optimise the permeability outcome with the acceptable range anticipated to be between 1% dry and 3% wet of the optimum moisture content.

- A toe drain/trench approximately 300 mm deep would be constructed on the downstream face of the embankment to collect runoff and/or seepage.

In addition, surface water runoff from the embankments will be collected by a spoon drain and directed to evaporation/sediment sumps (Figure 3).

It is proposed that the recovery of water from the sand residue dam and the slurried overburden emplacement will be operated in such a way that only a small pond of water will be maintained with a view to minimising the amount of water which could potentially seep from the emplacement.

In addition to the above design features, monitoring bores will be installed surrounding the water and sand residue dam and the slurried overburden emplacement to monitor monthly for lateral seepage from the emplacement (Figure 2).

Given the above design features/mitigation measures and monitoring, the potential for significant infiltration of saline water to the surrounding environment is considered to be negligible. Given this, and the saline condition of the existing groundwater system, the potential for significant impacts on the surrounding environment resulting from any infiltration is considered to be negligible. Notwithstanding, the proposed monitoring system allows for detection and intervention if necessary.

6 MANAGEMENT AND PERFORMANCE MONITORING

6.1 SALINE WATER USE MANAGEMENT

The use of saline water as a dust suppressant on haul roads and regularly used minor roads will be used for air quality control and safety purposes. The use of saline water could potentially increase the salinity of surface soils in these areas. Figure 2 shows the general arrangement of the site and provides the location of projects roads that would require dust suppression. Haul roads between the dredge pond pit and overburden stockpiles will also require dust suppression. Topsoil will be stripped from all disturbed areas and stockpiled for rehabilitation. The use of saline water for dust suppression during topsoil stripping will not be allowed.

Measures to be adopted for the Project to manage potential salinity issues associated with the use of groundwater as a dust suppressant include:

- **Containment of Potentially Saline Seepage Generated from Initial Water and Sand Residue Dams**

  The proposed seepage control measures for the initial water and sand residue dams include moisture conditioned compacted clay floor liners, upstream clay fill zone embankments, seepage cutoff trenches, moisture conditioned and compacted *in situ* foundation soils and toe drains. Water collected in the toe drains and cutoff trenches will report back to the dredge pond. See Section 5.

- **Containment and Management of Saline Surface Water Runoff**

  The proposed water management scheme incorporates interception drains (toe drains) and collection storages (temporary sediment basins and contained water storages) around stockpile areas and overburden emplacements containing saline materials.

  Groundwater would be used as dust suppression water within the mining lease on roads where runoff is controlled and directed to evaporation sumps. Groundwater salts collected in these sumps would be periodically removed and deposited with sand residues behind the dredge pond.

  Inspections of the evaporation sumps will be conducted to assess potential adverse impacts from the use of saline groundwater. The inspections will be conducted opportunistically after run-off generating rainfall events. Should these areas show substantial degradation as a result of watering with saline groundwater then alternative methods for dust suppression will be considered.

- **Monitoring of Groundwater Bores**

  Monitoring of total dissolved solids and water levels in the groundwater bores will be conducted at monitoring locations at the Snapper Mine (as detailed in the Borefield Impact Management Plan).

- **Isolation of Saline Groundwaters by the Dredge Pond**

  Saline waters used for the Project mining operations will be pumped directly to the dredge pond, via a bunded pipeline, to maintain dredge pond water levels during mining. Saline water requirements of the dredge pond are such that makeup water is required during the life of the Project (i.e. at no stage will is the Project predicted to operate at a water surplus).

- **Monitoring**

  A vegetation monitoring programme would be implemented in areas where saline water is used for dust suppression. The rates of occurrence of vegetative die-back in close proximity to areas of saline water application would be monitored. These results would be compared to similar monitoring to be conducted at control site(s). If monitoring results are indicative of detrimental Project-attributable impacts (such as vegetation die-back adjacent to saline water use areas), an investigative process would be implemented. Criteria to which these impacts are measured against from data collected from control sites will include species diversity, plant density and soil salinity. The investigative process may include:

- species-specific considerations;
- prevailing meteorological considerations;
- methods and rates of road watering and saline water use; and
- rehabilitation measures to mitigate Project-attributable impacts.

In addition to the vegetation monitoring programme in areas where saline water is used for dust suppression, soil salinity (ie electrical conductivity [EC] measurements of a soil/water solution) monitoring will be undertaken. Monitoring will be conducted at sites located within the mining lease existing sites adjacent to the highway access road and other major Project roads at varying distances from the road verge (eg 20m and 40m). The trend of monitoring results will be assessed and an investigative process will be implemented if monitoring results are indicative of detrimental Project-attributable impacts. Such a process may include:

- baseline soil salinity (EC) levels;
- vegetation tolerance levels;
- prevailing meteorological conditions;
- methods and rates of road watering and saline water use; and
- rehabilitation measures to mitigate Project-attributable impacts.

- **Rehabilitation of Areas Subject to Dust Suppression**

  Following cessation of mining, areas that have been subject to dust suppression watering will be rehabilitated. Rehabilitation of these areas will comprise stripping of any salt contaminated materials for disposal under overburden (in the final depression) followed by chemical testing of foundation soils, contour ripping and, if required, chemical amelioration. Stockpiled soils would then be applied as necessary and stabilised. Revegetation would be undertaken with suitable endemic plant species.

6.2 SEDIMENT AND EROSION CONTROL SYSTEMS

Drainage from disturbance areas will be directed to the evaporation/sediment sumps for containment. Waters collected in evaporation/sediment sumps may be utilised for dust suppression at the mine site or allowed to evaporate.

Retention structures will be routinely inspected and cleaned out to maintain design storage capacity. Salts and silty material collected will be removed and deposited with the tailings from the mining operation. Retention structures be routinely monitored to ensure effectiveness, and will be modified if required during routine inspection and clean out.

Documented inspections of on-site sediment control structures will be undertaken following major rainfall events. The structures will also be regularly assessed for structural integrity and effectiveness. Inspections will be undertaken to ensure:

- There are no low points in retention structures that could overtop in a large storm event;

- Sediment fences are not undercutting, sagging and/or overtopping;
- Design capacity and minimum freeboard of sediment dams and drains are maintained;
- Drains and sediment dams are operating as intended; and
- There are no active areas of erosion.

A maintenance program for the sedimentation and erosion control structures will be implemented based on the results of the monitoring program. The following maintenance/ remediation works will be undertaken on sediment and erosion control structures as required:

- Periodically cleaning out sediment dams and diversion drains to maintain design capacity.
- Silt and salts removed from the retention structures servicing access roads that have had dust suppression water applied will be disposed with the tailings from the mining operation;
- Replacement or repairing of sediment fences and other such biodegradable products; and
- Control of excessive vegetative growth in drains and channels where water flow is impeded through mowing, slashing or biodegradable herbicides.

6.3 REPORTING ON THE EFFECTIVENESS AND PERFORMANCE OF THE SEDIMENT AND EROSION CONTROL SYSTEMS

The effectiveness of the sediment and erosion control systems and the performance of those systems will be reported against the objectives contained in the WMP for the management of erosion and sediment migration from disturbed areas on site from construction and subsequent operation of the Project.

In addition, the effectiveness of the sediment and erosion control systems and the performance of those systems will be reported against the EA objectives for erosion and sediment control on-site (Bemax, 2007):

- To control soil erosion and sediment generation from areas disturbed by mining and construction activities.

The programme for reporting on the effectiveness and performance of the sediment and erosion control systems will include:

- Reporting of the site soil erosion status and the effectiveness of the erosion control measures in the Annual Environmental Management Report (AEMR).

An AEMR will be produced for Snapper Mine. Details of the sediment and erosion control strategies undertaken for the preceding 12 months will be reported in the AEMR. The AEMR will also include any proposed modifications to erosion and sediment control strategies for the ensuring 12-month period. The AEMR will be distributed to DOP, DWE, WSC, DPI, DECC and local landholders in close proximity to the operations. The report will also be made available for public information at WSC.

The programme for reporting on the effectiveness and performance of the sediment and erosion control systems will enable the assessment of the effectiveness and performance of the sediment and erosion control systems against the objectives contained in the WMP by recording the erosion and sediment control systems to control of the movement of sediment from areas disturbed by mining and construction activities.

7 REFERENCES

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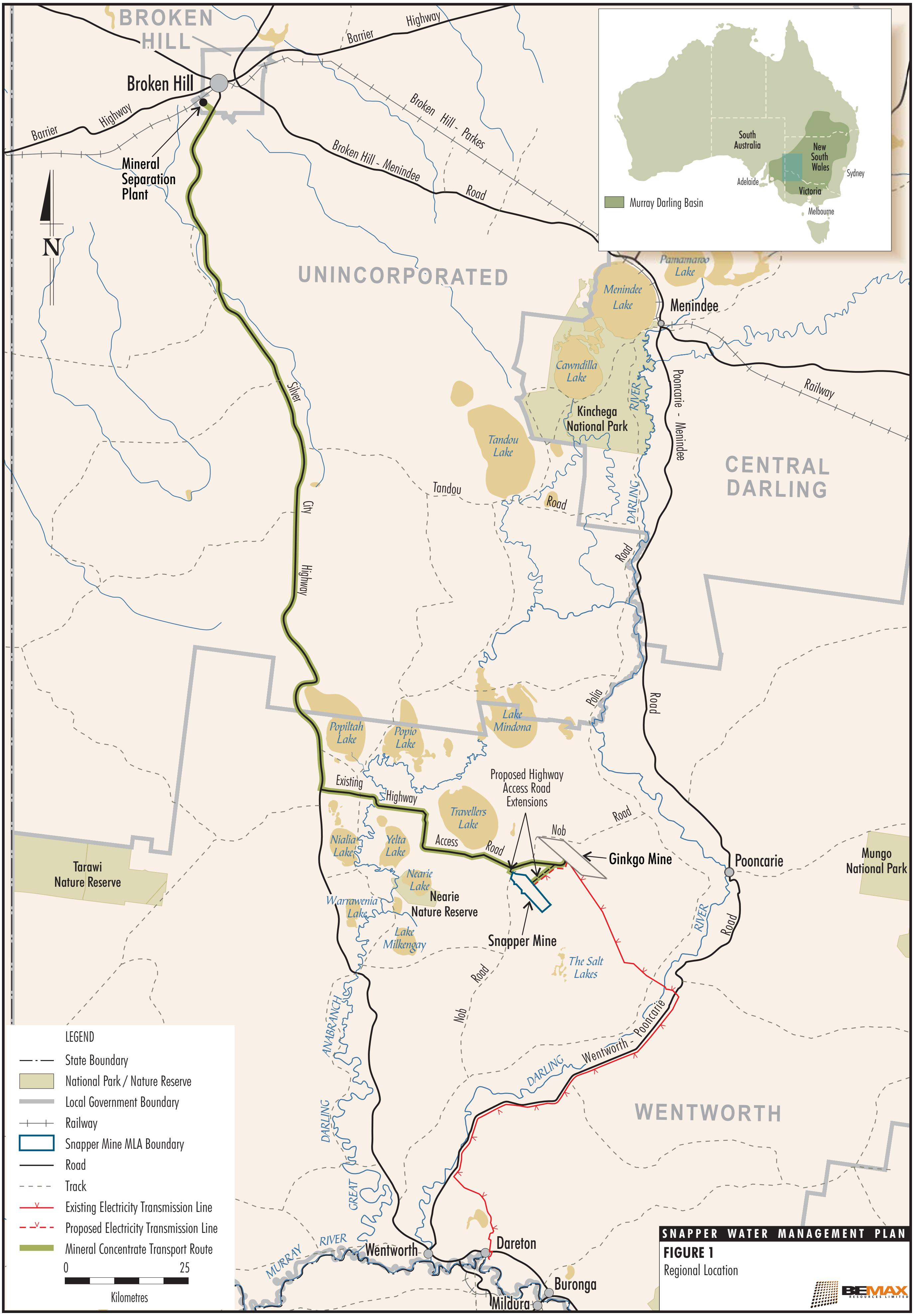
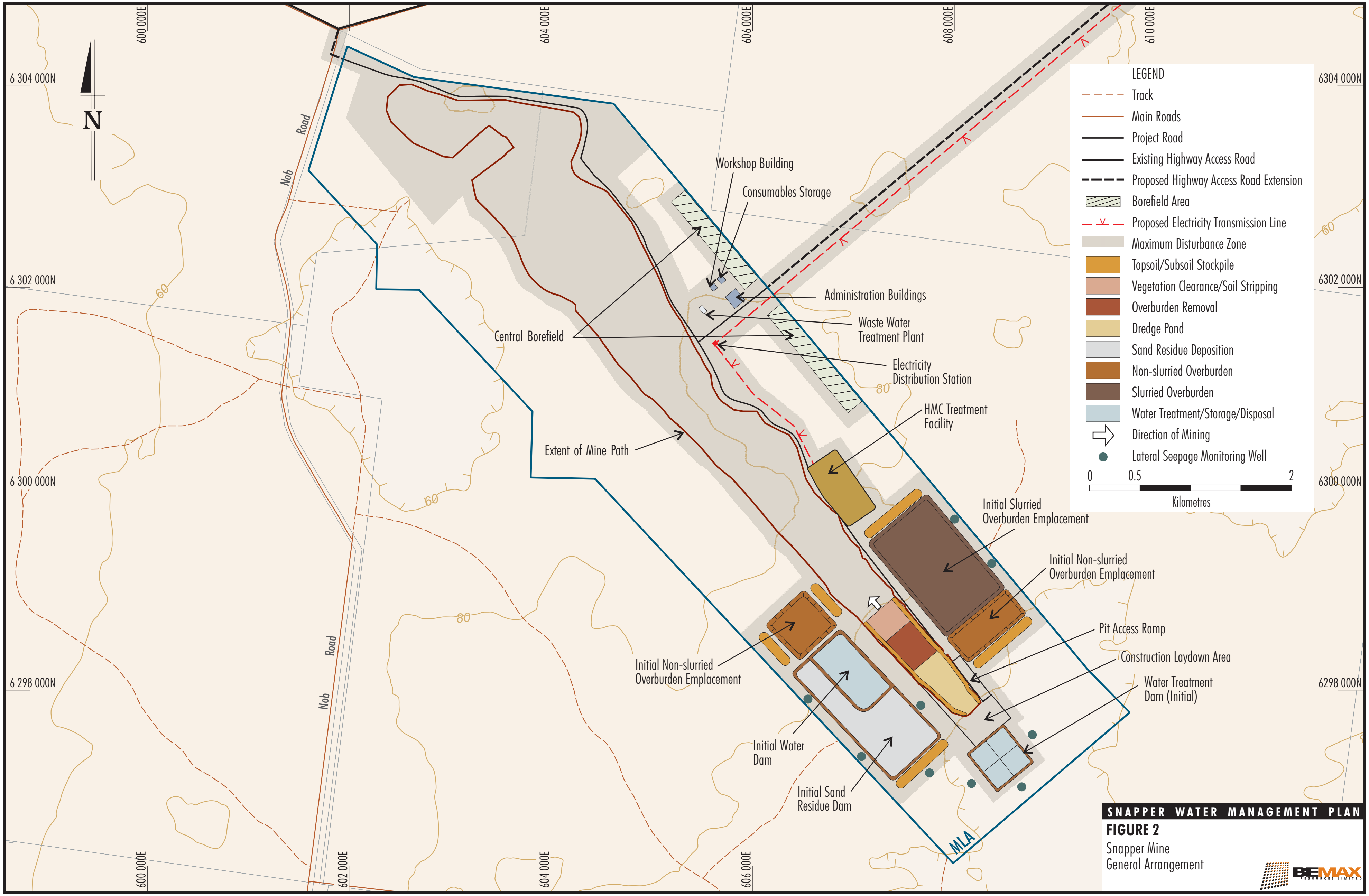
FIGURES



SNAPPER WATER MANAGEMENT PLAN

FIGURE 1
Regional Location

BMX-07-19 WMP_002A



SNAPPER WATER MANAGEMENT PLAN

FIGURE 2

Snapper Mine General Arrangement

BEMAX RESOURCES LIMITED

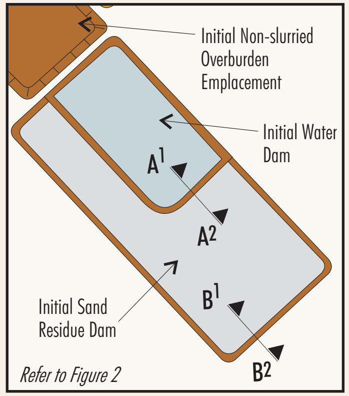
BMX-07-19 WMP_003A

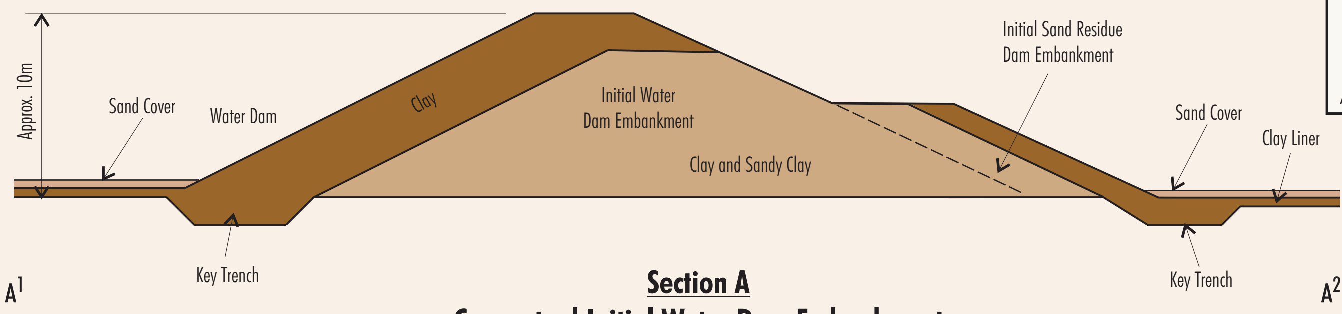
SNAPPER WATER MANAGEMENT PLAN

FIGURE 3

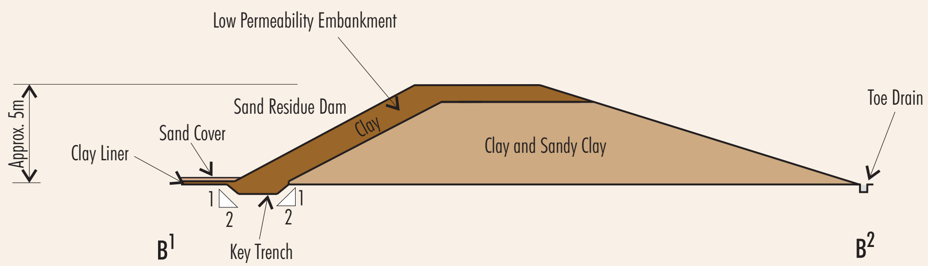
Water Management System

BMX-07-19 WMP_001A





Section A
Conceptual Initial Water Dam Embankment



Section B
Conceptual Initial Sand Residue Dam Embankment

Not to Scale

SNAPPER WATER MANAGEMENT PLAN

FIGURE 4

Initial Sand Residue Dam and
Initial Water Dam - Conceptual
Embankment Detail

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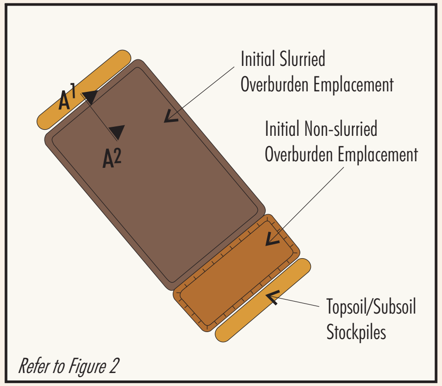

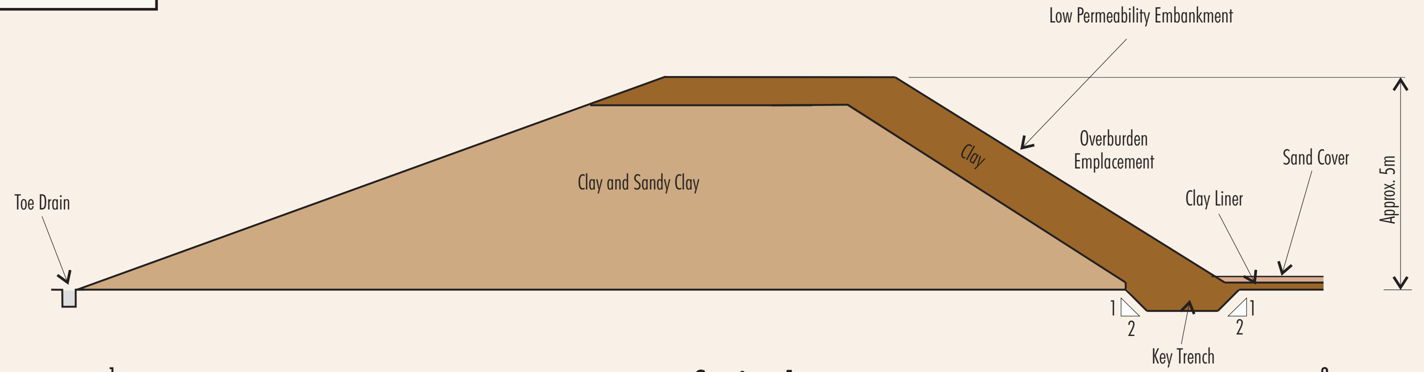

Section A
Conceptual Initial Slurried Overburden Emplacement Embankment

Not to Scale

SNAPPER WATER MANAGEMENT PLAN

FIGURE 5

Initial Slurried Overburden Emplacement - Conceptual Embankment Detail

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