



HATCH

99 4402 PROJECT REPORT

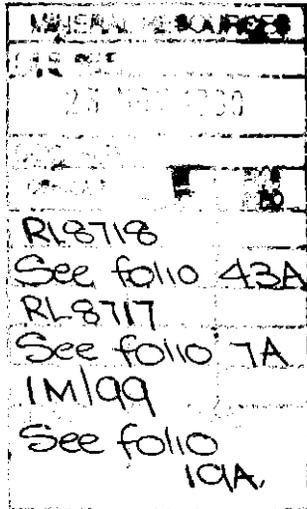
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May 28, 1999

CREST/MULTIPLEX MAGNESIUM PLANT

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MINE PLAN

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Project Report - Mine Plan - Crest/Multiplex
Magnesium Plant - RL 8717 & RL8718
Crest Magnesium NL.; Hatch
Astell, R.

RL8717; RL8718

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1. PREFACE

2. EXECUTIVE SUMMARY

3. INTRODUCTION

3.1 The Proposed Development

3.2 The Proponent

3.3 Corporate Structure

3.4 Project Objectives

3.5 Project Scope

3.6 Alternatives

3.6.1 *Do Nothing*

3.6.2 *Mine Sites*

3.6.3 *Pit Location*

3.6.4 *Ore Haulage*

3.6.5 *Rail Corridors*

3.6.6 *Access Routes*



4. MAGNESIUM METAL PROJECT OVERVIEW

4.1 Introduction

4.2 Project Components

4.2.1 *The Mine*

4.2.2 *The Rail Link*

4.2.3 *The Metal Plant*

4.2.4 *Gas Supply*

4.2.5 *Power Station*

5. RESOURCE GEOLOGY AND MINING LEASE

5.1 Resource Geology

The magnesite deposits of the Arthur and Lyons River area, northwestern Tasmania, occur in a north northeasterly striking belt of metamorphosed Pre-cambrian rocks within the Arthur River Lineament which extends from Wynyard in the North to Granville Harbour on the West Coast, a distance of some 105 kilometres (**Figure 5.1-1: Project Location**).

The regional geology of the area covering Retention Licences 8717 (Lyons River) and 8718 (Arthur River) comprises a sequence of folded quartz mica schist, micaceous quartzite and phyllite with minor dolomite overlying magnesite and dolomite which in turn overlies pyritic siltstone, mudstone and quartzite with minor carbonate and amphibolite. Intrusive into the Proterozoic sequence are mafic dolerite/gabbro dykes and/or plugs of both Proterozoic and Jurassic age.

These rocks are in turn overlain by siltstones, mudstones, fine grained sandstones and carbonaceous shales of Permian age.

In the Lyons River area there is an extensive cover of Tertiary basalt both as flows and possibly plugs. In the Arthur River area, with the exception of minor magnesite exposures in riverbeds, almost all the magnesite resource zone is concealed under a cover of Quaternary-aged alluvium and residual soil (**Figure 5.1-2: Regional Geology**).

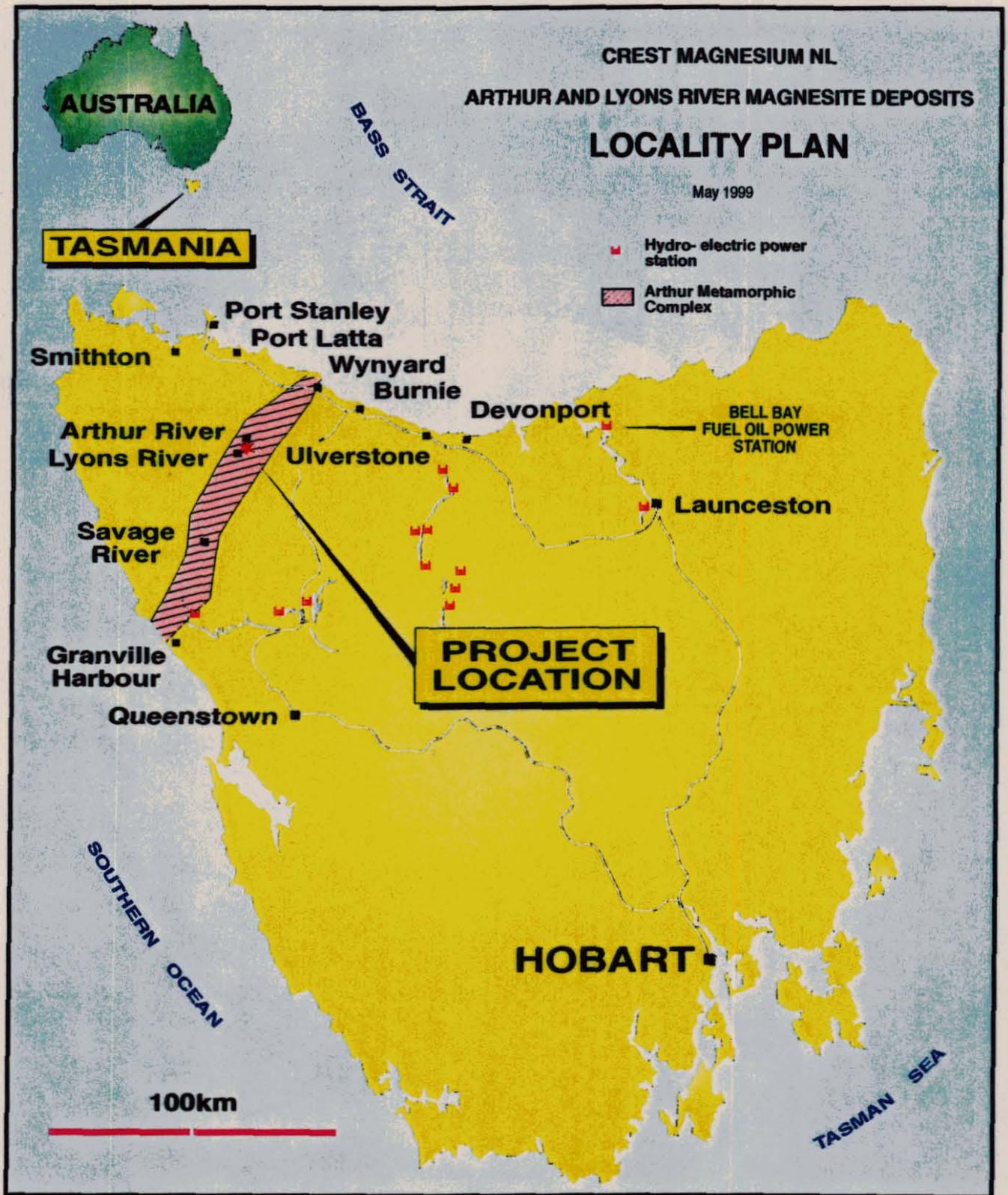
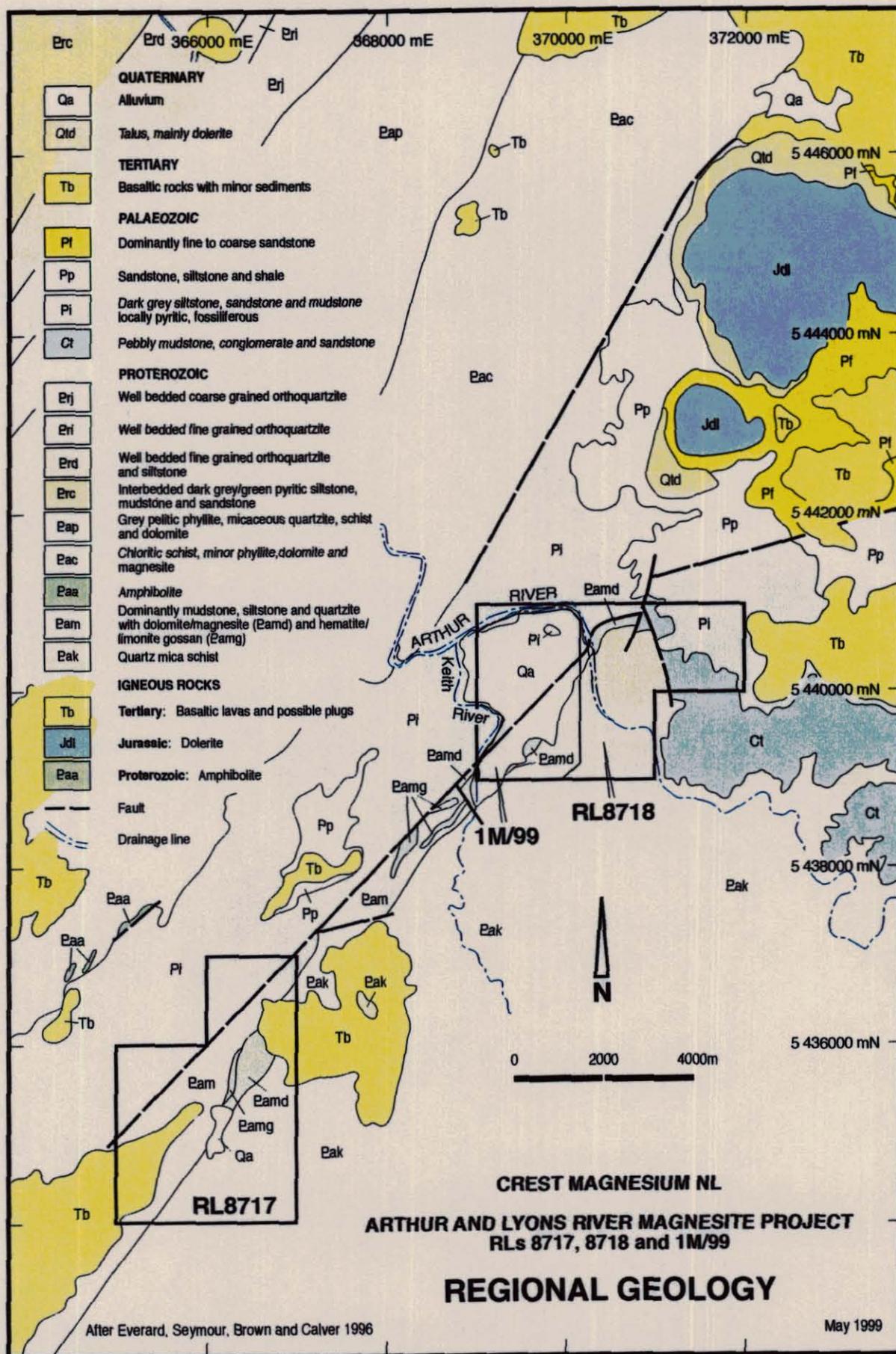
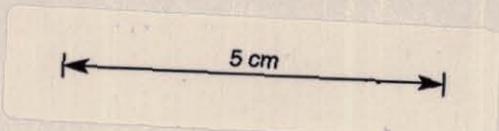


Figure 5.1-1



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Figure 5.1-2



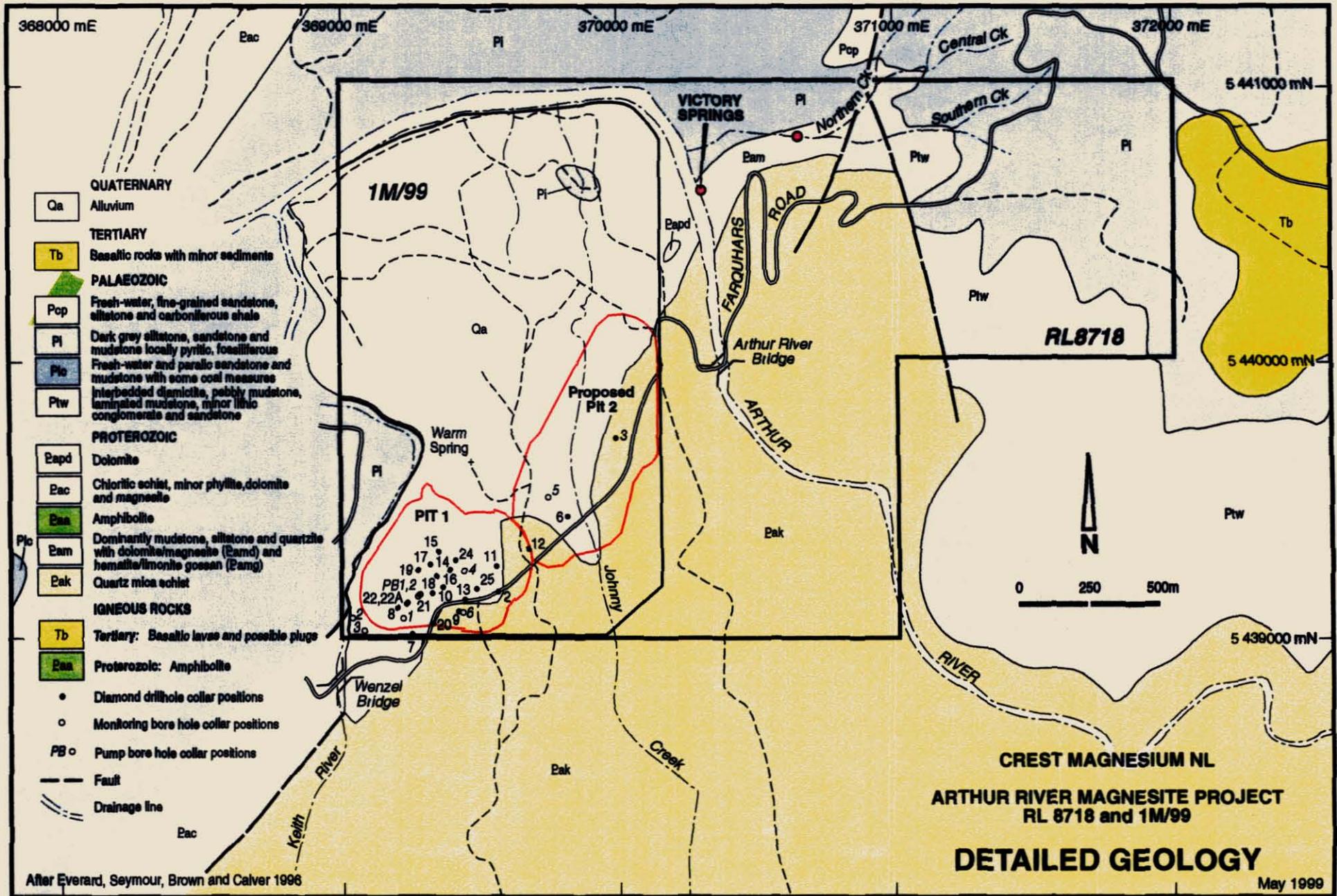
5.2 Mining Lease

The Arthur River magnesite deposit occurs within Retention Licence 8718 which has an area of 5 square kilometres. Within this retention licence a resource zone has been identified by exploratory, check and infill drilling having a strike length of at least 2500 metres, ranging in width from 100 metres to at least 350 metres and dipping steeply to the southeast.

It has been estimated from past and recent drilling that the Arthur River magnesite deposit contains as much as 100 million tonnes of high grade magnesite to a vertical depth of 150 metres. Diamond drilling evidence indicates that the high grades continue at depth to at least 400 metres below ground surface (-240 metres AHD) and probably much deeper.

In February 1999, a Mining Lease (1M/99) having an area of about 195 hectares was applied for within RL 8718, covering about 1.5 kilometres strike length of high grade magnesite mineralisation. The proposed mining operation to extract some 15 million tonnes of this high grade resource is located in the southwestern corner of the mining lease and covers an area some 250 metres long by 200 metres wide, and to a vertical depth of 145 metres.

The geology of the mining lease is almost totally concealed beneath a 10-15 metres deep cover of sand, gravel and boulder sediments. Outcrop is negligible being confined to in-situ magnesite in watercourses draining the area together with schistose scree material commonly present adjacent to the main formed gravel access track which skirts the southern edge of the resource zone (Figure 5.2-1: Detailed Geology) & Figure 5.2-2: Detailed Topography).



After Everard, Seymour, Brown and Calver 1996

ORD STREET DIGITAL (+61B) 9321 8598

Figure 5.2-1

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In addition to mapping carried out by earlier workers the bulk of the geological information has been obtained from drill core recovered during the three exploration programmes completed in 1983 (CRAE), 1997 (Tasmania Magnesite NL) and 1998/1999 (Crest Magnesium NL/Multiplex JV).

The geological setting is summarised as follows: -

Quaternary

- Grey sand/silt/boulder alluvium and red brown limonitic clay at the northeastern end of the resource zone which contains dolerite rubble. This igneous intrusive, of which the attitude and thickness is unclear, divides the magnesite resource into two parts.

Tertiary

- Basaltic rocks with minor sediments.

Palaeozoic

- Permian sandstones, siltstones and mudstones.

Proterozoic

- Hanging-wall quartz schist
- Magnesite with minor dolomitic horizons
- Footwall pyritic schist, dolomite and siltstone which is commonly contorted and brecciated adjacent to the contact with the overlying magnesite.

Proterozoic/Jurassic

- Intrusive dolerite dykes or plugs.

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6. ENVIRONMENT AND CONSERVATION CONTEXT

6.1 Land Use, Tenure and Zoning

6.2 Historic Heritage

6.3 Aboriginal Cultural Heritage

6.4 National Estate

6.5 Geomorphology

6.6 Magnesite Karst

6.7 Geoconservation Significance

6.8 Landscape Values

6.9 Visual Characteristics and Viewfields

6.10 Site Topography

6.11 Nature of the Overburden

6.12 Terrestrial Flora

6.13 Terrestrial Fauna

6.14 Karst Invertebrate Fauna

6.15 Aquatic Biota

6.16 Site Surface Water

6.17 River Water

6.18 Groundwater

6.19 Flood Vulnerability



6.20 Fire Sensitivity

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6.21 Recreational Values

6.22 Meterology



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7. THE MINE PLAN AND MINING OPERATIONS

7.1 Mine Geological Model

7.1.1 Introduction

Drillhole data were converted into digital format to allow resource modelling and estimation for the Arthur River Magnesite Project.

Drilling data were provided in the form of hand-written geological logs and digital text files for the drill core assays, whilst drillhole collar surveys were keyed in from data from contract surveyors.

Drillhole sections were established on a local grid for simpler computer processing. Resource estimates were completed using the Surpac2000 software, and comprise both a classical sectional resource model and a block model.

For the block model, wireframes were constructed and used to constrain interpolation of block grades. The inverse distance weighting technique was used for grade interpolation.

7.1.2 Data Collection

7.1.2.1 Surveying

Local Grid and AMG Transformation Coordinates

A local grid was placed over the AMG for resource modelling and estimation purposes. Local grid North is oriented 60° ENE of AMG North. Any coordinates referred to in this report, or shown on drawings, relate to the AMG. Coordinates shown on sections are in local grid coordinates.

Local grid to AMG ties are given below:

Mine Grid		AMG	
10 000E	20 000N	369 048.1E	5 439 069.5N
10 000E	20 650N	369 611.0E	5 439 394.5N

Collar Surveys

Almost all drillhole collars were surveyed by GPS and instrument surveys carried out by contract surveyors. Drill rigs were oriented on the grid using a compass or sighter pegs. Drillhole declination was set using a clinometer placed on the drilling rods, after the drilling rig had been levelled.

Downhole Surveys

One downhole survey was carried out on AR023 during the 1997-1999 drilling programme. No dip deviation was recorded. CRAE holes were downhole surveyed using a single-shot Eastman camera and these reported surveys were used in the database.

7.1.2.2 Drilling

Drilling Location Plan

Holes drilled to date within 1M/99 are shown in **Figure 5.2-2**.

Drillhole Pattern

The drillhole pattern was generally 40m fences with holes variably spaced along these lines.

Drilling Methods

Resource delineation drilling was by the diamond coring method. Results of some 1983 programme diamond core holes were included in the database. Data from water-monitoring and pumping boreholes were not used in the resource estimates.

7.1.2.3 Sampling

Sampling Procedures

All cores from diamond drilling were collected and stored in core trays. All cores were logged and then photographed on site, prior to delivery for sample preparation. The cores were cut and quartered using a diamond saw, and one-quarter core was taken for sampling. Core was crushed and pulverised in Burnie and then dispatched to Perth for analysis. The remaining three-quarters of the cores have been stored in Burnie for future use. Reject pulps were dispatched to Canada for metallurgical testwork.

Sample Recovery

Core recoveries were logged by the geologist and recorded on the drill logs. They have yet to be entered in the database.



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Sample Preparation and Assaying

Sample preparation involved oven drying the quarter cores, followed by crushing, splitting and milling the sample to pass 75µm (90%). 100g was split from each milled sample and fused with 12/22 flux to form a disc. Each disc was assayed by XRF (X408, detection limit 0.01%-0.05%). L.O.I. was performed for each sample.

Sample and Assay Quality-Control

External quality-control checks (cross-lab checks) are being carried out and will be completed prior to final reporting of any resource estimates to provide additional assurance that assay results were precise and unbiased.

In the initial analyses, internal laboratory quality-control checks were made by performing repeats on 70 samples, as well as insertion of certified standards. Scatter plots for the original sample analyses versus the repeat sample analyses for four major components are shown in **Figure 7.1-1 Scatter Plots**. No bias is evident from these results. One spurious repeat sample was found to have been incorrectly labelled, and was corrected.

Logging and Mapping Procedures

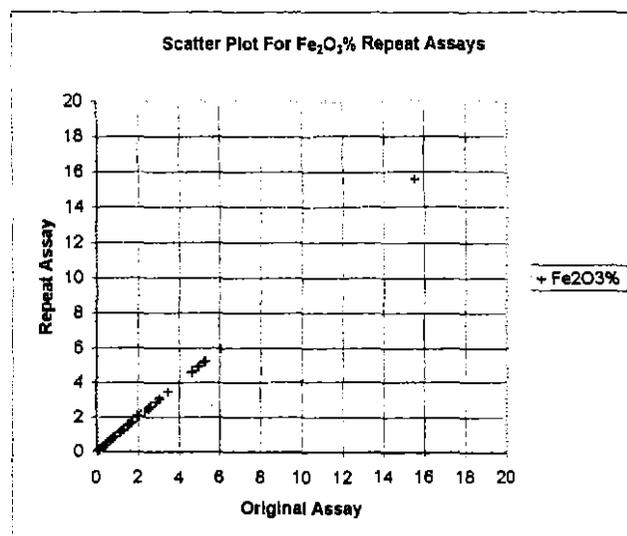
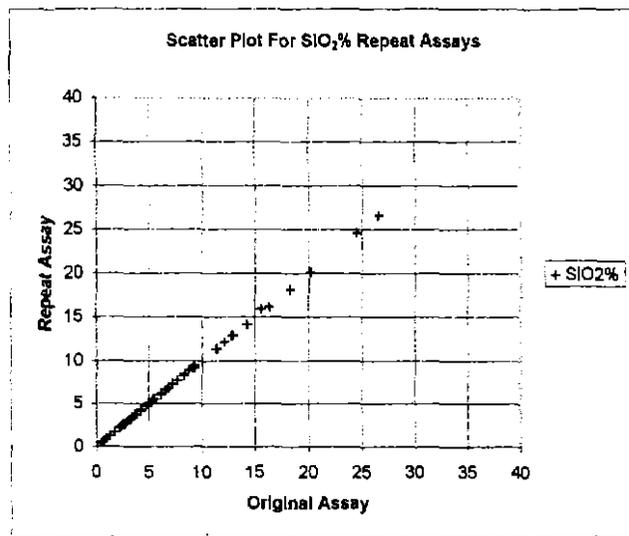
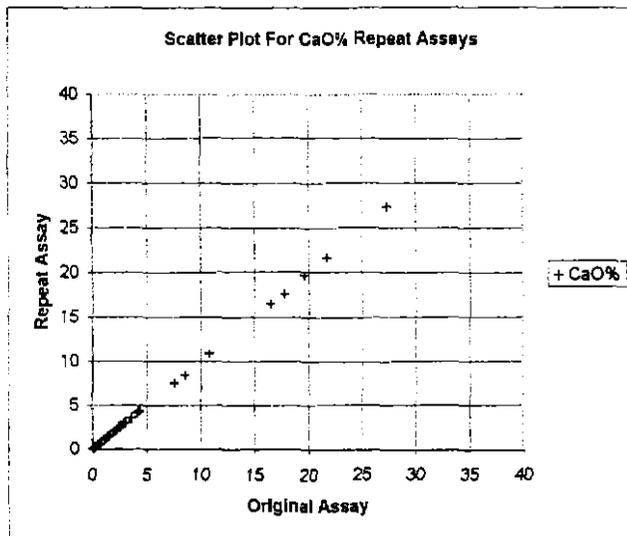
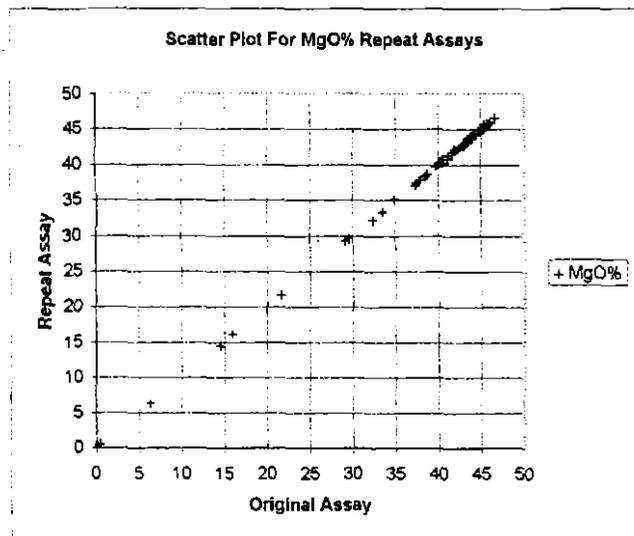
All holes were logged using standard Drill Log Sheets and nomenclature. Geological descriptions were simplified and coded, and entered into a geology table in the database. Cavities that had been recorded on the logs were also entered into the geology table.

7.1.2.4 Bulk Density Testwork

Initial bulk density assumptions were based on 1983 testwork. In April 1999, further testwork was carried out by Analabs in Burnie, with results supporting the assumptions used in the resource modelling. Both datasets resulted from testing using the water immersion method.

Densities used in the sectional resource modelling are detailed below:

<u>Rocktype</u>	<u>Density g/cm³</u>
Footwall/Hangingwall schist & siltstones	2.5
Overburden	2.0
Hard crystalline magnesite	2.7
Clayey magnesite	2.6
Broken hard magnesite	2.6
Cavernous, decomposed magnesite	2.6
Dolerite	2.7



Scatter Plots For Major Minerals - Repeat Assays

Figure 7.1-1 Scatter Plots

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7.1.3 Statistics

7.1.3.1 Distribution

Histograms for the major four minerals are shown in **Figure 7.1-2 Histograms**. All four compounds show highly skewed distributions.

7.1.3.2 Cut-off Grades

Sectional ore zones were interpreted at 38.0% MgO, 4% CaO, 6% Fe₂O₃ and 12% SiO₂ cut-off grades, with the MgO and CaO assays being the principal controls.

7.1.4 Resource Estimation

Sectional ore zones were interpreted at 38.0% MgO, 4% CaO, 6% Fe₂O₃ and 12% SiO₂ cut-off grades, with the MgO and CaO assays being the principal controls.

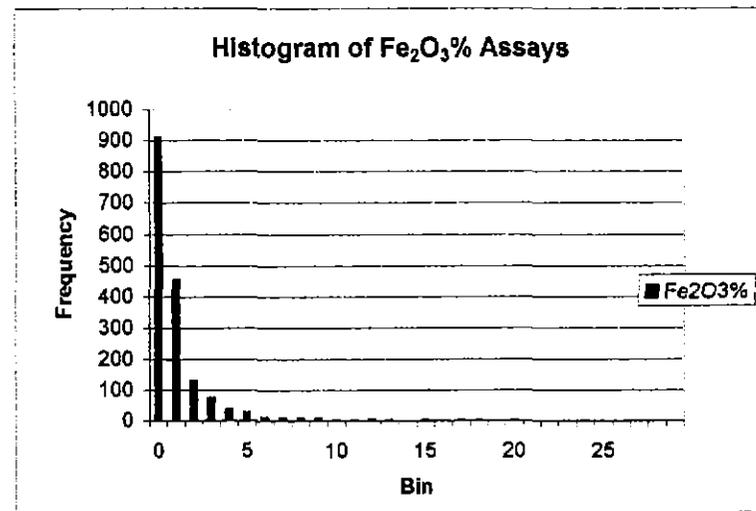
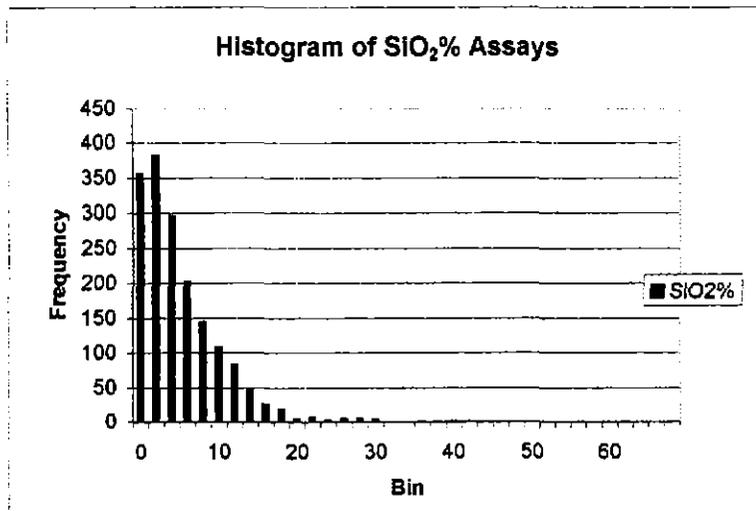
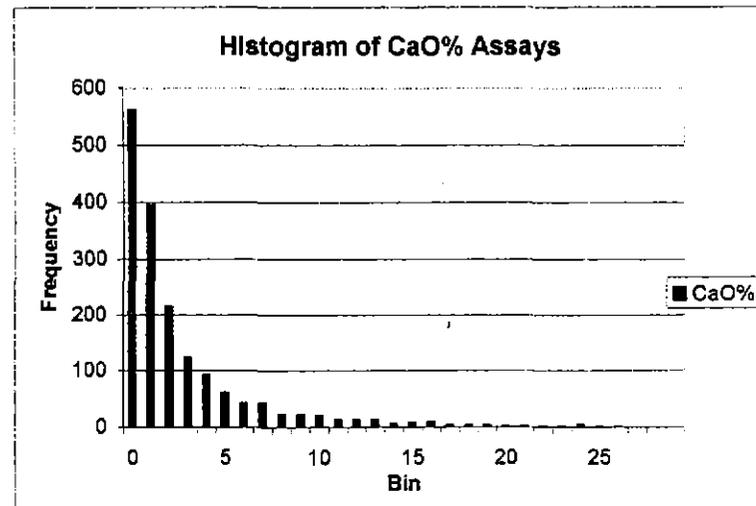
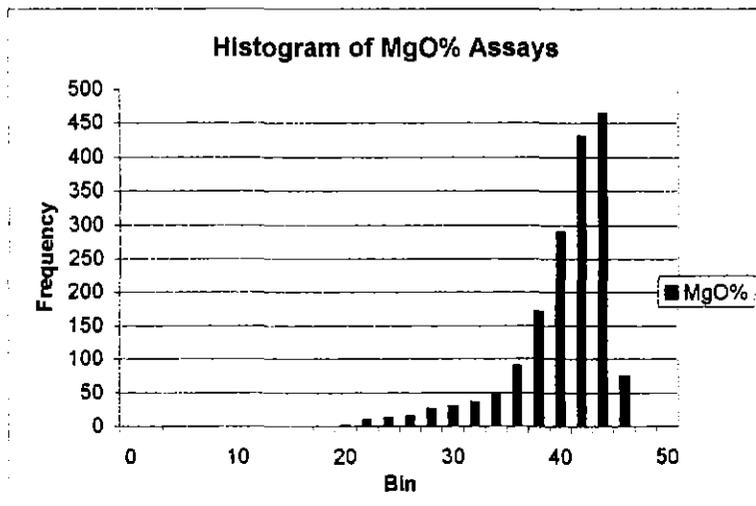
7.1.4.1 Geological Interpretation and Procedures

A sectional interpretation at 40-50m sectional intervals was completed in April 1999. The sectional polygons followed a model of steeply east-dipping (~65-70°, local grid East) footwall and hangingwall rocks bounding the magnesite zone. To the North (local grid) of the main magnesite zone (as currently drilled), the magnesite is intersected by two dolerite dykes, interpreted to be parallel to each other but cross-cutting the magnesite. Insufficient drilling data are available to provide a better model of the dolerite orientation and thickness. Mineralised structures were modelled as being parallel to the footwall/hangingwall contacts. Magnesite was classified into clayey, cavernous, broken, crystalline and high CaO% zones.

7.1.4.2 Polygon Parameters, Procedures and Classification

Polygons were interpreted on sections using the following parameters:

- footwall and hangingwall contacts, with the contacts interpreted where no drillhole intercept data were available.
- high CaO% zones, parallel to footwall or hangingwall rocks, considered to be continuous down-dip on the footwall side and discontinuous down-dip on the hangingwall side, restricted to 40m away from the drillhole intercept on the hangingwall side, or halfway to the nearest hole, whichever was the lesser;
- no down-hole edge dilution;
- all polygons were classified as measured;
- magnesite classified as clayey was further subdivided into high grade and low grade zones;
- alluvium/overburden zones were modelled on each section.



Frequency Histograms For the Major Minerals

Figure 7.1-2 Histograms

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7.1.4.3 Block Modelling

Procedures and Model Parameters

Wireframes were constructed for the main magnesite zone inclusive of broken, hard, iron-stained, cavernous decomposed and high CaO% zones; for the high CaO% zones; for the high grade clayey and low grade clayey magnesite; and for the interpreted dolerite dykes.

The block dimensions for the Surpac model were:

Basepoint	Cells	Number	Minimum cell size (Subcells)
9640E	X 20m	42	X 10m
19919N	Y 20m	43	Y 10m
0mRL	Z 5m	55	Z 2.5m

Rotation

0°

Attributes and Background Values

MgO	0.0
CaO	0.0
Fe ₂ O ₃	0.0
SiO ₂	0.0
SG	2.5
Category	3.0 (Measured)
Rocktype	WASTE

Bulk densities shown below were applied to the entire model.

Rocktype	SG
Magnesite	2.7
High CaO% magnesite	2.7
High grade clayey magnesite	2.6
Low grade clayey magnesite	2.6
Overburden	2.0

Samples were composited to equal lengths of 1.5m. Grades for MgO%, CaO%, Fe₂O₃% and SiO₂% were assigned to block centroids by interpolation using IDW squared methods. Large search ellipsoids were used due to the large spacing between samples, particularly on some of the sections. Search ellipsoid radii and orientation are detailed below:

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Rocktype	Ellipsoid Radius (m)			Ellipsoid Orientation	
	Major Axis	Semimajor Axis	Minor Axis	Bearing	Dip
Magnesite	100	100	25	0	-70
High CaO% zones	100	100	25	0	-70
High grade clayey magnesite					
Steep dipping	100	100	25	0	-70
Flat dipping	100	100	25	0	5
Low grade clayey magnesite					
Steep dipping	100	100	25	0	-70
Flat dipping	100	100	25	0	5

A maximum of 10 of the nearest samples was used to interpolate grades into each of the cells.

All cells were classified as Measured and were assigned a flag of 3.

The natural surface was mined off using a digital terrain model (DTM), constructed from the 1:25000 topographic contours provided by Pitt & Sherry Holdings Pty Ltd in March 1999, along with surveyed points along tracks within the mining lease 1M/99, from Peacock, Darcey & Anderson Pty Ltd.

The block model was called BMOD1.MDL.

7.1.5 Further Work

Further work may be necessary to determine the orientation of the clayey and high CaO% magnesite zones which have largely been inferred from drilling data. The hangingwall has not been defined on some sections, so the approximate position has been interpreted. Further drilling could also possibly establish the orientation of the hangingwall and footwall and any structural controls, as well as provide information concerning the orientation and thickness of the dolerite dykes. However, because the available tonnages of high grade magnesite resource are very large, further exploration can probably be deferred until mining commences, at which time some grade control measures may have to be implemented in these areas where high CaO% magnesite is known to occur.

Concerning resource estimates established from the above model, minor adjustments may be necessary as additional information becomes available.

It should be further noted that the current mine model is based on relatively wide spaced data and should therefore be classified as preliminary.

Drilling along strike from the current proposed pit position, between drillholes AR003 and AR006, is recommended. This additional work may delineate better quality magnesite, in particular less clayey magnesite and magnesite uninterrupted by dolerite intrusions. It may

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also establish a magnesite resource without the restrictions imposed on the current resource, namely the proximity to the Keith River (and possible water ingress from the river into the pit), and the southern boundary of the mining lease 1M/99.

Quality control cross-laboratory checks currently in progress need to be completed and data analysed. Further drilling and sampling should incorporate quality control procedures such as replicates and blanks per sample batch, as well as cross-laboratory checks, for improved confidence in the sample analyses.

7.2 Overburden and Waste Rock Characteristics

7.2.1 Overburden Characteristics

Information derived from drilling, drill-site preparation works and exploratory pitting, indicates that the overburden largely comprises grey sandy gravels containing some silt and pebble/boulder horizons. The gravels are composed of well rounded schist, dolerite, magnesite and quartz material, whilst the sand size fragments comprise both sub-rounded and well rounded fractions.

More detailed information from site pit excavations by Pitt and Sherry is recorded below.

In addition to the gravel overburden, there is an extensive area of red-brown clay developed, on rising ground at the northeasterly end of the resource zone, in the vicinity of Sections 20420N, 20500N and Section 20660N. These red brown clays are associated with two dolerite dykes which were encountered during drilling of diamond drill holes AR 002, 011, 012, 013, 014, 024 and 025.

Pitt and Sherry

More detailed summarised report on their pit excavations

7.2.2 Waste Rock Characteristics

The material designated waste rock comprises:

- Soil - possibly 100,000t
Requires special dump area for future rehabilitation works.

- Overburden - possibly 7.30 million tonnes
Includes some clays developed over doleritic intrusions at northeastern end of resource zone and areas of clay developed over hangingwall schist which had no drill control on overburden thickness. No special stock pile requirements apart from possibly lower angle batter slopes.

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- Waste - possibly 13.50 million tonnes.
Includes all hangingwall and footwall schist, low grade clay and dolerite and pyritic footwall schist (which possibly totals 900,000 tonnes).

In addition to waste rock stockpiles, the high and low grade clayey magnesite resource together with magnesite containing >4% CaO will also be selectively stockpiled for probable future blending with hard, high grade magnesite which will be used for plant startup.

7.2.3 Overburden and Waste Rock Management

7.2.3.1 Management

Top Soil

Following initial excavation, top soil will be stored progressively in a bunded area from the pit. This top soil will be used for the progressive rehabilitation of the overburden and waste rock dump re-vegetation.

Overburden

Overburden that is suitable for fill material will be used as such. Material over and above this will be placed on the waste dump. The progressive development is shown on drawings AO-G-0002, AO-G-0003, AO-G-0004, AO-G-0005 and AO-G-0006. The duration of the stages are shown. A cross section of the dump is shown in drawing AO-G-0007.

Waste Rock

Footwall material containing disseminated pyrite has been intersected in the resource drilling. This material will be sealed in a clay area within the waste dump.

Sediment Run Off Control

The waste dump will have a drain on each berm at the intersection of the batter (See Drawing AO-G-0007). These drains will be graded to either inlet of the settling pond and discharge directly into it. Thus any erosion will only result from rain falling on to the batter face.

A drain will be constructed at the toe of the dump. For details of the settling pond and discharge see the Golder Associates report in Appendix A.

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7.3 Mine Plan and Pit Layout

Mining of magnesite will be by open pit methods. Sequencing of the open pit excavation will need to ensure that the yearly strip ratio does not exceed 5:1.

The final open pit totals 37.6 million tonnes comprising 13.2 million tonnes high grade magnesite, 2.2 million tonnes high calcium magnesite and 1.6 million tonnes high grade clayey magnesite and 20.6 million tonnes of waste.

These resource categories will be stockpiled for possible future blending with high grade treatment plant feedstock.

Mining will be by truck and excavator and the material will be broken by drilling, charging and blasting. It is anticipated that the complete blasting service will be contracted out.

All open pit faces will be excavated and dressed to reduce erosion. Faces will be supported by concrete grouted bird-caged bolts or cable bolts, as required.

The top face will have a 40° batter slope which may be supported with fibrecrete and grouted birdcaged bolts. The top surround adjacent to the Keith River will have a 2 meter high bund wall, with sides sloping at 30 degrees and a top width of at least 2 meters. This bund may have to be wider to allow dumping of suitable material.

A windrow will be positioned around the pit circumference and starting at at least 2 meters back from the high wall.

The first wall face of 40° will be 5 meters high onto a 5 meter wide berm. This berm may be formed as a drain and possibly fibrecrete lined.

The next face is proposed at 45° for a 20 meter high lift to a 5 meter wide berm.

The next face is proposed at 55° also for a 20 meter high lift to a 5 meter wide berm.

Faces below are proposed at 65° face angle for each face of 20 meters height.

All catch berms are 5 meters wide.

Design controls for the final open pit layout are the Keith River where the pit edge is located at least 50 meters from the stream edge.

Along southern boundary of 1M/99 the high wall is located 30 meters from the boundary to allow a windrow and a lined spoon drain.

The final floor level of the pit is planned for RL10 being controlled by the proximity of the Keith River.

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A 15 meter wide ramp at 1 in 8 gradient is proposed. This is wider than normal but allows for an adequate windrow and a drain which may be required in the wet months.

7.4 Mining Stages and Timing

Five mining stages are shown on separate stage plans 7.5-1-5 and Stage 1 is a small pit to 80 meters depth to ensure that if any flooding occurs it should fill this pit and allow production to be maintained from other stages.

Stage tonnages are as follows:

Stage	Ore Tonnes	Waste Tonnes	Strip Ratio	Incremental Ore Tonnage and Timing
1	2,600,000	5,100,000	2.01:1	2,600,000 @ 1M tpa = 2.56 Years
2	1,500,000	6,800,000	4.56:1	4,100,000 @ 1M tpa = 4.04 Years
3	1,900,000	7,200,000	3.81:1	6,000,000 @ 1 M tpa = 5.93 Years
4	2,600,000	3,000,000	1.20:1	8,600,000 @ 1 M tpa = 8.49 Years
5	4,700,000	2,300,000	0.49:1	13,300,000 @ 1M tpa = 13.16 Years
	13,300,000	24,400,000	1.86:1	
Total	37,700,000 Tonnes			

7.5 Process Flow Chart

7.5.1 Design Criteria

Production Capacity	1,000,000 tpa
Operations	50 weeks
Days per week	5 days
Shifts per week	5
Total hours per shift	10
Variation Allowance	85%
Tonnes per shift	4000
Net hours crushing operating per shift	8 hours
Net hours crushing per shift	7 hours
Design processing rate	700 tpG

7.5.2 Process Flow Sheet

See Figure 7.5.2-1 Process Flow Sheet.

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7.6 Major Items of Equipment

7.6.1 Mobile Equipment

The following equipment will be required for open pit mining, feeding the crusher, drilling blast holes, forming roads, dumps etc, loading rail trains or road trains, general cleanup, and as personnel carriers.

- 5 x 50 Tonne Haul Trucks (capable of 1 in 8 grade)
- 2 x 80 Tonne Excavator
- 1 Drill (not top hammer) capable of 10 meter single pass and 110mm to 180mm holes
- 1 Water Truck (2nd hand as work load will be limited)
- 2 x 10 Cubic Meter Front End Loaders
- 1 x Grader to clean roads etc.
- 1 x Rubber Tyred Dozer
- 1 x Bobcat
- A D11 Dozer size can be hired as required
- 3 x Covered Land Cruiser type vehicles
- 3 x Covered Van 4WD type vehicles
- 2 x Tray 4WD vehicles
- 4 x Trailer Mounted High Lift Pumps
- 1 x 4 Wheel Drive Ambulance (Ex Hellyer)
- 1 x Mobile Rock Breaker
- 1 x Fuel/Oil Maintenance Vehicle

7.6.2 Fixed Equipment

These will include crusher grizzly, bin, feeder, crusher, conveyors, sump pumps, workshops, offices, ablutions, etc.

7.6.2.1 Equipment Schedule Materials Handling Plant

Design Tonnage - 700 T/Hr

DESCRIPTION	CAPACITY	POWER	NOISE
Hydraulic Rock Breaker	Heavy Duty	55 Kw	105 dBa @ 1M
Grizzly Feeder	700 t/hr	40 Kw	100 dBa @ 1M
Jaw Crusher	400 t/hr	160 Kw	103 dBa @ 1M
Collecting Conveyor	700 t/hr 800mm	15 Kw	N/A
Transfer Conveyor	700 t/hr 800mm	75 Kw	N/A
Dust Extraction Unit	5000 M ³ /hr	7.5 Kw	85 dBa @ 1M
Overhead Crane	5 tonne	2.5 Kw	N/A
Mine Pit			
Workshops & Offices	Small Power	40 Kw	

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7.6.2.2 *Equipment Description*

Hydraulic Rock Breaker

A heavy duty hydraulic rock breaker will be used mounted on a tracked vehicle. The rock breaker selected has not been fitted with a silencer but one could be fitted if required.

Grizzly Feeder

A Grizzly Feeder would be used to feed the jaw crusher. Particles below 150mm will pass directly to the collecting conveyor.

Jaws Crusher

The jaw crusher will be fed by material less than 750mm and greater than 150mm. The product will be material of less than 150mm. This is the maximum particle size suitable for down stream processing.

Collecting and Transfer Conveyor

The discharge from the jaw crusher will be onto the collecting conveyor. The transfer conveyor will transfer the material to stockpile. Both these conveyors are envisaged to be 80mm belt width.

Dust Extraction Unit

A dust extraction unit will remove the dust from the jaw crusher. The air will be cleaned by either bag or cartridge type air filters. It is envisaged that air will be extracted at approximately 5000M³/hr.

Overhead Crane

An overhead crane is provided to maintain the jaw crusher.

7.7 Energy Sources

7.7.1 *Mine Electrical Power Supply*

The deposit is located approximately forty kilometres inland between the Arthur and Keith rivers and southwest of the coastal town of Burnie in the northwest area of Tasmania. The deposit is located in a relatively undeveloped area and there is no electrical infrastructure convenient to the site location. Because of the lack of electrical facilities the electrical power supply for the mine will be by means of diesel powered alternator sets. The mine reticulation will be designed such that when an alternative source of electrical power can be provided by



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an electrical utility supplier this can be readily connected to the mine reticulation at a future date.

7.7.2 Standards

All electrical equipment will be supplied in accordance with the relevant AS, IEC and BSS specifications and codes of practice as applicable.

7.7.3 Estimated Mine Electrical Demand

The total electrical power requirements for the mine site excluding the mine dewatering pumps is approximately 400 MVA. The mine dewatering pumps will be trailer mounted mobile units powered directly by diesel engines. The ratings of the pumps are relatively large and operate intermittently on an as required basis. This has implications with respect to the unnecessary over-sizing of the diesel alternator sets and obviates the necessity of taking electrical power supplies from the surface substation into the mine itself.

7.7.4 Main Power Supply

The diesel alternator station will be located in a central position on site near the crusher plant and sited adjacent to the substation. To cater for the total expected plant power demand as well as the starting duty of high inertia loads such as the crusher and transfer conveyor the installed diesel alternator capacity will be 500 KVA. This capacity will be provided by two diesel alternator sets each rated at 250 KVA 400 volt, three phase, 50 Hz and capable of being synchronised and operating in parallel. The diesel alternator sets will be installed on a concreted area and be protected from the weather by an open sided, flat roofed steel structure. Power will be fed from the diesel alternator sets by cable to a low voltage motor control centre located in a substation building comprising of a single level, single room building of concrete and brick construction. The substation will be ventilated by a small fan unit and fire extinguishers will be provided.

The LT MCC's will be conventional low voltage motor starter circuits equipped with a circuit breaker, contactor and overload. Earth leakage protection has been incorporated. Drives will be capable of being started and stopped either from the MCC panel or from a control station located at the drive itself. The philosophy adopted for the isolation of equipment for maintenance or repair is that plant operating staff will have access to the LT MCC's and all isolation and lockout will be done at the MCC. No remote isolators located in the field at the drives are envisaged. Emergency stop push buttons are to be provided local to each motor drive. Power will be fed via armoured cable to be installed in trenches and on cable racking as applicable to the various items of plant and to the office, stores, change-house and work shop buildings.

7.7.5 Earthing and Lighting Protection

A main low impedance earth mat will be established at the substation. The earthing and lightning protection of buildings and structures will be carried out conventionally in accordance with AS 1768.

7.7.6 Lighting and Small Power

General area lighting will be provided in the vicinity of the plant and offices area by strategically positioned light masts equipped with either 400W or 1000W HPS floodlights. No in pit lighting will be provided as mining operations will only take place on a single shift basis. Circuits for small power ie.220 volt reticulation will be wired in accordance with the requirements of the SAA Wiring Rules, Australian Specification AS 3000.

7.7.7 Communications

Two communication systems are envisaged. ie. a radio network for the mine and mine plant operators, and a telephone system.

7.8 Workers and Working Hours

Workforce

1	Manager
1	Mine Supervisor
1	Workshop Fitter - Leading Hand
2	Workshop Fitter - Electricians
1	Geologist
2	Grade Control - Survey Assistants
1	Surveyor
2	Security - First Aid
5	Truck Drivers
2	Excavator drivers (one for Rubber Tyred Dozer)
2	Drill Operator and Offsider
1	Loader Operator - Crusher Operator - Bobcat Operator
1	Loader Operator - Grader - Water Truck
2	Spare - Absentees - Mobile Equipment Operator
2	Rehabilitation and General Clean Up - Bob Cat Operator
1	Crusher Operators
1	Cleaner
2	Mine Clerks - Telephonist, Typist, Computer

30 Total



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It is planned that most of the workforce will work 10 hour shifts.

Security may require at least 20 hours cover to ensure the safety of the equipment on the lease.

A bus service may need to be used to transport workers from Yolla - a small village located about 30 kilometres from the mine site.

7.9 Blasting

Holes will be drilled in the open pit at 102mm diameter to a depth of 11 meters, comprising 10 bench height and 1.0M sub drill.

Pattern is Burden 3.8 meters at 4.2M spacing.

The above pattern is 0.5 kilo of slurry per tonne of material.

A stemming of 2.5 meters is required and this can be by hand off a Bobcat.

A small stockpile of aggregate can be dumped on the blast area for this purpose.

Blasting should be once per week.

An experienced contractor, Orica Aust. Pty Ltd of Burnie, Tasmania have proposed a total charging and initiation service. They have a mixing plant at the Savage River mine, which will mean that a magazine for explosives or initiators is not required on site.

They have suggested the following: -

Noise - Assuming the maximum charge per delay is 400Kg of explosives and 3500 meters to the nearest structure,

Vibration is 0.29mm/Sec²

Overpressure is 99.3 dBl.

All blasts will be initiated with non electric detonators and the blast will be suitably delayed to reduce both vibration and noise to a minimum.

7.10 Extraction

An 80 tonne excavator supported by five 50 tonne trucks will be used to load and haul material from the open pit.

A 10 meter bench face will be blasted and a mining face of 3.3 meters will be maintained. This mining face will allow the excavator to be on the broken rock and load the trucks on the

pit floor which means that the excavator is not required to swing 90 degrees or 180 degrees to load.

Two excavators will be available to allow for breakdowns, service, wall dressing and digging sumps.

A rubber tyred bull-dozer will be used to clean up the flyrock after the blast. A haulage ramp is proposed from the R.O.M. Pad and to the open pit floor.

7.11 Crushing

Material will be fed either by front end loader or mine haul truck to the crusher grizzly. The grizzly spacing will be 750mm and any oversize material will be broken by hydraulic rock breaker.

The crusher will be fed by a vibrating grizzly feeder with apertures of 150mm ensuring that the crusher is fed by +150mm material only. The crusher closed side setting will be 150mm.

A typical crushing layout is attached in **Figure 7.11-1 Crushing Layout**.

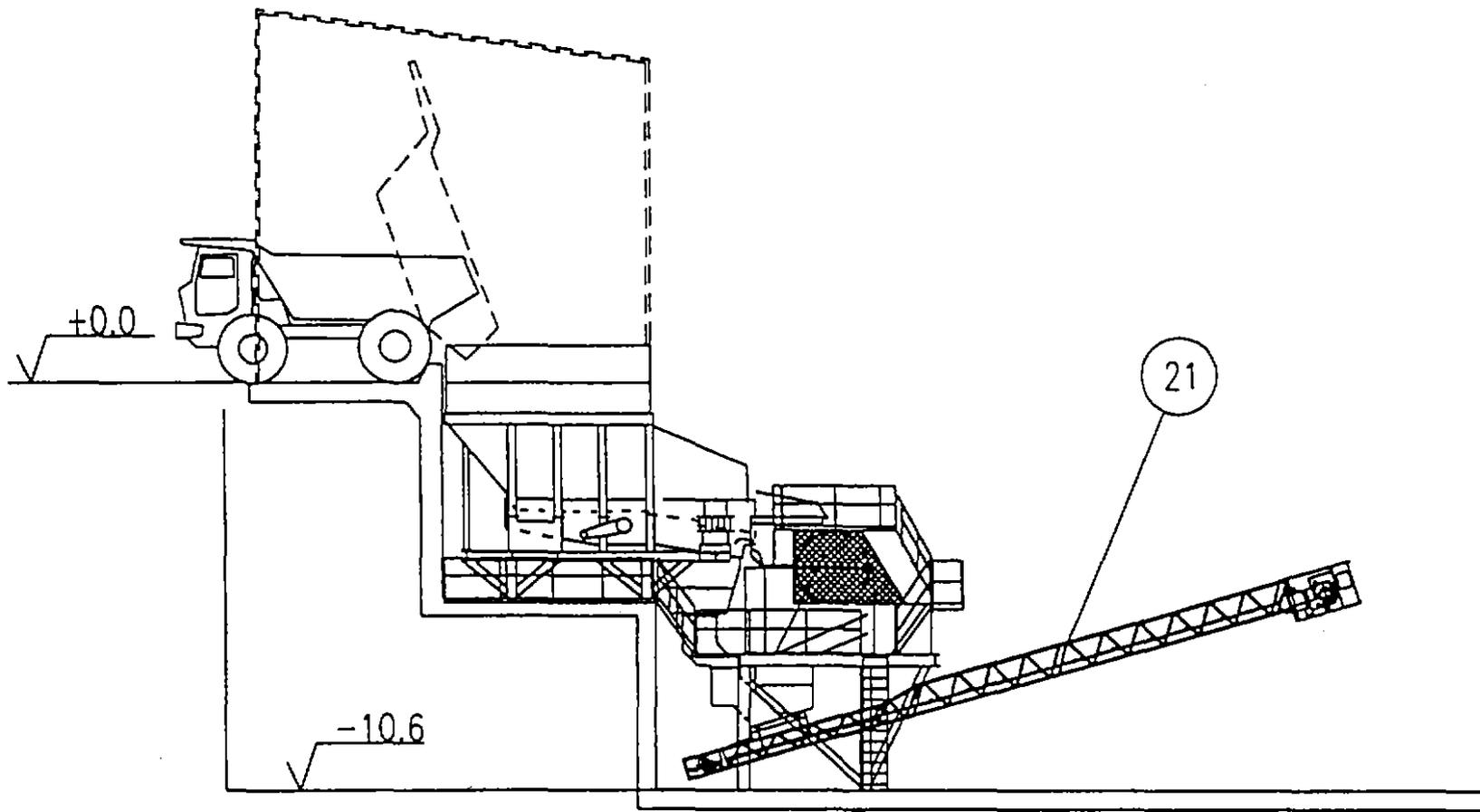


Figure 7.11-1

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7.12 Crushing Dust Suppression

It is envisaged that in the majority of the year the ore will be damp and little or no dust will be generated. During dry periods, a weatheradjust extraction system has been provided which will extract dust from the crusher and feeder.

This unit will be either a bag or cartridge type.

7.13 Ore Haulage

Ore and waste will be hauled from the open pit in 50 tonne rear dump trucks.

Production is planned at 4,000 tonnes of magnesite material per day and this equates to 80/50 tonne truck loads per day or 10 truck loads per hour.

Where possible ore will be tipped directly into the crusher bin otherwise it will be tipped onto the R.O.M. pad onto finger type stockpiles to allow for possible future blending into the crushed ore stockpile.

The oversize rocks can be broken on the R.O.M. pad with a mobile rock breaker.

Required material can be fed to the crusher bin by a 10 cubic meter front end loader. This operation is normally carried out by the crusher operator to ensure that large rocks do not block the crusher.

Overburden and waste will also be hauled from the pit and placed on waste dumps.

Initially, only high grade massive magnesite will be used in the treatment plant with stockpiles of high grade clayey and high calcium magnesite for use when this material becomes acceptable.

7.14 Loadout

Each train including locomotives will be about 40 meters in length. The train consists of two locomotives and 26 Hopper Wagons.

Production of magnesite is planned at 4,000 tonnes per day and it is proposed to load 51.3 tonnes of magnesite in each hopper wagon.

Each train should carry 1333 tonnes with 3 trains being loaded per day.

A 6,000 tonne crushed ore stockpile will be maintained to keep ahead of train loading.

The trains will be loaded using 2 x 10 cubic meter front end loaders with each train being loaded in 40 minutes.

7.15 Stockpiles

The Crusher R.O.M. Pad will comprise several finger stockpiles which may be used for blending as required. The crusher will be fed by a 10 cubic meter front end loader.

The finger stockpiles will probably comprise: -

- High grade massive magnesite plus - 40%
- Medium grade massive magnesite - plus 38%
- High grade clayey magnesite - for probable future blending
- Grade magnesite with Calcium - below 4%
- Grade magnesite with Iron - below 6%
- Grade magnesite with Silica - below 12%

If there is insufficient space available on the R.O.M. pad stockpiles may need to be made elsewhere.

All top soil removed from the open pit, waste dump areas, and during the construction or road areas will be stockpiled for use for the re-generation of ground cover. Top-soil stockpiles will be established at several locations.

A crushed material stockpile will be created at the end of the crushed material belt.

Provision has been made for additional crushed material stockpiles.

7.16 Pit Dewatering

7.16.1 Pit Pumping

Mine dewatering will be required since the pit will be excavated to at least 100 m below the level of the water table. It is envisaged that dewatering will be achieved by sump pumping from the pit floor, allowing free inflow through the pit walls. The dewatering rate will increase progressively from about 100-120 L/s in year 2 to 150-180 L/s by year 27. About 80% of this water is predicted to come from leakage through the bed of the Keith River.

Taking the 5 Year recurrence interval storm of 24 hours duration as the design storm and allowing 24 hours to drain the pit floor, it is estimated that a maximum total pumping capacity of 470 L/s would be required.

Pit dewatering is proposed using 4 Kelair trailer-mounted pump units equipped with a diesel motor and possibly a pump. Each unit is capable of 150 litres per second at 120 meter of head.

The pump can be a Southern Cross and the Diesel Motor either a 200Kw Cummings or Volvo.



The third and fourth units will need to be used during heavy water inflow periods.

An additional backup set of units may be required when the pit exceeds a 120 meter head.

A sump can be located in the second smaller extension pit presently designed to RL60.

All engines at full throttle produce a noise of 93dB(a) at 1 Meter.

Pumping

A small pump or pumps will be located near the crusher to collect any drainage from the R.O.M. pad and works area and to pump to the settling ponds at 369850E.

7.16.2 Treatment of Pit Water

Settlement ponds will be used to collect solids entrained in the water. A retention time of 6 hours was used allowing particles of 0.01mm and above to be captured.

Given the ingress flowrate of 470 l/s, an area of 10,000m² is required with an active moving water depth of approximately 1m. The pond is envisaged to have a depth of 2m. As no allowance has been made for adverse effects an area of 20,000m² has been provisionally allowed for.

7.17 Stormwater and Site Drainage on 1M/99 Lease

7.17.1 Loadout and Waste Dump Area Drainage

Again a 24 hour, 1 in 5 year rainfall event has been used giving a volume of 41,500m³. Drainage trenches on the berms of the dump, at the toe and at the loadout area are graded to the settling pond situated at the North of the waste dump. (See drawing A0-G-0006). A sump and pump is provided adjacent to the crusher plant at a natural low lying area. This would also pump to this settling pond.

Settling is again achieved in a 20,000m² area pond however surges are accommodated by a storage pond of 15,000m³.

7.17.2 Stormwater and Site Drainage

The southern edge of the pit will be protected from water ingress by a spoon drain. The incoming water will be from virgin ground from the South and therefore not contain contaminants. The spoon drain will be lined and drain to the Keith River.

A 2m high windrow will be constructed along the western side of the lease 40m from the eastern edge of the Keith River. It is therefore assured that the 100 year flood elevation of 145 RI will not overflow the lip of the pit.

A lined spoon drain will cut off water draining from the eastern slopes to the pit. This, and the other virgin eastern areas will drain down an existing gully to the Arthur River. See drawing A0-G-0006.

7.17.3 Grout Curtain Between the Keith River and the Proposed Open Pit

A concrete/fibrecrete grout curtain may be installed to reduce groundwater flow into the proposed open pit from the Keith River and pit perimeter. Exploratory and in-fill diamond drilling completed to date indicates that most cavities developed in the magnesite occur within the upper 70 metres and it is believed a grout curtain to this depth, or to a depth where solid rock is encountered will significantly reduce groundwater seepage from the Keith River by way of cavities, fault zones, rock fractures and bedding planes developed within the magnesite and along rock contact zones.

Initially a curtain comprising holes at 25 metre centres to a vertical depth of 70 metres is proposed (**Drawing No. A0-G-0009**). Depending on the results of this work additional grout holes may need to be installed. Influx of water from the northeastern end of the pit is not expected to be a problem because of the presence of a dolerite dyke and associated clay which are expected to be relatively impermeable.

Prior to installation of the curtain it is proposed that further bores be drilled between the pit and the Keith River and at other selected sites and pump tested both as a check on grout intake and the effect on groundwater drawdown generally.

It is possible that as an alternative to a grout curtain installed by way of holes located between the pit and the Keith River, it may be easier to install a grout barrier from inside the pit as excavation progresses. The worth of such a proposal will be evaluated from an examination of pump and monitoring bore tests which will be carried out when perimeter pump bores are being tested.

The whole question of how to best control the influx of groundwater into the pit will initially depend on data derived from monitoring and pump bores already installed. Should this data be insufficient for the proposed evaluation then additional bores may need to be drilled.

The effects of long-term pumping on the groundwater levels in the immediate vicinity of the pit on both sides of the Keith River will also be monitored. Whereas there is ample evidence to show that re-growth of vegetation within the mine area will take place once mining ceases and the original groundwater levels are re-established, it may only be necessary to maintain groundwater egress into the pit at a rate which does not seriously affect nearby vegetation.

7.17.4 Proposed Pit Perimeter Pump Bores

In addition to the grout curtain a number of pump bore holes are planned for installation around the perimeter of the pit. Whereas these holes are primarily designed to check on probable grout intake, they will also be used to check on their value as a way of reducing groundwater flow into the pit. (**Drawing No. A0-G-0009**).

It has been estimated from preliminary pump and monitoring borehold tests that possibly between 100-180 litres per second will flow into the pit as groundwater, with as much as 80% of this water coming from the Keith River bed. It is believed that suitably screened pump bores may significantly reduce (or even eliminate) this flow and at the same time extract relatively clean water which, by way of a staged aeration system, will meet current legislative criteria and can be pumped directly into the Arthur River.

Removal of this water may in fact obviate the need for a grout curtain and in any event would reduce the size of the planned settlement ponding.

Other suitably sited pump bores may be installed along the northern and southern boundaries of the pit. At the eastern end of the pit, exploratory diamond drill holes indicate the presence of a dolerite dyke and associated clays which are believed may be relatively impermeable and act as a barrier for groundwater flow.

The whole question of groundwater control can only be resolved once the pit excavation is commenced and the rock quality of the magnesite resource and hangingwall and footwall contact zones established.

It may well be that the best solution will involve both limited pumping and the progressive installation of a grout (or other) barrier as the pit develops. Careful monitoring of the groundwater levels and their effect on the mine site vegetation will dictate the final method of groundwater controls.

7.18 Progressive Rehabilitation

7.18.1 Objective

The objective of the progressive rehabilitation is to return the vegetation, wherever possible, back to its present state.

7.18.2 Areas Disturbed

The areas disturbed are shown on Drawing No. A0-G-0014. The areas can be described as follows:

Pit Area

The top soil will be removed and stockpiled in the adjacent area shown. A proposed future pit is indicated.

Overburden and Waste Rock Dump

The top soil, again, will be removed and stockpiled in the adjacent area immediately to the East of the dump.

Rail, Access Roads, and Stockpiles

Top soil will be removed and stockpiled. Suitable overburden material will be used as compacted fill to create a working surface.

Settling Ponds

Settling ponds will be constructed approximately in the positions shown on Drawing AO-G-0014.

7.18.3 Rehabilitation Activities

Rehabilitation will be undertaken on all areas that have been disturbed as soon as is practicable. This will be primarily the side slopes of the waste pit. These slopes will be covered with top soil taken from the dumps and re-seeded with native plants similar to those removed at the onset of the works. This is shown graphically on drawings A0-G-0010 to A0-G-0014.

7.19 Closeout Rehabilitation

Areas that have been disturbed during the mining activities will be addressed in the following way:

Overburden and Waste Rock Dump

The surface area will be fully revegetated with plant species of type presently there.

Pit

The pit will be allowed to fill with water to its natural water level. A lined overflow trench will be installed, discharging into the Keith River, which will stop the pit overflowing in periods of heavy rain. The exposed pit walls will be revegetated using plant species of the type presently in the area. The pit edge will be fenced to ensure safety.

Settling Ponds and Windrow

The compacted walls will be levelled and revegetated with local plant species.

Offices and Workshops

Offices and workshops will be removed from site. Any disturbed areas will be revegetated.

Crushing and Stacking Equipment

All equipment, supporting structures and all other items will be dismantled and removed from the mine site. Any disturbed areas will be revegetated.

Rail and Road

It is proposed to leave the rail and road in situ. A locked gate will ensure no motor vehicle movement.

7.20 Solid Wastes

Solid waste will be generated at the workshop and offices. This will be collected on a regular basis and taken to a common waste skip. Skips will be removed and replaced by a contracted waste removal company.

7.21 Atmospheric Emissions

7.21.1 Dusting

As a result of the high rainfall experienced in the area it is unlikely that dusting will be a problem. In periods of dry weather dusting will be controlled by use of water trucks on roads and tipping transfer points. This water can be sourced from pit ingress.

7.21.2 Diesel Fume

Diesel fume generation from mobile equipment and diesel generator units will meet statutory requirements.

7.22 Liquid Emissions

Liquid emissions will be limited to ablutions and sewerage. These liquids will go into an underground storage tank which will be periodically emptied by an appointed contractor.

7.23 Hazardous Materials

Diesel fuel will be supplied to the sites high level storage tanks by a selected supplier. All storage tanks will be bunded with concrete surrounds to accommodate a total leak situation. Most equipment can draw on these tanks and a fuel/oil and maintenance vehicle will transfer this material to pit equipment during servicing or refuelling.

Any leaked material will be removed off site by waste away contractors.

7.24 Site Infrastructure

This will consist of offices, roadways, workshops, stores, generator, crusher areas, railway lines and bridges for the railway and access road.

Drainage will be into a drain located near the railway line.

7.24.1 Access Roads

Access roads and bridges to the mine site will be the responsibility of the Tasmanian Government. Roads on site will be of compacted rock suitably demarcated. For the location of roads refer **Figure 5.2-1**.

Existing access, namely Farquhars Road, which currently serves as the main access to the proposed Arthur River mine site, will almost certainly have to be re-established. At present Farquhars Road crosses the Arthur and Keith Rivers by way of two bridges, with the section between these two bridges passing along the southern perimeter of the proposed mine workings, which means it will be exposed during regular blasting operations. Because of this when mining commences access along the road will have to be restricted.

As a safety measure and also to maintain access to the general area for forestry workers, pre prevention vehicles, beekeepers and the public, an alternative route will have to be found.

Investigations into another route, which may make use of disused but established forestry tracks or portions of the Relapse Creek road are currently under investigation.

7.24.2 Offices

All buildings will be transportable and will comprise at least six offices together with small conference and work areas. Transportable crib rooms, change rooms, ablutions, male and female toilets, and a security and first aid office will also be located on site.

All office entrances, car ports, and access paths between buildings will be covered.



Mine vehicular transport will be garaged in car ports adjacent to the offices whilst the ambulance will be under cover adjacent to the security/first aid office.

A visitors and workers car park will be provided outside the security fence.

7.24.3 Workshops

The workshop house will be a steel building, large enough to house 2 x 50 tonne trucks with trays raised and some work benches along the back and side walls. Two or three sea containers will be used as lockup tool and parts stores.

7.24.4 Storage Areas

A fenced in, lock up area or hard standing will be provided for drums etc.

A small transportable may be needed for general equipment.

7.24.5 Potable Water Source and Treatment

7.24.5.1 Potable Water

It is envisaged that water will be pumped from the Arthur River and then filtered, using particulate and activated carbon filters, and disinfected. The clean water will be pumped up to a constant head tank for use.

7.24.5.2 Sewage Treatment

Sewage will be piped to a local septic tank which will be cleaned periodically.

7.24.5.3 See Section 7.8.

7.24.5.4 See Section 7.8.7.

7.24.6 Sewage and Domestic Wastes

7.24.7 Security

Two security personnel have been allocated to cover at least 20 hours. Security personnel will also be trained in first aid. An ambulance will be parked adjacent to the security office for emergencies. Signs will be posted at all areas to the mining lease at all bridges and at a suitable distance on each road away from the least as a warning that mining is in progress and blasting may take place at any time. A blasting times notice will be located outside the crib room.

Large fences with locked gates will be required along the South boundary, and at the East boundary, particularly where the old track enters the lease. A fence will be required at the security office to reduce any unauthorised entry.

Safety on site will be subject to the relevant mining regulations safety and will be strictly enforced at all times.



8. POTENTIAL ENVIRONMENTAL IMPACTS

8.1 Historical Disturbance Context

8.2 Access Road

8.3 Traffic

8.4 Bridge Capacities

8.5 Soil Disturbance

8.6 Overburden

8.7 Pit Excavation

8.8 Waste Rock

8.9 Geomorphological Features

8.10 Historic Heritage

8.11 Aboriginal Cultural Heritage

8.12 Vegetation Removal

8.13 Habitat Disturbance

8.14 Visual Impact

8.15 Vibration

8.16 Noise

8.17 Pit Dewatering

8.18 Atmospheric Emissions

8.19 Liquid Emissions



8.20 Solid Waste

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8.21 Sewage

8.22 Hazardous Substances

8.23 Fire Risk

8.24 Weeds

8.25 Root Fungi

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9. SOCIAL AND ECONOMIC EFFECTS

9.1 Regional Context

9.1.1 *Regional Demographics*

9.1.2 *Regional Economy and Employment*

9.1.3 *Regional Infrastructure*

9.2 Local Context

9.2.1 *Local Demographics*

9.2.2 *Local Economy and Employment*

9.2.3 *Local Infrastructure*

9.3 Potential Effects

9.3.1 *Employment*

9.3.2 *Economic*

9.3.3 *Infrastructure Requirements and Impacts*

9.3.4 *Community Effects*

9.4 Local and Regional Consequences of Not Proceeding

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10. ENVIRONMENTAL MANAGEMENT PLAN

10.1 Environmental Management Strategies

10.1.1 *Corporate Philosophy*

10.1.2 *Corporate Environmental Policy*

10.1.3 *Organisational Structure, Environmental Responsibility and Accountability*

10.1.4 *Environmental Management System*

10.1.5 *Contractor Obligations*

10.2 Construction and Establishment Plan

10.2.1 *Construction Timetable*

10.2.2 *Construction Equipment*

10.2.3 *Construction Traffic Movements*

10.2.4 *Road and Bridge Capacities*

10.2.5 *Erosion Control*

10.2.6 *Protection of Management of Special Features*

10.2.7 *Protection of Flora and Fauna*

10.2.8 *Minimisation of Noise*

10.2.9 *Minimisation of Atmospheric Emissions*

10.2.10 *Minimisation of Liquid Emissions*

10.2.11 *Fire Risk Management*

10.2.12 *Visual Impact Management*

10.2.13 Clean Up and Rehabilitation

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10.3 Magnesite Karst - Management of Potential Impacts**10.3.1 Drilling****10.3.2 Blasting****10.3.3 Extraction****10.3.4 Above-Ground Earthworks****10.3.5 Heavy Vehicular Traffic****10.4 Water Emissions and Water Management Regime****10.4.1 Water Sources****10.4.2 Water Uses****10.4.3 Water Discharges****10.5 Operational Land Management****10.5.1 Management of Impacts on Flora and Fauna****10.5.2 Fire Prevention and Management****10.5.3 Weed and Root Fungus Management****10.5.4 Archaeological, Historical and Cultural Heritage Features****10.5.5 Features of Special or Scientific Interest****10.5.6 Visual Impact and Landscape****10.5.7 Erosion****10.5.8 Noise and Vibration****10.5.9 Atmospheric Emissions**

10.5.10 Hazardous Materials and Hydrocarbons

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10.5.11 Waste Management Strategy

10.5.12 Rehabilitation

10.5.13 Ore Transport

10.6 Monitoring and Review

10.6.1 Pitwater Discharges

10.6.2 Wastewater Discharges and Receiving Waters

10.6.3 Groundwater

10.6.4 River Water

10.6.5 River Biota

10.6.6 Karst System

10.6.7 Erosion

10.6.8 Noise

10.6.9 Vibration

10.6.10 Dust

10.6.11 Flora and Fauna

10.6.12 Fire

10.6.13 Weeds

10.6.14 Root Fungus

10.6.15 Annual Review of Objectives

10.7 Periodical Review of Environmental Management Plan

11.	ENVIRONMENTAL MANAGEMENT SYSTEM	501053
11.1	Organisational Commitment	
11.2	Environmental Policy	
11.3	Environmental Impact Evaluation	
11.4	Community Consultation	
11.5	Objectives, Targets and Relevant Regulations	
11.6	Documentation and Environmental Manual	
11.7	Operational and Emergency Procedures	
11.7.1	<i>Non-Compliance Procedures</i>	
11.7.2	<i>Planning Procedures</i>	
11.7.3	<i>Emergency Procedures</i>	
11.8	Responsibilities	
11.9	Reporting Structure	
11.10	Training	
11.10.1	<i>General Training</i>	
11.10.2	<i>Specific Training</i>	
11.10.3	<i>Follow-Up Training</i>	
11.11	Environmental Impact and Compliance Audits	
11.12	Emission Monitoring	
11.13	Performance Monitoring	
11.14	Review Process	

12. **SUMMARY OF COMMITMENTS**

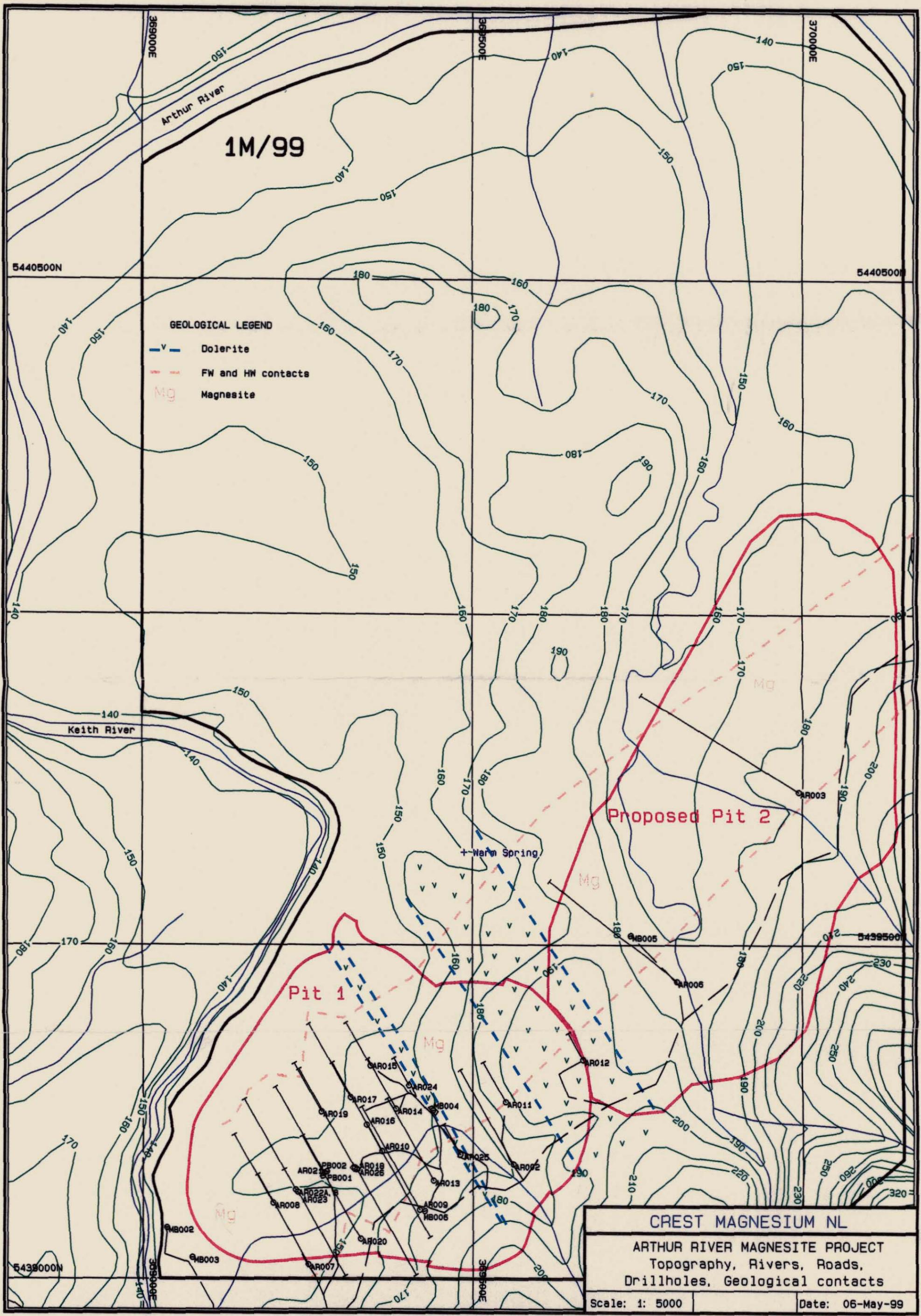
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13. CONCLUDING REMARKS

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RA:skw

Rob Astell



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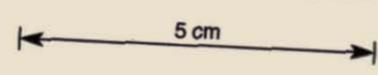
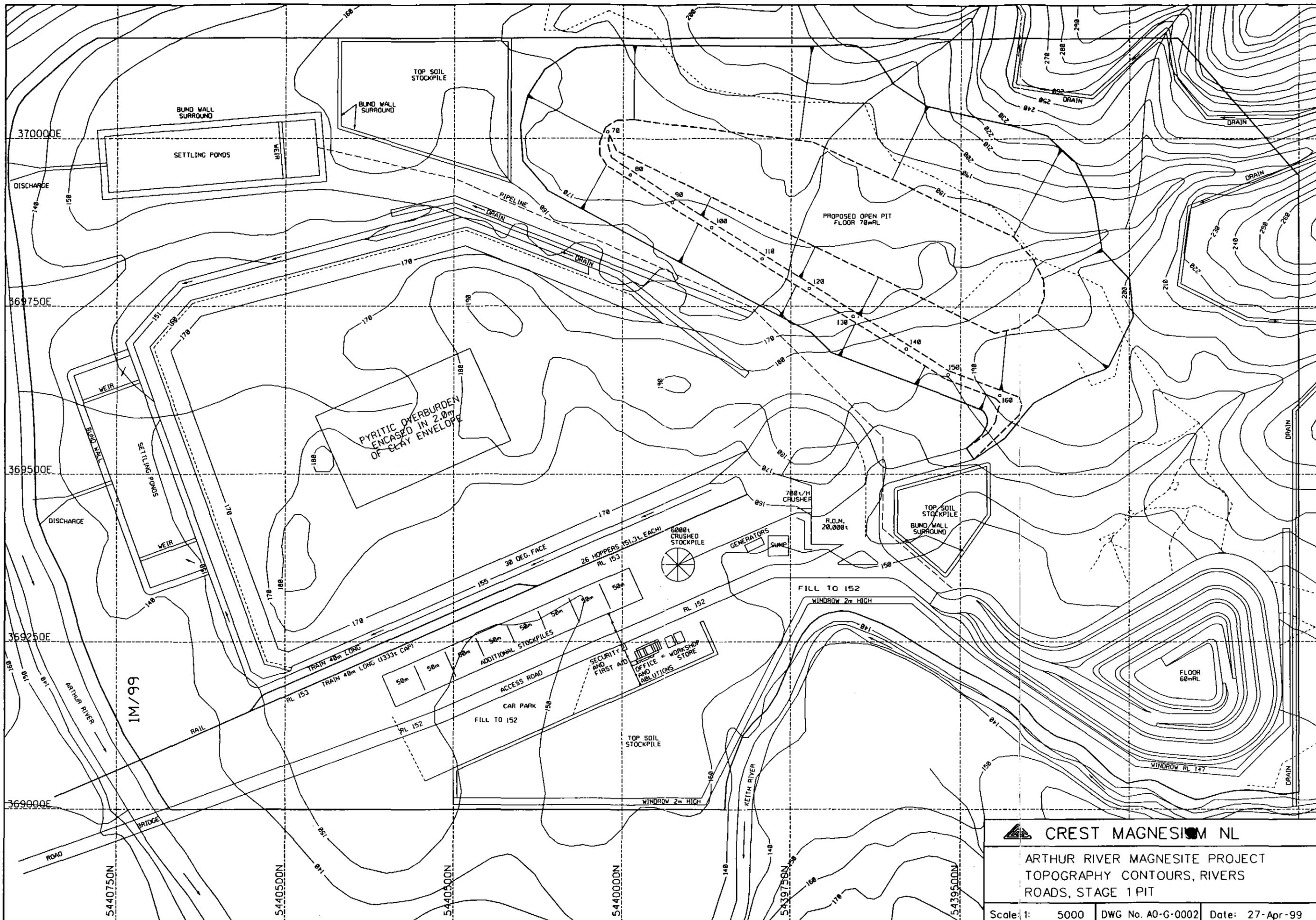


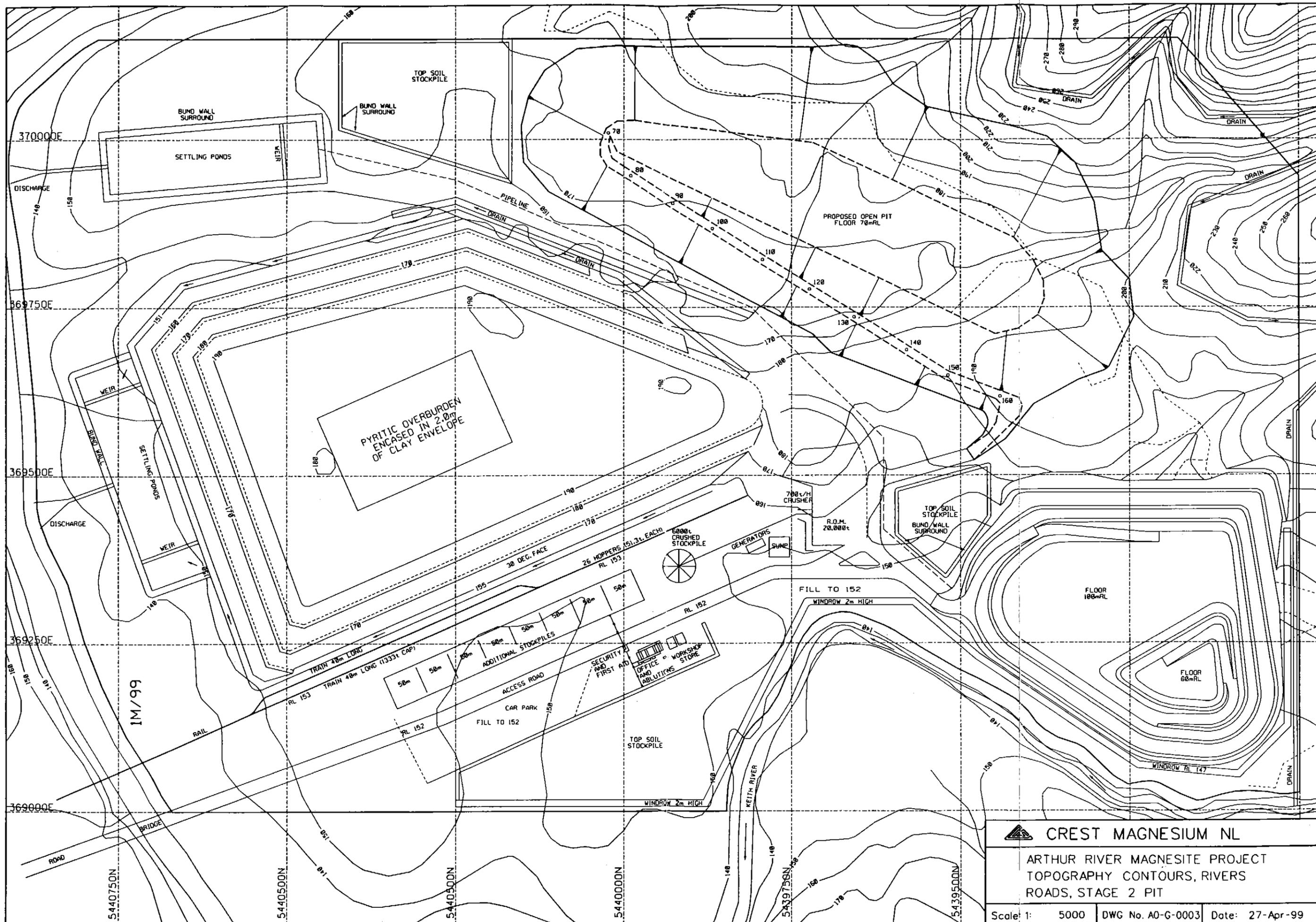
Figure 5.2.2



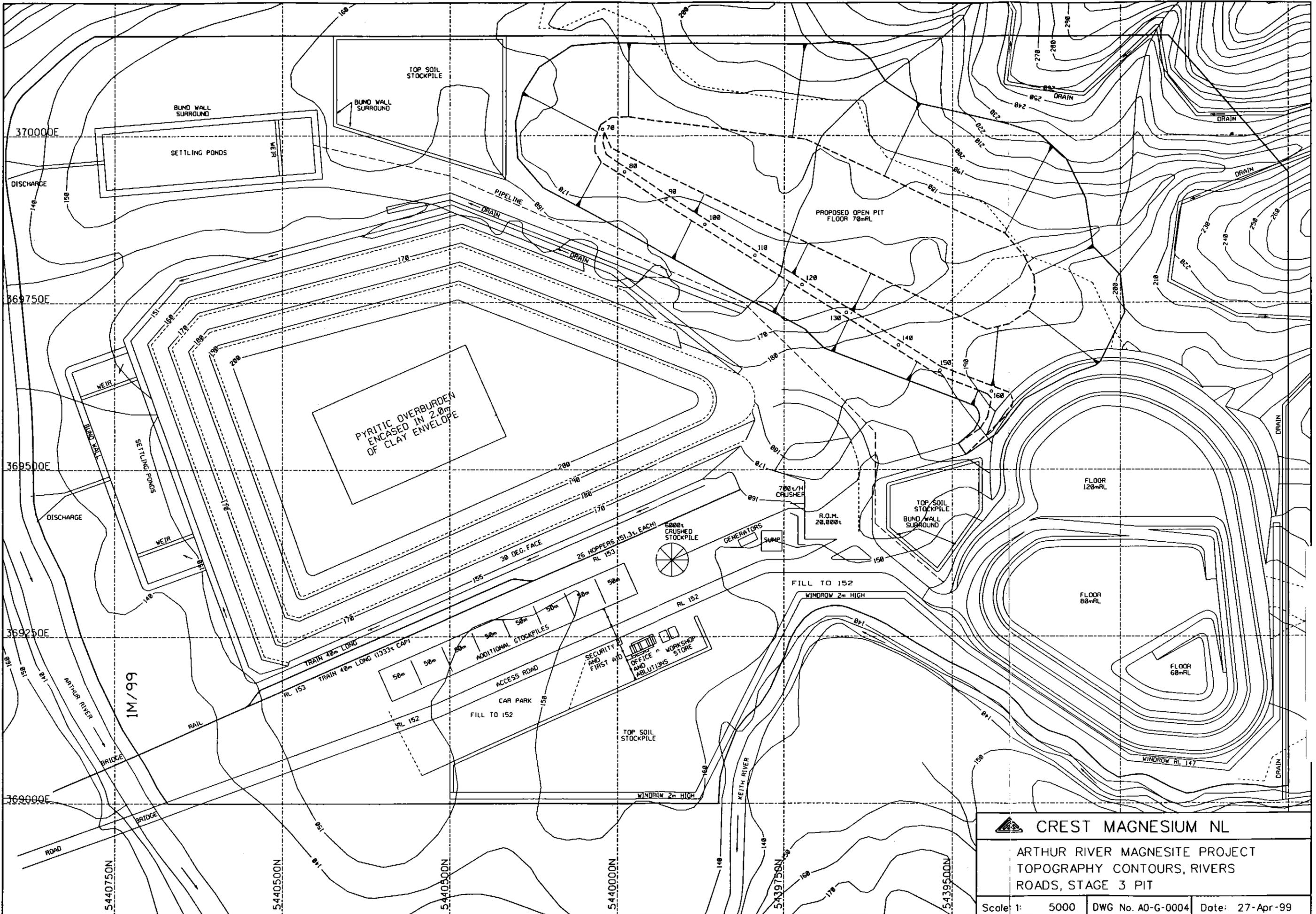
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 ARTHUR RIVER MAGNESITE PROJECT
 TOPOGRAPHY CONTOURS, RIVERS
 ROADS, STAGE 1 PIT
 Scale: 1: 5000 DWG No. A0-G-0002 Date: 27-Apr-99



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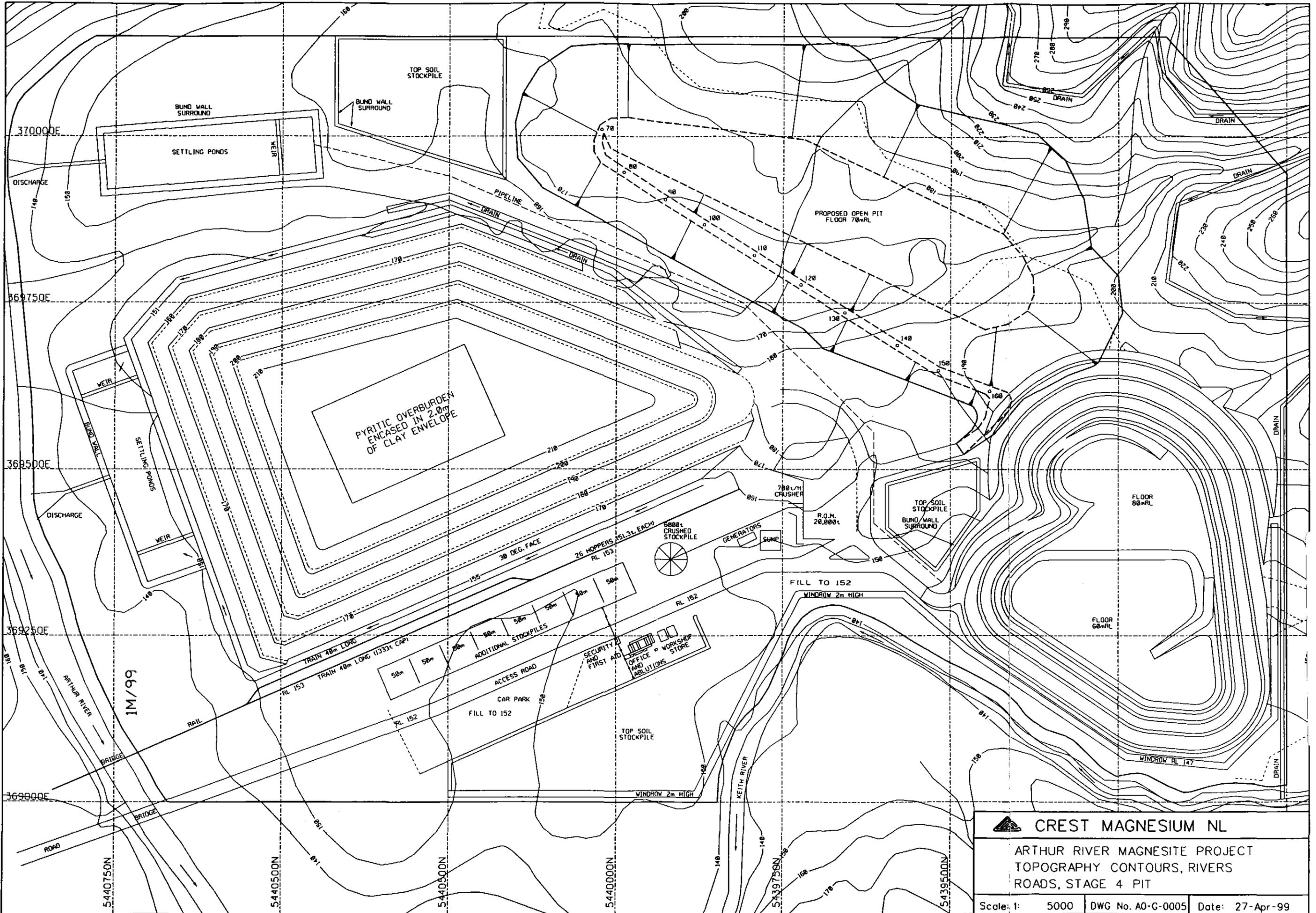


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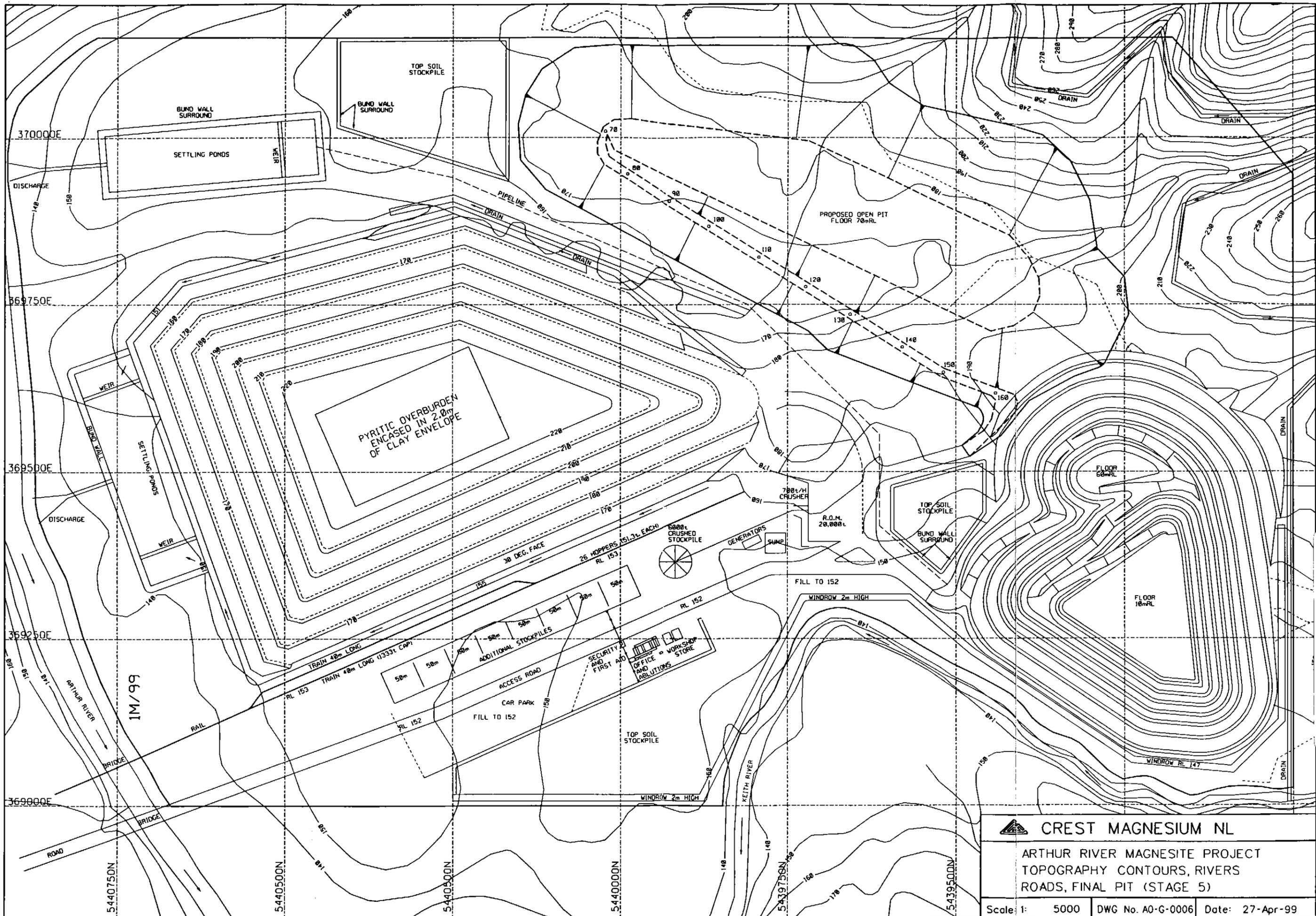
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ROADS, STAGE 3 PIT

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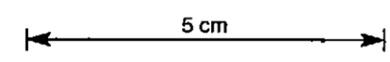
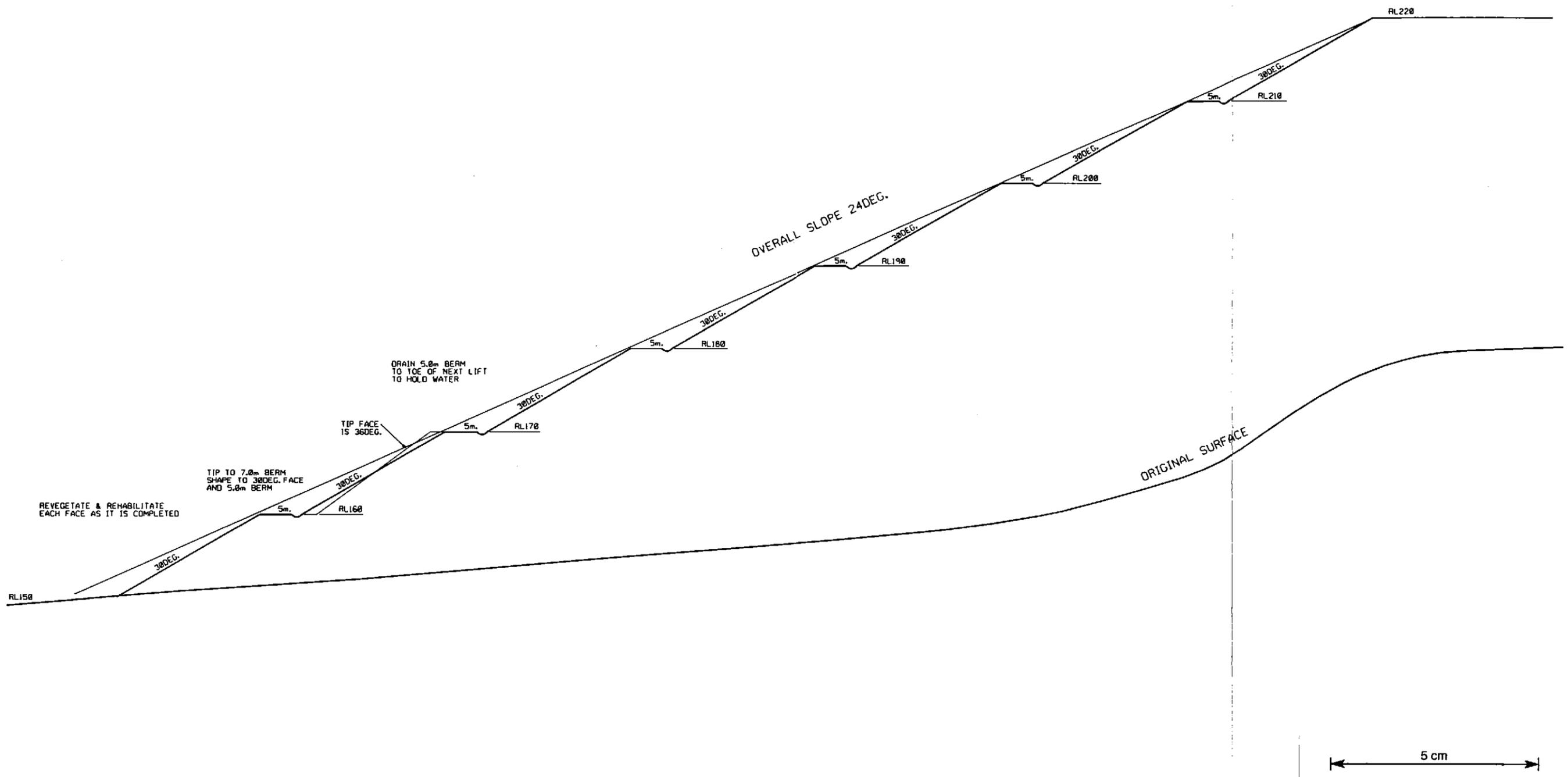
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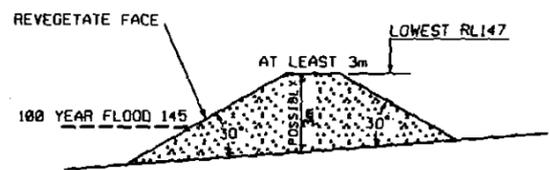
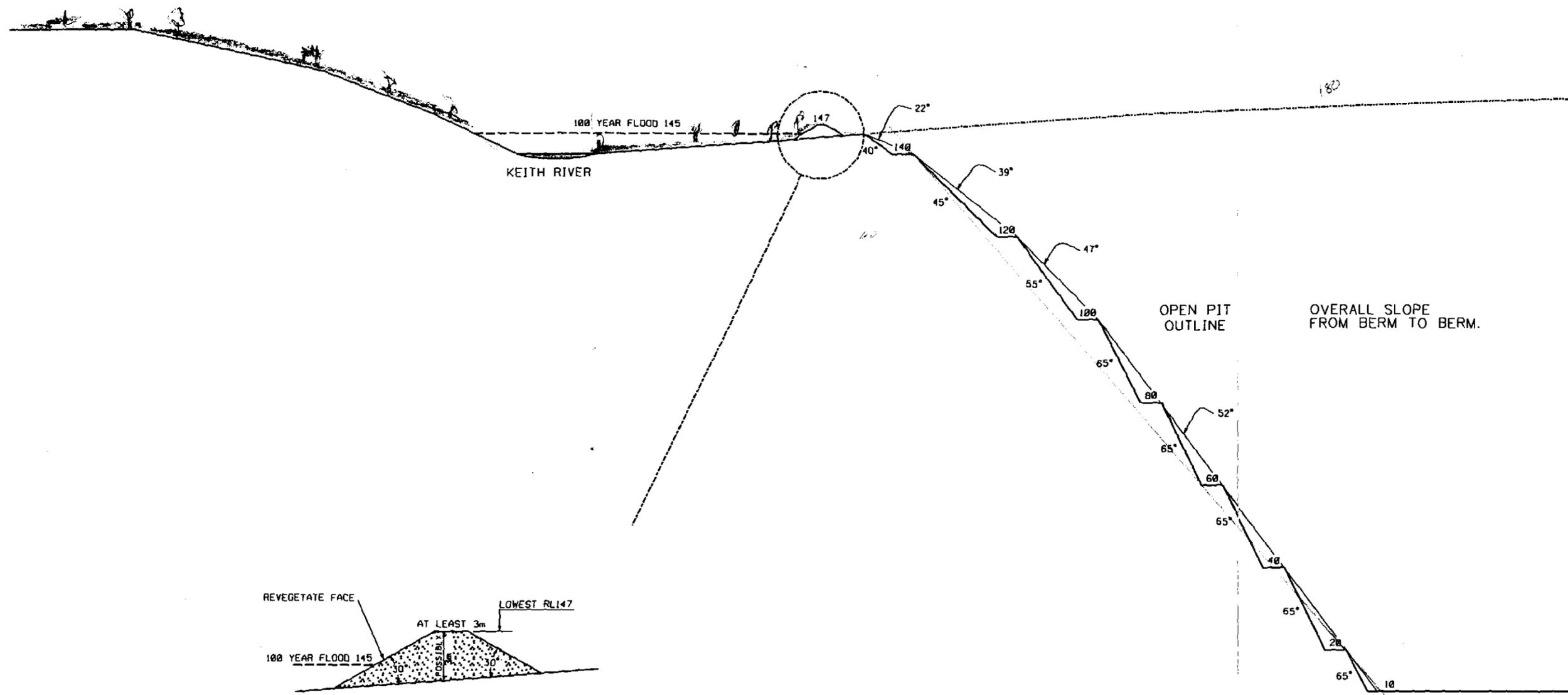
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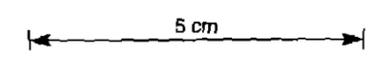
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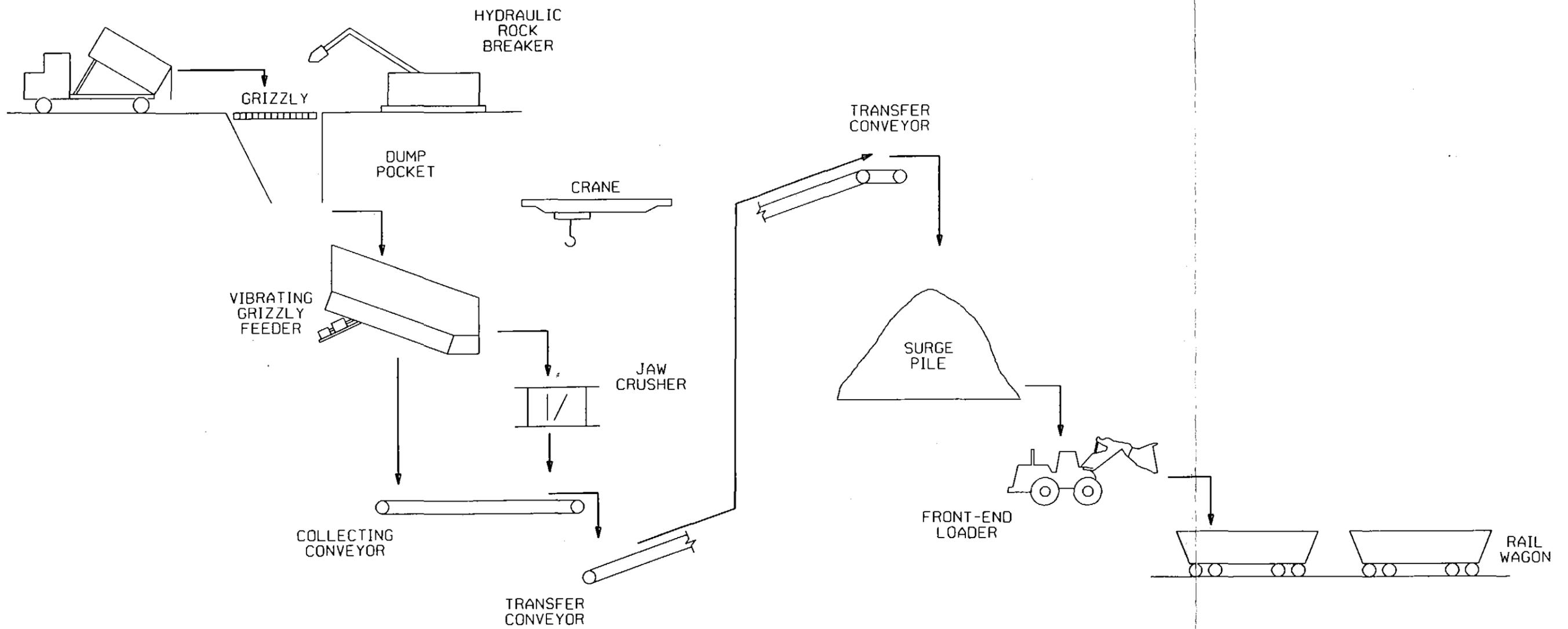
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CROSS SECTION OF BUND WALL

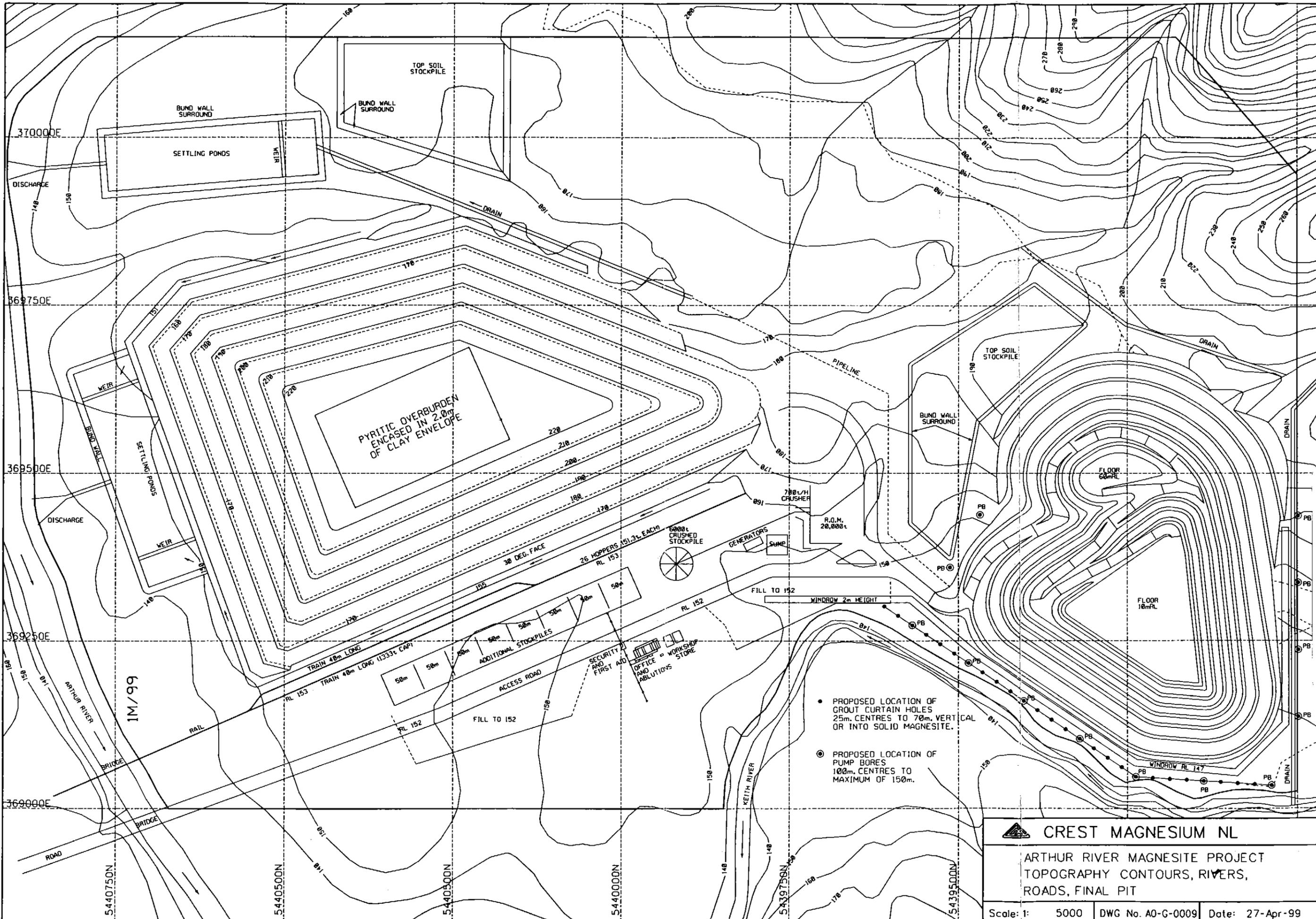


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ARTHUR RIVER MAGNESITE PROJECT SECTION ALONG PIT AND RIVER (5439150N)			
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 CREST MAGNESIUM NL <small>ACH 061 575 442</small>	 HATCH
PROCESS FLOW SHEET	
MJS	9 APRIL 99

Figure 7.5.2-1

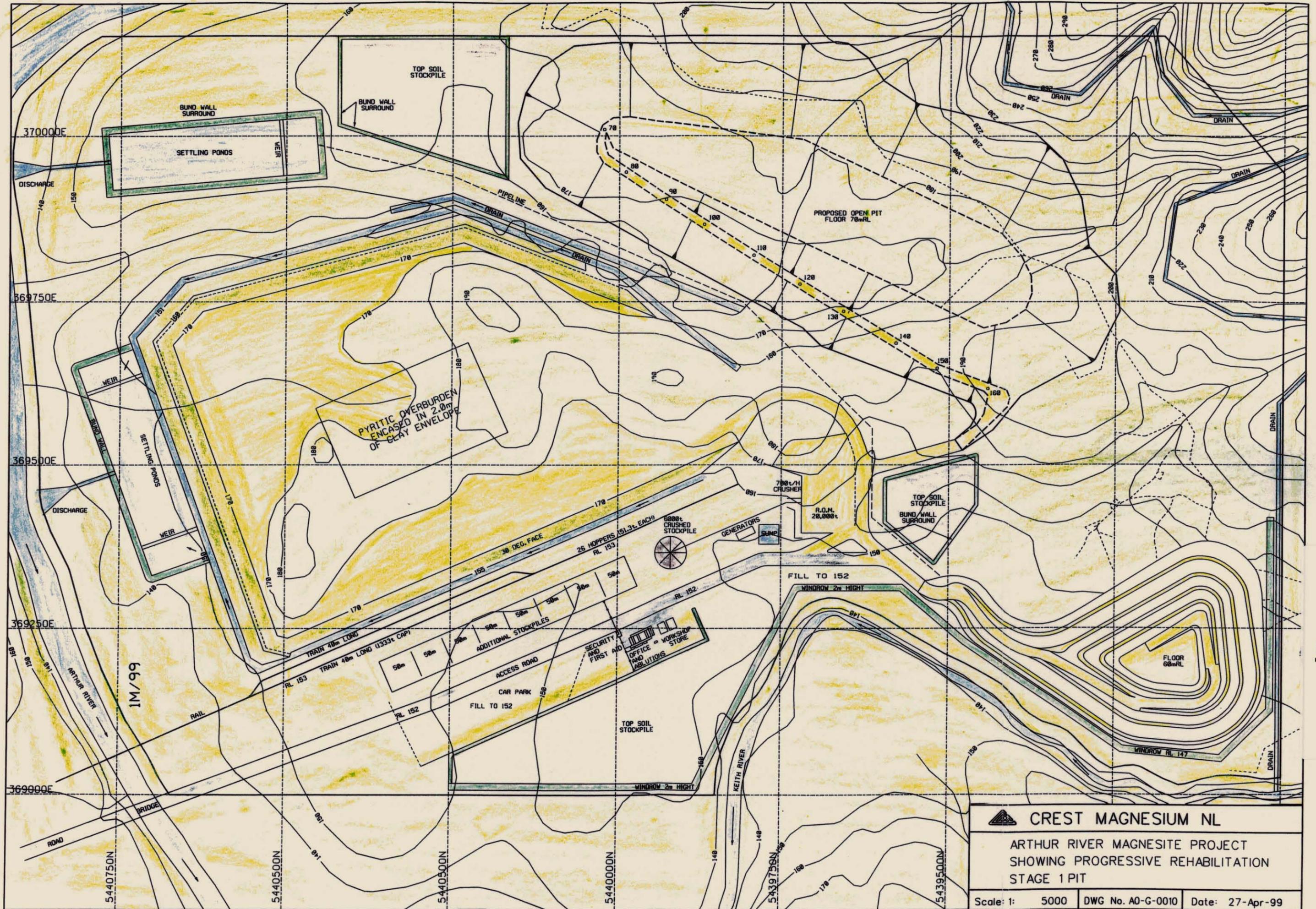


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CREST MAGNESIUM NL

ARTHUR RIVER MAGNESITE PROJECT
TOPOGRAPHY CONTOURS, RIVERS,
ROADS, FINAL PIT

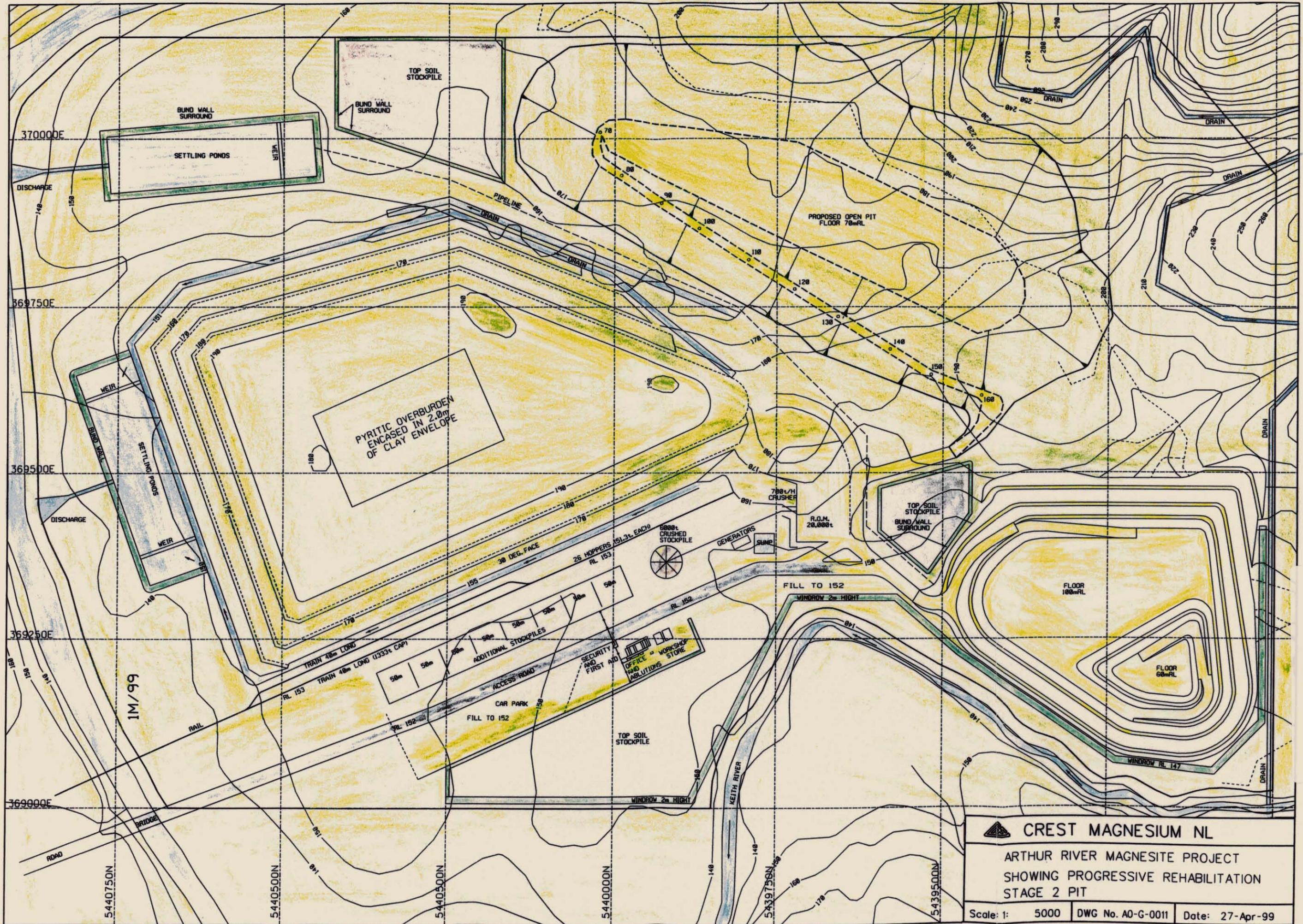
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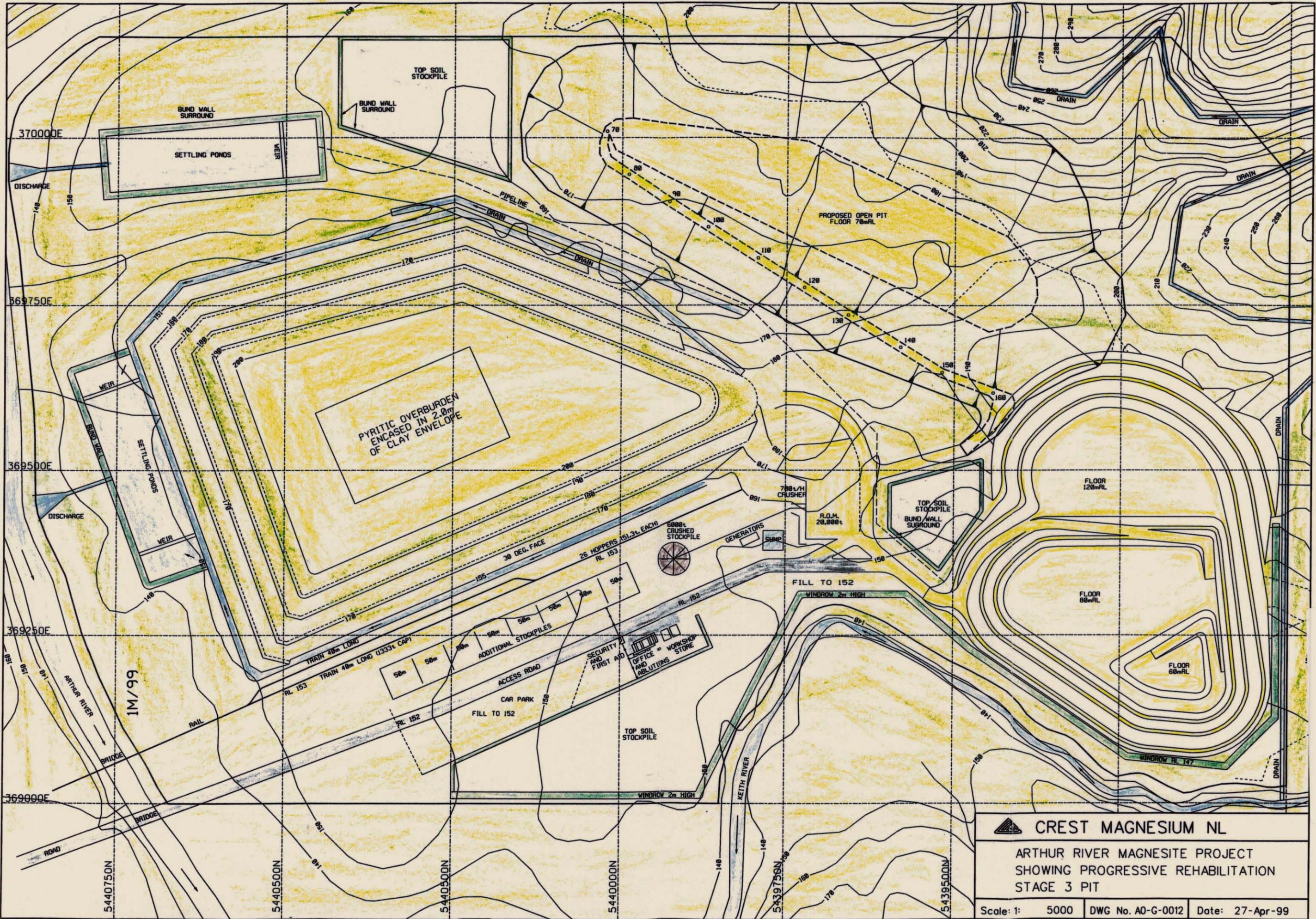
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		Date: 27-Apr-99



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 CREST MAGNESIUM NL		
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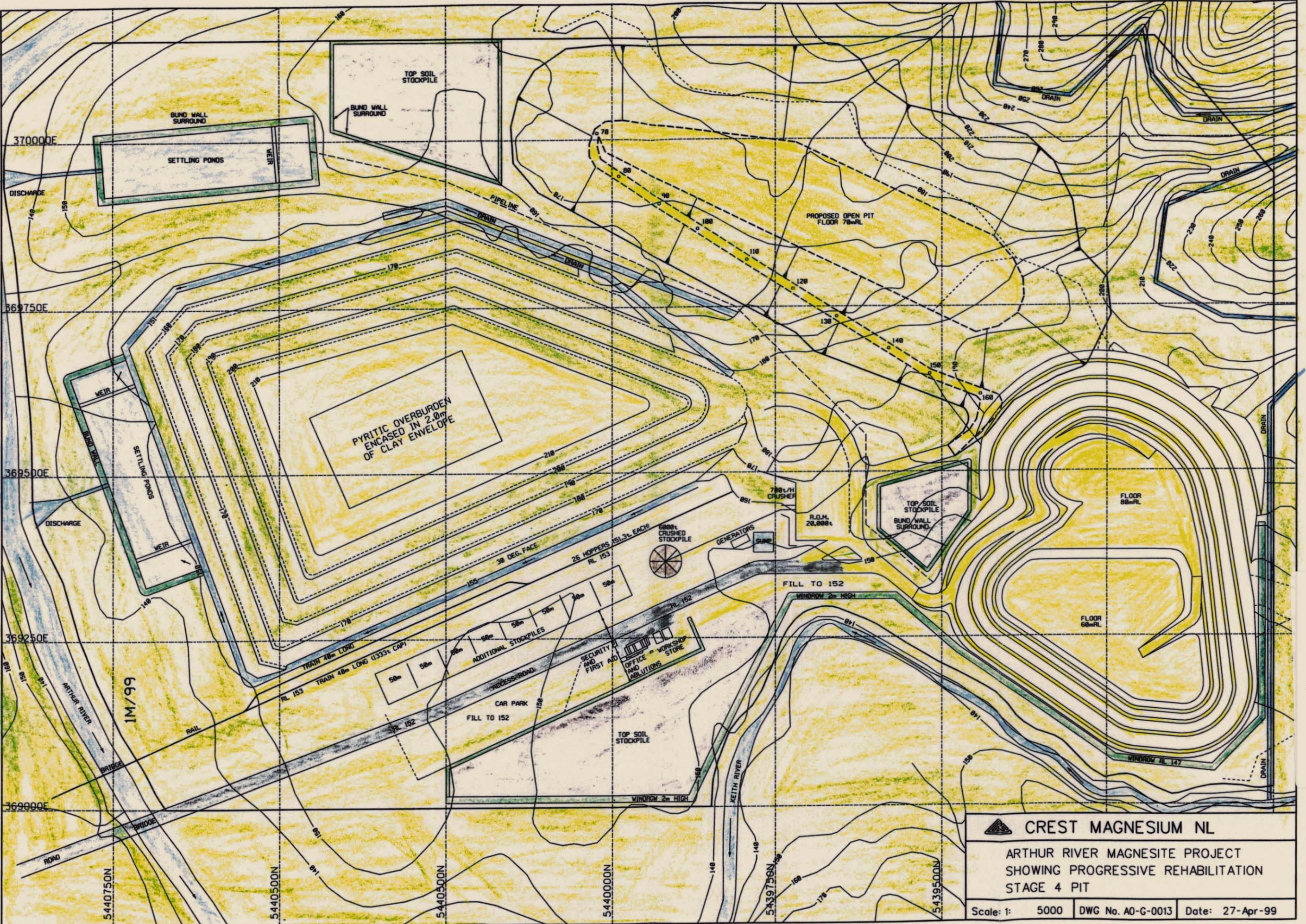


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STAGE 3 PIT

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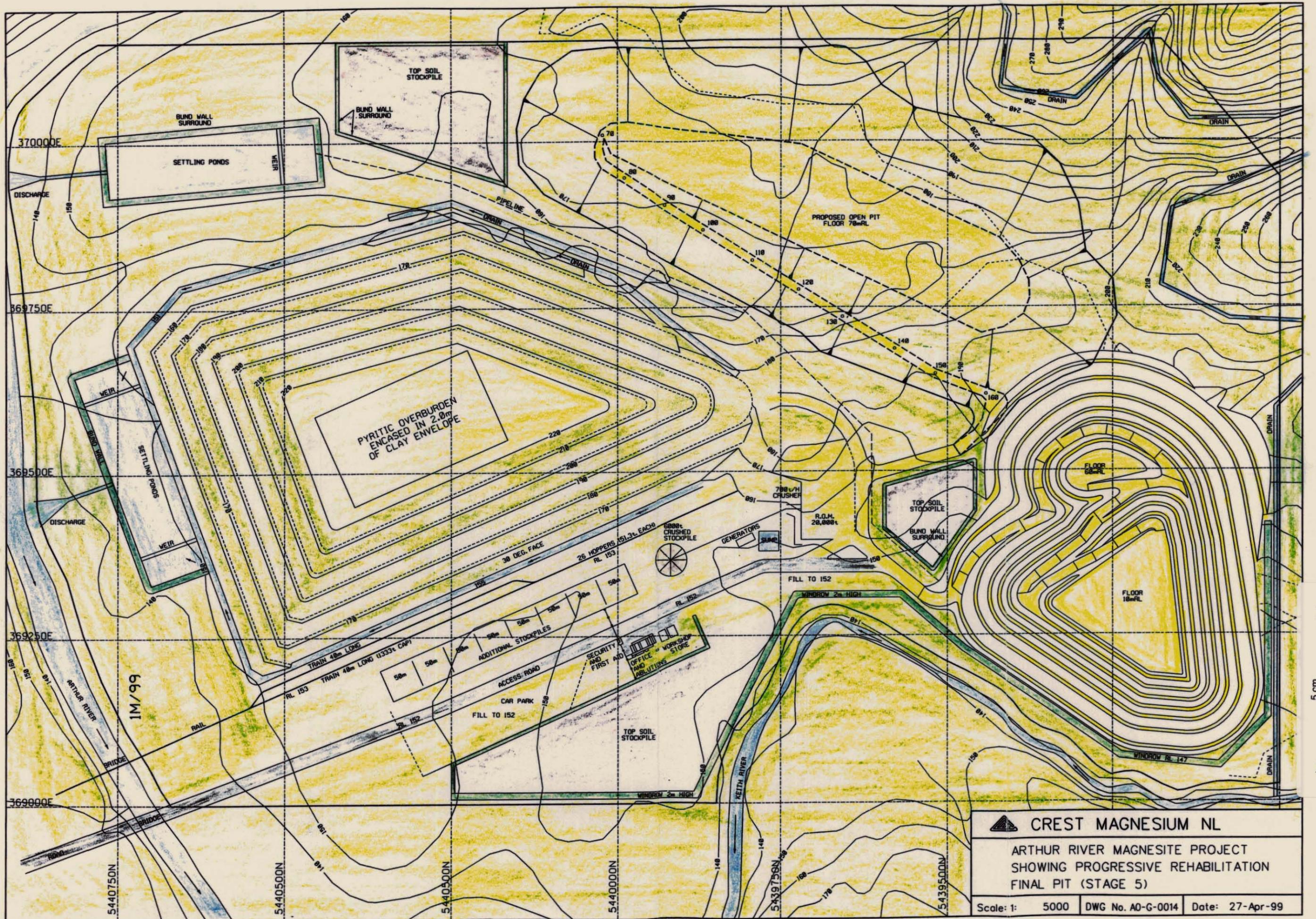


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CREST MAGNESIUM NL

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 STAGE 4 PIT

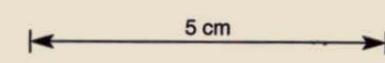
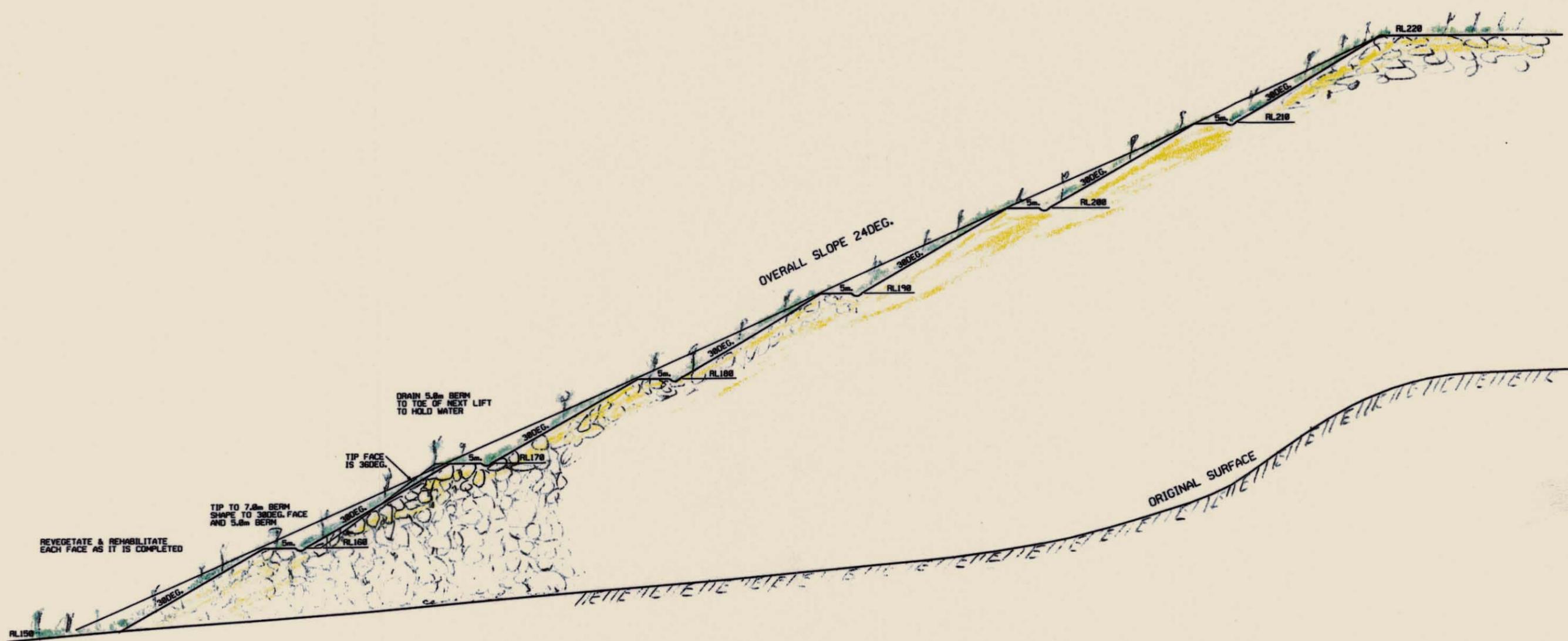
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