BEAL CONSULTING ENGINEERING & PROJECT MANAGEMENT

REPORT

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

UPDATE OF MANUNGU CLOSURE COSTING AS PER DMR GUIDELINE- SEPTEMBER 2018

Submitted to:

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28 September 2018

Report Number:

E018_ClosureCostingReport_001

EXECUTIVE SUMMARY

BEAL (Pty) Ltd (BEAL) was commissioned by Environmental Impact Management Services (EIMS) to review and update the scheduled and unscheduled closure costs for the Manungu Colliery as at end of September 2018. According to the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the holder of a mining right must make full financial provision for rehabilitation of negative environmental impacts.

Manungu Colliery is situated on portions of the Weilaagte 271 IR and Welgevonden 272 IR farms, near the town of Delmas in the Mpumalanga Province. The open pit mining operation mainly produces beneficiated coal. In terms of current planning, the remaining life of the mine is approximately fourteen years for the open pit area and underground activity will extend the life of mine further, with mine decommissioning and closure scheduled to occur during 2040.

The 2017 closure costs, developed by Digby Wells, served as a basis for review and update of Manungu Colliery closure costs. This report contains the estimated closure costs as well as the methodology and assumptions made to arrive at the final closure estimate.

METHODOLOGY

The closure cost estimates for both the scheduled and unscheduled situations have been determined in accordance with the Department of Mineral Resources (DMR).

A site visit to Manungu Colliery was conducted on the 8th of March 2018, which was followed by closure cost calculations and the compilation of a report on the quantities, types of structures and costs involved for rehabilitating the areas.

For the purposes of the cost estimate, scheduled closure was assumed as 2040. The unscheduled situation reflects immediate closure as at end September 2018.

The costs are structured according to the format routinely used for the presentation of closure costs for mine sites as per the following categories:

- Infrastructural areas;
- Mining areas;
- General surface rehabilitation;
- Water management;
- Post-closure aspects; and
- Additional allowances.

The plans and maps supplied by Manungu Colliery were used for the cost estimate quantities and augmented by dedicated site visits. The unit rates to determine the closure costs were sourced from BEALs' data base and/or in consultation with demolition practitioners.

CLOSURE COSTS

The overall closure costs increased, compared with the 2017 closure costs, mainly due to the following:

- The application of new unit rates compared to previous DWS rates;
- Inflation over a one-year period;
- Additional infrastructure not allowed for in the previous closure costing developed by DWS;
- Routine adjustments to the master unit rates of BEAL, to reflect the increased efficiency of dismantling/demolition of large-scale routine surface infrastructure;

- Changes to infrastructure and mining areas, or assumptions regarding the rehabilitation thereof in terms of the following:
  - Updated quantities for open pit rehabilitation;
  - Transportation and disposal costs of general demolition waste to the Delmas landfill site; and
  - Increased allowances for post-closure monitoring.

A summary of the scheduled and unscheduled closure costs for Manungu Colliery can be seen in the table below.

E018 Manungu Coal Mine Closure Costs, as at September 2018					
Closure components		Unscheduled Closure (2018)		Scheduled Closure (2040)	
1	Infrastructural aspects	R	15 935 358,83	R	165 026 577,75
2	Mining aspects	R	206 795 858,99	R	116 699 020,89
3	General surface rehabilitation	R	24 832 263,39	R	24 249 425,45
4	Water management	R	110 996,08	R	192 701,53
	Sub-Total 1	**R**	**247 674 477,28**	**R**	**306 167 725,62**
5	**Post-Closure Aspects**				
5,1	Surface water monitoring	R	533 600,00	R	533 600,00
5,2	Groundwater monitoring	R	1 305 600,00	R	1 305 600,00
5,3	Rehabilitation monitoring	R	870 000,00	R	2 160 000,00
5,4	Care and maintenance	R	913 085,48	R	3 195 799,17
	Sub-Total 2	**R**	**3 622 285,48**	**R**	**7 194 999,17**
6	**Additional Allowances**				
6,1	Preliminary and general	R	29 720 937,27	R	36 740 127,07
6,2	Contingencies	R	24 767 447,73	R	30 616 772,56
	Sub-Total 3	**R**	**54 488 385,00**	**R**	**67 356 899,64**
	Grand Total Excl. VAT. (Sub-total 1 +2 +3)	**R**	**305 785 147,76**	**R**	**380 719 624,42**

CONCLUSION

The scheduled and unscheduled closure costs for Manungu Colliery, were based on information provided by the mine. Estimates were made based on experience, where the required information was not available. Unit rates for the closure costing were obtained from BEAL's data base and where required adapted to reflect site specific conditions.

The focus of this project was on the calculation of the closure costs including the demolition and management of the physical infrastructure, pit and overburden as well as the rehabilitation of these affected areas.

Aspects that require further attention to improve the accuracy of future closure costs have been identified and listed in this report. Notwithstanding the above, the closure costs documented in this report adequately reflects the costs for unscheduled and scheduled costs in September 2018 and 2040 respectively. The reflected closure costs objectives also provide a good base for future closure costings at Manungu Colliery.

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LIST OF TERMS AND ABBREVIATIONS USED

Rehabilitation	The re-instatement of a disturbed area into a usable state (not necessarily its pre-mining state) as defined by broad land use and related performance objectives
Remediation	To assist in the rehabilitation process by enhancing the quality of an area through specific actions to improve especially bio-physical site conditions
Scheduled closure	Closure that happens at the planned date and/or time horizon
Unscheduled closure	Immediate closure of a site, representing decommissioning and rehabilitation of the site in its present state
Decommissioning	This relates to the situation after cessation of operations involving the deconstruction/removal and/or transfer of surface infrastructure and the initiation of general site rehabilitation
Care and maintenance	This involves the maintaining and corrective action as requires as well as conducting the required inspection and monitoring to demonstrate achievement of success of the implemented measures
Closure	This involves the application for closure certificate and initiation of transfer of on going care and maintenance to third parties
Site relinquishment	Receipt of closure certificate and handover to third parties for on-going care and maintenance, if required
Post-closure	The period of on-going care and maintenance, as per arrangement with third parties
Preliminary and Generals (P&Gs)	This is a key cost item which is directly related to whether third party contractors are applied for site rehabilitation. This cost item comprises both fixed and time-related charges. The former makes allowance for establishment (and de-establishment) of contractors on site, as well as covering their operational requirements for their offices (electricity/water/communications), latrines, etc. Time-related items make allowance for the running costs of the fixed charged items for the contract period
Contingencies	This allows for making reasonable allowance for possible oversights/omissions and possible work not foreseen at the time of compilation of the closure costs. Allowance of between 10 percent and 20 percent would usually be made based on the accuracy of the estimations. The South African Department of Mineral Resources Guideline (January 2005) requires an allowance of 10 percent

1. INTRODUCTION

BEAL (Pty) Ltd (BEAL) was appointed by Environmental Impact Management Services (EIMS) to update the unscheduled closure costs, as at September 2018, and to develop the scheduled closure cost as at 2040 for Manungu Colliery. The estimated closure costs, methodology and assumptions made to arrive at the closure costs is contained in this report.

The previous closure cost, determined by Digby Wells during 2017, served as a base for review and update for the closure costing. Costs have been calculated assuming that the mine would have to close immediately and would have to rehabilitate or remediate the impacts without delay.

Manungu Colliery is situated near the town of Delmas in the Mpumalanga Province (refer to Figure 1). Manungu Colliery is a mining operation that primarily produces beneficiated coal. Trucks transport the coal to various Eskom power stations.

Benefits of appropriate closure management includes:

- Minimised residual environmental impacts upon closure;
- Advanced financial planning for environmental rehabilitation costs; and
- Reduced cost of financial provision through proactive completion of rehabilitation.

In terms of current planning, mine decommissioning and closure is scheduled to occur during 2040.

The costs are structured according to the format routinely used for the presentation of closure costs for mine sites as per the following categories:

- Infrastructural areas;
- Mining areas;
- General surface rehabilitation;
- Water management;
- Post-closure aspects; and
- Additional allowances.

Figure 1: Locality Map 1

2. APPROACH TO COST DETERMINATION

The following approach were applied to review and update the Manungu Colliery closure costs:

- Background information such as aerial images, layout drawings and specialist studies, etc. were gathered;
- A project initiating meeting were conducted on 8 March 2018 with Manungu Colliery management team, a site visit, accompanied by Ms Koketso Mphago (Environmental Officer), followed by further gathering of supporting information;
- Unit rates were updated to form a dedicated suite of unit rates that reflect site-specific conditions;
- Good practice requirements for key closure measures were confirmed and revised where required;
- Bills of quantities (BoQs) and detailed costing sheets in a format that complies with the Department of Mineral Resources' (DMR) requirements and/or standards were compiled;
- Liaised with BEAL's surface profiling team to confirm scheduled and unscheduled closure costs for the rehabilitation of the Manungu open pit and the planned open pit; and
- The closure costing report, summarising the approach, assumptions and findings applicable to the closure costing were compiled.

The following information was made available and has been utilised, as deemed necessary, in determining the closure costs, is shown in Table 1 below.

Table 1: Available information

Title/description	Format	Author	Date
Manungu Colliery Layout	DWG, PDF	ECMA Consulting (Pty) Ltd.	October, 2017
LOM Plan	PDF	ECMA Consulting (Pty) Ltd.	June, 2017
Manungu Crushing Plant, Civil Layout	PDF	Pentalin trading 56 (Pty) Ltd	May, 2015
Manungu Infrastructure Layout Drawings	DWG, PDF	BEAL	August 2018
Quarterly water quality monitoring report	PDF	Philo Environmental Management CC	July – September 2017
Closure Cost Assessment for Manungu Colliery 2017	PDF	Digby Wells Environmental	February 2017

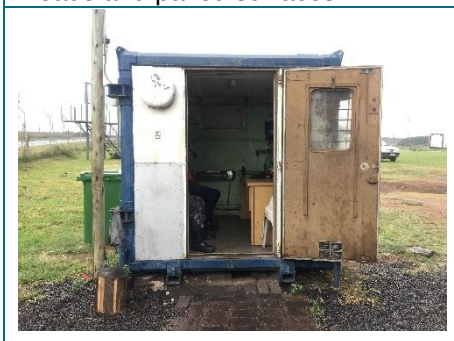
3. BATTERY LIMITS

The specific mine related components addressed in the closure costing is listed below.

- Infrastructural areas; and
- Manungu Mining Areas.

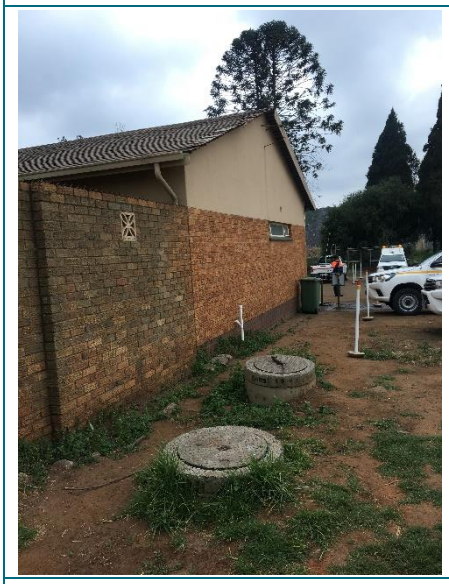
The battery limits as applied with the Manungu Colliery closure costs are further elaborated in Table 2 below.

Table 2: Battery limits

<table>
<tr><th>Area</th><th colspan="2">Description</th></tr>
<tr><td rowspan="3">Existing Infrastructural areas</td><td colspan="2">Office area;
Plant area;
Contractors area;
Hard park;
Old chicken run;
Abandoned infrastructure;
Dirty water impoundments; and
Roads and paved surfaces.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Guard house (Ref no 11 on drawing E018-000-002)</td><td>Carports (Ref no 9&10 on drawing E018-000-002)</td></tr>
</table>

Area	Description	
		
	Boardroom (Ref no 14 on drawing E018-000-002)	Main office building (Ref no 18 on drawing E018-000-002)
		
	Offices (Ref no 16 on drawing E018-000-002)	Dog houses (Ref no 17 on drawing E018-000-002)
		
	Abondaned buildings and JoJo water tank slab (Ref no 14 & 15 on drawing E018-000-002)	Lapa and storage area (Ref no 8 on drawing E018-000-002)

Area	Description	
		
	Offices (Ref no 2,3,4,5 on drawing E018-000-002)	Septic tank (Ref no 26 on drawing E018-000-002)
		
	Workshop (Ref no 6 on drawing E018-000-002)	Walkways (No reference on drawing E018-000-002)
		
	Guard house (Ref no 12 on drawing E018-000-003)	Diesel bay (Ref no 26 on drawing E018-000-003)
		

Area	Description	
	Braai area (Ref no 25 on drawing E018-000-003)	Offices (Ref no 22,23 & 24 on drawing E018-000-003)
		
	Offices (Ref no 21 on drawing E018-000-003)	Brick building and container (Ref no 18 & 20 on drawing E018-000-003)
		
	Septic tank (Ref no 19 on drawing E018-000-003)	Abandoned buildings and JoJo tanks slabs (Ref no 16 & 17 on drawing E018-000-003)
		
	Buildings (Ref no 13, 14 & 15 on drawing E018-000-003)	Buildings (Ref no 8 on drawing E018-000-003)
		

Area	Description	
	Workshop (Ref no 6 on drawing E018-000-003)	Waste area and storage (Ref no 2, 3 & 5 on drawing E018-000-003)
		
	Wash bay (Ref no 1 on drawing E018-000-003)	Containers (Ref no 11 on drawing E018-000-003)
		
	Hard park (Ref no 27, 28 & 29 on drawing E018-000-003)	Chicken run concrete bases (Ref no 6 on drawing E018-000-001)
		
	Abandoned buildings (Ref no 10 on drawing E018-000-001)	Abandoned guard house (Ref no 9 on drawing E018-000-001)
		

Area	Description	
	Conveyors (Ref no 6 & 14 on drawing E018-000-004)	Reclaimed feeder (Ref no 2 on drawing E018-000-004)
		
	Crusher, container and power box (Ref no 7, 10 & 13 on drawing E018-000-004)	Container and Conveyor CV 5 (Ref no 11 & 9 on drawing E018-000-004)
		
	Refuel area and generator container (Ref no 14 on drawing E018-000-001)	Dirty water channel (Ref no 12 on drawing E018-000-001)
		
	Jojo tanks (No reference on drawing E018-000-001)	PCD, culverts and silt trap (Ref no 16 & 17 on drawing E018-000-001)
		
	Guard house and entrance area (Ref no 20 on drawing E018-000-001)	Weigh bridge (Ref no 19 on drawing E018-000-001)

Area	Description	
		
	Health and safety building (Ref no 19 on drawing E018-000-002)	Containers (Ref no 20, 21, 22, 23 & 24 on drawing E018-000-002)
		
	Septic tank and ablution (Ref no 25 on drawing E018-000-002)	Waste area (Ref no 30 on drawing E018-000-001)
Mining areas		
	Open pit (Ref no 24 on drawing E018-000-001)	Open pit (Ref no 24 on drawing E018-000-001)
		
	Haul roads (Ref no 1 on drawing E018-000-001)	

4. ASSUMPTIONS AND QUALIFICATIONS

4.1. GENERAL

The general assumptions and qualifications that were made are listed below:

- The Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine, by the DMR (January, 2005) guideline was followed for the closure cost estimates;

- Cost components such as the decommissioning and rehabilitation costs, equating to an outside (third party) contractor establishing an on-site camp and conducting the rehabilitation-related work, is addressed in this report;
- The closure costs, as computed, does not cover components such as staffing of the site after decommissioning, the infrastructure and support services (e.g. power supply, etc) for this staff as well as workforce matters such as separation packages, re- training /re-skilling, etc.
- Certain matter such as the retaining of infrastructure after mine closure for beneficial re-use by the communities, will be negotiated/discussed with the regulatory authorities during the remaining operational period of the mine for finalisation towards mine decommissioning;
- The DMR Guidelines suggest fixed ration of preliminary and general (P&Gs) and contingencies for the establishment costs of the dedicated contractors that would be commissioned to conduct the demolition and rehabilitation work on site;
- The cost estimates allow for post-closure care and maintenance work, as well as compliance monitoring by specialist contractors and consultants;
- No cost off-sets due to possible salvage values were considered. This is in accordance with the DMR guidelines, only gross decommissioning and rehabilitation costs are detailed in this report; and
- Both the scheduled and unscheduled closure costs have been determined. The scheduled closure takes place at a planned date and/or time and is in accordance with overall mine planning. Whereas the unscheduled closure entails immediate closure of a site, representing decommissioning and rehabilitation of the site in its present state.

4.2. SITE-SPECIFIC

The site-specific assumptions and qualifications that were made is as follows:

4.2.1. Infrastructure

- Assume Delmas is the closest town for general waste disposal (travel distance from mine 12km);
- Assume that all demolished steel structures will be transported and disposed of at Delmas;
- Assume all containers will be transported to Delmas;
- Assume Delmas-Botleng waste management facility is still in operation and that general demolition waste will be disposed at this waste management facility. Assume a transport distance of 20km between Manungu Colliery and waste management facility;
- Assume that all hazardous waste be disposed at Holfontein H:H WDF (transport distance 38km);
- Assume all concrete footings, bases and structures are to be demolished to 1000 mm below the final surface topography;
- Assume demolished concrete will be disposed in the pit; and
- Assume no notable quantities of asbestos and related products are present on site, which require specific measures for dismantling, handling and disposal.

4.2.2. Dirty Water Impoundments

- Concrete channels are to be demolished;
- Culverts are to be demolished;
- Silt traps are to be demolished;
- The Pollution Control Dams would be rehabilitated as follows:

- Contaminated soil/sediment will be removed from the dam basin and disposed of in the open pit prior to its rehabilitation. (Assume sediment hazardous waste rating is low as to allow for disposal in pit);
- Assume a double liner. All liners to be removed;
- Breach the dam wall and shape to a minimum of 1:5 (V:H);
- Shape and level the disturbed area to facilitate free drainage; and
- Establish vegetation.

4.2.3. Mining areas

- The total backfill volume for the final void at Manungu pit, consisting of cut, fill, Load & Haul and fill to free drain volumes, these volumes were calculated based on the available point file information. (refer to attached drawing -E018-001-CON-000);
- For unscheduled closure the final void rehabilitation volume was determined by BEAL's landform design team (refer to attached drawing -E018-001-CON-000);
- For Scheduled closure no landform design was available to obtain the final earth moving volumes, therefore a final void width of 80 m, length of 1550 m, and depth of 50 m was assumed to calculate the material required for rehabilitation of the final voids. It is recommended that a predictive model be developed for the Manungu open pit to increase the accuracy of the closure costing.

4.2.4. General surface rehabilitation

- It has been assumed that all coal stockpiles would be sold and/or removed off-site at mine decommissioning and that these facilities would not require rehabilitation, except for the clean-up and rehabilitation of the footprint areas;
- Carbonaceous coal veneers have accumulated at the Manungu coal stockpile, Run of Mine (ROM), plant areas, hard park, contractors camp and underground infrastructure areas. Therefore, allowance has been made to clean-up and rehabilitate these areas by removing 30cm of contaminated soil followed by ripping, importation of topsoil and vegetation establishment. It is assumed that the contaminated soil can be disposed of in the pit prior to final rehabilitation; and
- Coal veneers have also accumulated on some of the haul roads. Hence the identified haul roads will be cleaned-up and rehabilitated by removing 10cm of the contaminated soil and disposing it in the pit prior to its rehabilitation. After the contaminated soil is removed, ripping and vegetation establishment will take place.

4.2.5. Post-closure aspects

- Allowance has been made for routine rehabilitation monitoring and care and maintenance within the mining area; and
- In order to determine the decant volume a detailed groundwater study has to be conducted. The proposed treatment plant can be evaluated, in terms of sufficient capacity, once the decant volumes is determined. For the purpose of the closure costing determination, no allowance was made for post-closure treatment and therefore further investigation is required.

5. UNIT RATES

The unit rates used in the determination of the closure cost were obtained from BEALs' existing data base. The unit rates were determined in consultation with demolition practitioners. Refer to Appendix B for the unit rates.

5.1. GENERAL SURFACE SHAPING

General surfacing forms part of the overall surface rehabilitation. It has been assumed that most of the areas would require surface shaping, especially where infrastructure has been removed. The stockpiling of building/demolition rubble to be removed for disposal is included, as well as the subsequent shaping and profiling of these surfaces.

It has been assumed that the material will be dozed at an average thickness of 500 to 750mm when the area is shaped and profiled. The adopted dozing rate of R 21.00/m3 equates to about R 105 000 to R 157 500/ha.

5.2. ROADS

For the unscheduled closure the haul roads were assumed to be 46m wide. The gravel roads have been assumed to be 8m wide and the engineered surface road to be 11m wide. For the scheduled closure the width of the haul roads were assumed to be 46m wide, the gravel roads to be between 4m and 16m wide and the engineered surface as 11m wide.

Allowance has been made to remove 100mm of contaminated soil from the haul road at a rate of R 21/m3. The contaminated soil will be loaded and hauled to the pit at a rate of R18/m3 for unscheduled closure and R 34/m3 for the scheduled closure case. The rehabilitation of the haul roads includes ripping, dozing, shaping/ levelling, vegetation and amounts to R27/m2. The rehabilitation of the gravel roads includes ripping, profiling and vegetation establishment and amounts to R11/m2. The roads with an engineered surface will be ripped, profiled and vegetated at a cost of R53/m2. The rehabilitation of the concrete roads into the shafts includes ripping, profiling and vegetation establishment.

5.3. COMPACTION ALLEVIATION

For general ripping allowance has been made for a mid-sized dozer equipped with 3 ripper tines, ripping to a depth of approximately 500 mm for compaction alleviation. An average unit rate of R 5477/ha was estimated based on a wet rate of R 2 740/h at a rate 0.5 ha/h. In the areas where deep (heavy) ripping is required allowance has been made for D9 dozer equipped with 1 ripper tine, ripping to a depth of approximately 1000 mm for compaction alleviation. An average unit rate of R 16 452/ha was estimated based on a wet rate of R 4940/h at a rate 0.3 ha/h.

5.4. VEGETATION ESTABLISHMENT

Soil amelioration will most likely be required if the vegetation has to be established on uncompact growth medium/ topsoil. This will depend on whether the topsoil was stockpiled and the period of the stock piling.

Allowance has been made to apply 0.5 ton/ha fertiliser, 5 ton/ha lime and 15 ton/ha organic material such as well-cured cattle manure, in order to determine a unit rate for re-vegetation. If cultivation and seeding are also included, but ripping to alleviate compaction excluded, this rate equates to R 56 495/ha.

5.5. SURFACE WATER MONITORING

It has been assumed that surface water monitoring will be conducted at four monitoring points and would take at least one man-day of and independent specialist to conduct the sampling of these points. It is assumed that in this one man-day the preparation of the sampling equipment is included. The professional fees and disbursements would equate to R 7 200 per sampling event. The sample analysis equates to R 16 000 (R4 000 per sample), therefore totalling to R 23 200 per event. Taking other disbursements (15 percent) into account this amount could be rounded to R 26 680 per sampling event, or R 106 720 per year for each of the above mining areas.

It has been assumed that surface water monitoring will have to continue for 5 years mine post-closure on a quarterly basis.

5.6. GROUNDWATER MONITORING

To reflect post closure groundwater quality, it has been assumed that at least 10 groundwater monitoring boreholes would be required.

If it is assumed that two man-days would be required to conduct a monitoring event (including preparation) this would equate to about R 7 200/day. Allowance has also been made to conduct chemical sample analysis at R 4000/ sample. Hence, these costs amount to about R 40 000 per sampling event. Taking other disbursements (20 percent) into account this amount could be rounded to R 65 280 per sampling event. If sampling has to be conducted at least four times a year, the annual costs are R 261 120/yr.

It has been assumed that groundwater monitoring will have to continue for 5 years post-closure.

5.7. REHABILITATION MONITORING

For the 290ha area of the unscheduled closure it has been assumed that two consultants would be required for seven man-days to conduct the rehabilitation monitoring. One event would equate to R67 200, if a R600/hr consultant rate is assumed. The annual costs would amount to R134 400 or roughly R464/ha if it is to be conducted twice a year. If travelling and accommodation is added the overall rate would increase to R592/ha/year, or R3 000/ha for a five-year period.

For the 720ha area of the scheduled closure it has been assumed that two consultants would be required for seventeen man-days to conduct the rehabilitation monitoring. One event would equate to R163 200, if a R600/hr consultant rate is assumed. The annual costs would amount to R326 400 or roughly R454/ha if it is to be conducted twice a year. If travelling and accommodation is added the overall rate would increase to R583/ha/year, or R3 000/ha for a five-year period.

5.8. REHABILITATION CARE AND MAINTENANCE

It is assumed that this would require 6 weeks per year of a team of 10 workers and 1 JCB as supporting equipment to conduct the corrective measures over 20 ha. It has been assumed that the hourly rate of the workers is R 25 and the equipment R 3 821/d (per machine). If accommodation and travelling of R 400/ha is also added, the overall rate is about R 9131/ha/year.

It has been assumed that the workers and equipment could be sourced locally.

6. CLOSURE COST ASSESSMENT

6.1. BENEFICIATION AREAS

Closure cost component	Closure cost assessment	
	Unscheduled (2018)	**Scheduled (2040)**
Processing plants, steel structures, reinforced concrete and brick structures, offices, workshops, weigh bridges, stores and related structures and infrastructure, old chicken run concrete	▪ Demolish all steel structures; ▪ Demolish all concrete and reinforced concrete buildings/structures to a depth of 1 m below ground level; and ▪ Rip, shape and vegetate the disturbed infrastructural surface areas.	▪ Demolish all steel structures; ▪ Demolish all concrete and reinforced concrete buildings/structures to a depth of 1 m below ground level; ▪ Rip, shape and vegetate the disturbed infrastructural surface areas; and

slabs, hard park and underground adit entrances		▪ Plugging and sealing of incline shafts.
Product stockpiles	▪ All useable stockpiles of raw and/or saleable material would have been processed at closure and none of these would remain on site requiring reclamation; and ▪ Rip, shape and vegetate the disturbed surface areas.	▪ As for unscheduled closure.
Topsoil and overburden stockpiles	▪ All stockpiles will be loaded and hauled to the open pit; and ▪ Import topsoil, shape and vegetate the disturbed surface areas.	▪ As for unscheduled closure.
Dirty water impoundments	▪ Demolish concrete channels, culverts, silt trap and dispose in pit; ▪ Allowance has been made for rehabilitation of pollution control dams: • Remove contaminated soil/sediment from dam basin, and disposal thereof in the pit; • Remove all liners; • Breach dam wall and shape to a minimum of 1:5 (V:H); • Shape and level the disturbed area to facilitate free drainage; and • Establish vegetation.	▪ As for unscheduled closure.
Roads	▪ Remove 10 cm from haul roads and rehabilitate; ▪ Rehabilitate gravel roads; ▪ Rehabilitate engineered gravel roads, except for those required for post-closure monitoring Dispose of engineered layer in open pit; ▪ Re-establish natural drainage; ▪ Rip to alleviate compaction; and ▪ Prepare for the natural re-establishment by keystone pioneer species.	▪ Remove 10 cm from haul roads and rehabilitate; ▪ Rehabilitate gravel roads; ▪ Rehabilitate engineered gravel roads, except for those required for post-closure monitoring Dispose of engineered layer in open pit; ▪ Demolish concrete road into underground incline shaft and rehabilitate; ▪ Re-establish natural drainage; ▪ Rip to alleviate compaction; and ▪ Prepare for the natural re-establishment by keystone pioneer species.
Power lines	▪ Remove all power lines, except the main feed lines leading to Eskom's substations.	▪ As for unscheduled closure.
Fences	▪ Dismantle and dispose of all fences that do not form part of post-closure property boundaries.	▪ As for unscheduled closure.
Demolition waste	General	▪ As for unscheduled closure.

	■ Sort and screen waste. Concrete demolition waste ■ Dispose concrete in the pit. Steel ■ Dispose of steel in Delmas. General waste ■ Transport and dispose of general waste at a registered landfill facility, such as the Delmas Botleng landfill. Hazardous waste ■ Transport hazardous waste to the Holfontein hazardous waste disposal facility. In Pit-disposal ■ Dispose of all carbonaceous veneers and contaminated soils in the pit, unless stipulated otherwise.	

6.2. MINING AREAS

Closure cost component	Closure cost assessment	
	Unscheduled (2018)	**Scheduled (2040)**
Rehabilitation of final voids and ramps	Voids Allowance has been made for the rehabilitation of final voids as follows: ■ Backfill the pit through effective materials movement (combination of blasting, dozing, load and haul and infilling) as computed by dedicated surface profile modelling; ■ Shape and level the dumped material; and ■ Place topsoil (500 mm) on backfilled pit areas assuming that topsoil stockpiles are situated within a short haul or dozing distance, not exceeding 1km; and ■ Establish vegetation. Ramps Allowance has been made for the rehabilitation of ramp scars as follows: ■ Shape and infill ramp scars, assuming a 50 percent ratio between dozing and load and haul (<1km); ■ Shape and level to facilitate drainage; ■ Place topsoil to 500mm thickness; and ■ Establish vegetation. Spoils	Similar to unscheduled closure, but assuming the following: ■ Roll-over rehabilitation up to date (no backlog). ■ Final Void location and dimensions were assumed to be 80 m width, length of 1550 m, and a depth of 50 m

	Allowance has been made for rehabilitation of spoils and fugitive spoils as follows: ■ Level spoils at low wall; ■ Bulk doze spoils; ■ Shape and level to facilitate free drainage; ■ Place topsoil to 500mm thickness; and ■ Establish vegetation.	

6.3. GENERAL SURFACE REHABILITATION

Closure cost component	Closure cost assessment	
	Unscheduled (2018)	**Scheduled (2040)**
Removal of contaminated material	■ Remove 100 and 300 mm of contaminated material over an appropriate percentage of an area were deemed necessary.	■ As for unscheduled closure.
Shaping and levelling of footprint areas	■ Shape disturbed areas through a cut to fill action and re-profile the area to allow free drainage.	■ As for unscheduled closure.
Ripping	■ General ripping of footprint areas to a depth of 500 mm to alleviate compaction, and to 1 000mm where deemed necessary.	■ As for unscheduled closure.
Establish vegetation	■ Ameliorate and cultivate soil and seed with an indigenous grass seed mixture.	■ As for unscheduled closure.

6.4. RUNOFF MANAGEMENT

Closure cost component	Closure cost assessment	
	Unscheduled (2018)	**Scheduled (2040)**
Re-instatement of drainage lines	■ Re-instate natural drainage lines over the site (excluding the areas included under the rehabilitation of final voids, ramps and spoils).	■ As for unscheduled closure.

6.5. PRE-SITE RELINQUISHMENT MONITORING AND AFTERCARE

Closure cost component	Closure cost assessment	
	Unscheduled (2018)	**Scheduled (2040)**
Surface water and groundwater monitoring	■ Quarterly monitoring over a 5-year period at 4 surface water monitoring points, in order to monitor the water quality of the stream; and ■ Quarterly monitoring over a 5-year period at 10 groundwater monitoring points.	■ Quarterly monitoring over a 5-year period at 4 surface water monitoring points, in order to monitor the water quality of the stream; and ■ Quarterly monitoring over a 5-year period at 10 groundwater monitoring points.

Rehabilitation monitoring	■ An allowance has been included for the rehabilitation monitoring of reclaimed areas for a 5-year period.	■ Assumed over a 5-year period on all areas rehabilitated at scheduled closure.
Care and maintenance	■ Care and maintenance of the reclaimed areas (entire disturbed footprint area), over a 5-year period, has been assumed.	■ Assumed over a 5-year period on all areas rehabilitated at scheduled closure.

6.6. P&G'S, CONTINGENCIES AND ADDITIONAL ALLOWANCES

Closure cost component	**Closure cost assessment**	
	Unscheduled (2018)	**Scheduled (2040)**
Preliminary and general	■ Aligned to the DMR guidelines an additional allowance of 12% of the total infrastructural and related aspects has been made.	■ As for unscheduled closure.
Contingencies	■ Aligned to the DMR guidelines an additional allowance of 10% of the total for infrastructure and related aspects has been made.	■ As for unscheduled closure.

7. ASPECTS REQUIRING FURTHER ATTENTION

Aspects that that require further attention have been identified. These aspects may improve the accuracy of futures closure cost estimates.

- To ensure that the financial provision is up-to-date and in accordance to the DMR requirements, annual revision of closure costing is recommended. This will also assist in accommodating changes in the closure costing due to any facilities that was constructed or demolished as well as any changes in the closure approach;
- With the determination of the closure costing it has been assumed that going forward the concurrent in-pit rehabilitation would remain up to date and that at the conclusion of mining only the final void would require rehabilitation. It has to be confirmed that this would be the case, since if not, this could have a significant effect on the computed closure costs;
- A predicative post- mining landform design is required to determine the final void size and location. This will increase the accuracy of the scheduled closure costing.
- On-going attention must be given to the predicted excess mine water make after closure. It is recommended that dedicated work be conducted to determine the liability associated with post-closure treatment of water, as excess water is, may decant at Manungu mine and treatment could be required soon. The on-going handling and treatment of this water is a costly closure cost component and refinement/improvement of the predicted rate of excess water requiring attention could have a notable effect on the computed closure costs; and
- It is recommended that detailed surface profile modelling be conducted for the open pit so that these costs, which contribute significantly to the overall costs, can be verified.

8. CONCLUSIONS

The financial provision for rehabilitation and closure for Manungu Colliery is documented in this report. Information were provided by Tshedza, a site visit was conducted and in those cases were information was not available, estimates/ assumptions were made based on experience.

The unit rates used in the closure costing were obtained from BEAL's data base. The unit rates were adapted to reflect site specific conditions, where required.

Notwithstanding the above, the closure costs documented in this report adequately reflects the costs for unscheduled and scheduled costs in September 2018 and 2040 respectively. The reflected closure costs objectives also provide a good base for future closure costings at Manungu Colliery.

9. STATEMENTS OF INDEPENDENCE AND COMPETENCE

9.1. STATEMENTS OF INDEPENDENCE

BEAL is an independent international consultancy. Neither BEAL nor its staff, have or have had, any interest in this project capable of affecting their ability to give an objective and unbiased opinion, and have and/or will not receive any pecuniary or other benefits in connection with the project, other than normal consulting fees.

9.2. STATEMENTS OF COMPETENCE

The Environmental Engineering Business Unit of BEAL is based in Silverlakes, Pretoria. This division is responsible for closure planning as well as the determination of decommissioning, rehabilitation and closure costs and liabilities for both mining and manufacturing-related industries.

The division has been involved with closure planning and costing projects for key clients throughout South Africa, utilising the South African Department of Mineral Resources' financial provision guideline (January, 2005) as well as international good practice to ensure closure costs are country- and site-specific, market-related and appropriate for the site conditions.

All costing and liability estimations are guided and reviewed by Arno van der Merwe (Pr Eng), Managing Director of BEAL Consulting Engineering and Project Management.

10. REFERENCES

- Department of Mineral Resources, 2005. Guideline Document For The Evaluation Of The Quantum Of Closure-Related Financial Provision Provided By A Mine;

Riaan de Beer
Environmental Engineer

Johann Le Roux
Business Unit Manager

APPENDIX A

Layout Plan

APPENDIX B

Unit Rates

APPENDIX C

Detailed Cost Breakdown

ITEM	DESCRIPTION
1	Proposed Shaft Boxcut Spoils
2	Proposed Southern Underground Infrastructure
3	Proposed Opencast Contractors Camp
4	Proposed North Western Underground Infrastrucure
5	Future Coal Haul Road
6	Hards And Parting Stockpiles 60m high
7	Softs Stockpile 60m high
8	Topsoil Stockpile
9	Long Term Access Road
10	Original Hards Boxcut Spoil 60m high
11	Existing Office and Plant Area
12	Hards Stockpile 60m high
13	Current Contractor Yard
14	Original Softs Boxcut Spoils

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE
RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: SCHEDULED CLOSURE
SITE WIDE LAYOUT PLAN

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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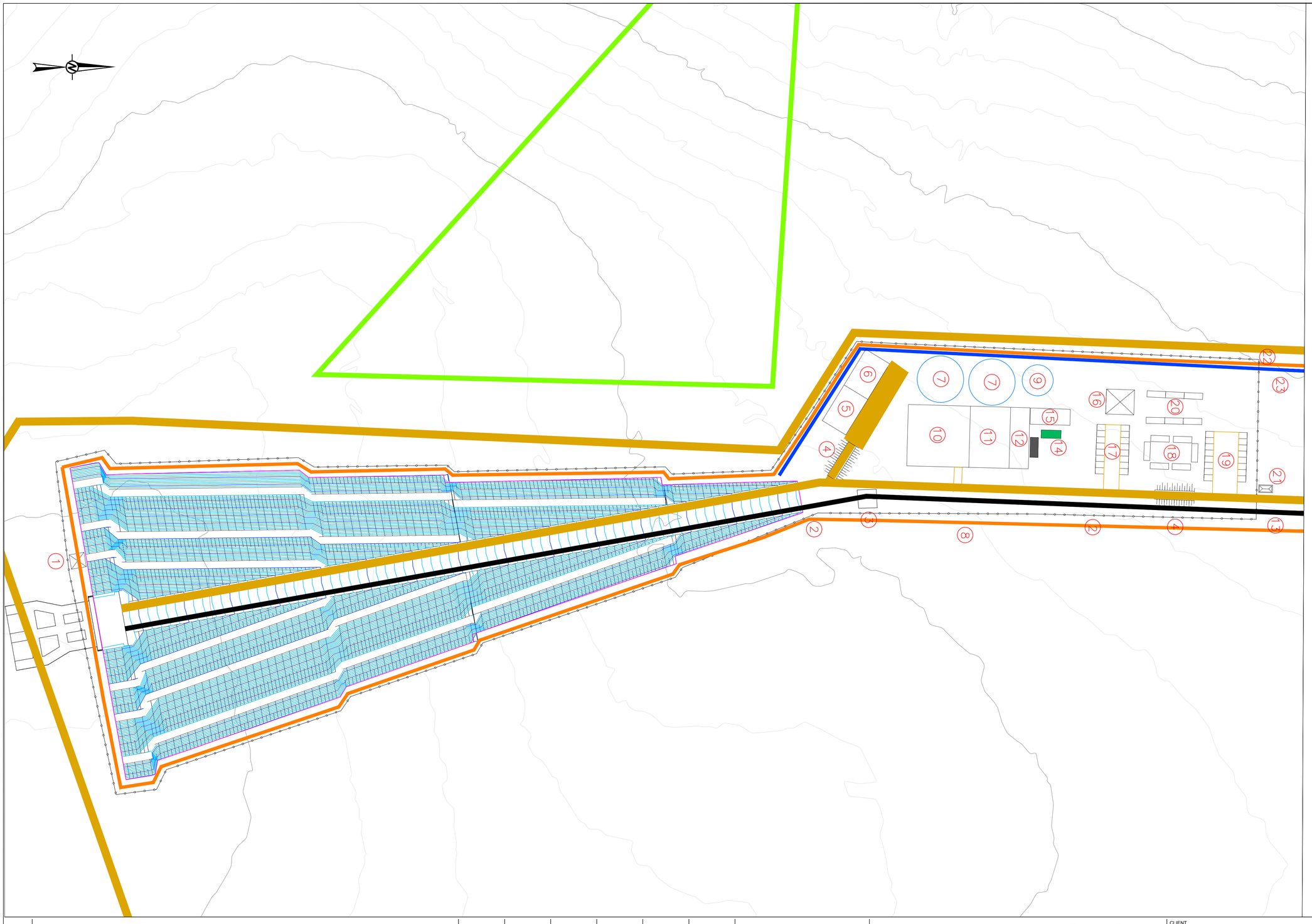

ITEM	DESCRIPTION
1	Air Vents
2	Underground Adit South Shaft Entrance
3	ROM BIN
4	Brake Test Ramp
5	Stone Dust Store
6	Cable Workshop
7	Service Water Dam
8	Security Fence
9	Potable water tank
10	Proposed Workshop
11	Workshop Stores
12	Washbay
13	Conveyor Belt
14	Oil Trap
15	Diesel Bay and Refueling Station
16	Generator and Sub-station
17	Mine LDV Parking
18	Southern Underground Offices
19	Employee and Visitor Parking
20	Change House and Waiting Place
21	Security and Entrance Gate
22	Clean and Dirty water separation berm
23	Dirty Water Channel

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: SCHEDULED CLOSURE
SOUTHERN UNDERGROUND
INFRASTRUCTURE LAYOUT DRAWING

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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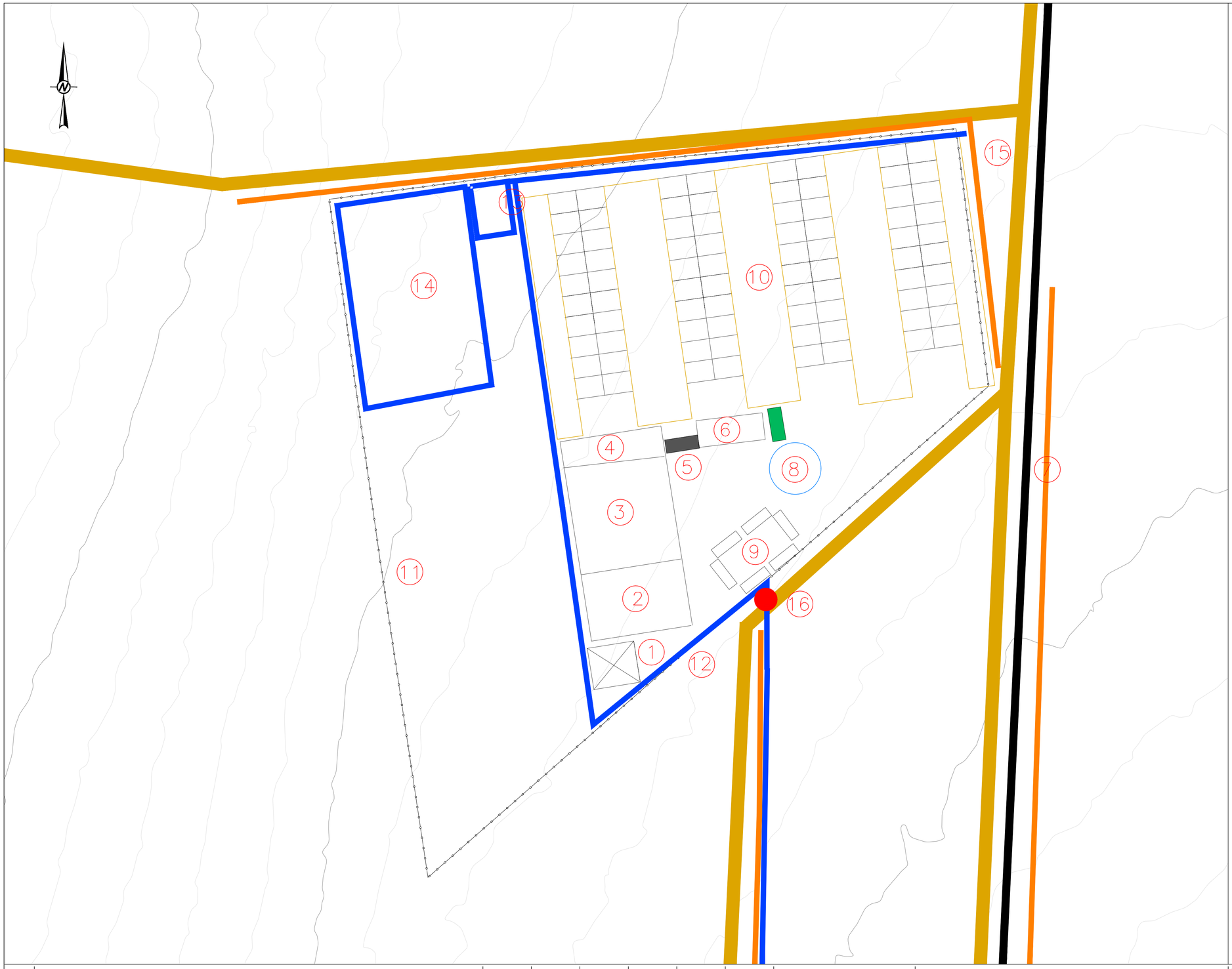

ITEM	DESCRIPTION
1	Waste Water Treatment
2	Workshop Stores
3	Proposed Workshop
4	Washbay
5	Oil Trap
6	Diesel Bay and Refueling Station
7	Conveyor Belt
8	Potable water tank
9	Opencast Contractors Offices
10	Hard Park Area
11	Security Fence
12	Dirty Water Channel
13	Silt Trap
14	Pollution Control Dam
15	Clean and Dirty water separation berm
16	Culvert Structure

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT
TSHEDZA MINING (Pty) Ltd.

PROJECT
CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE
SCHEDULED CLOSURE
OPENCAST CONTRACTORS CAMP
LAYOUT DRAWING

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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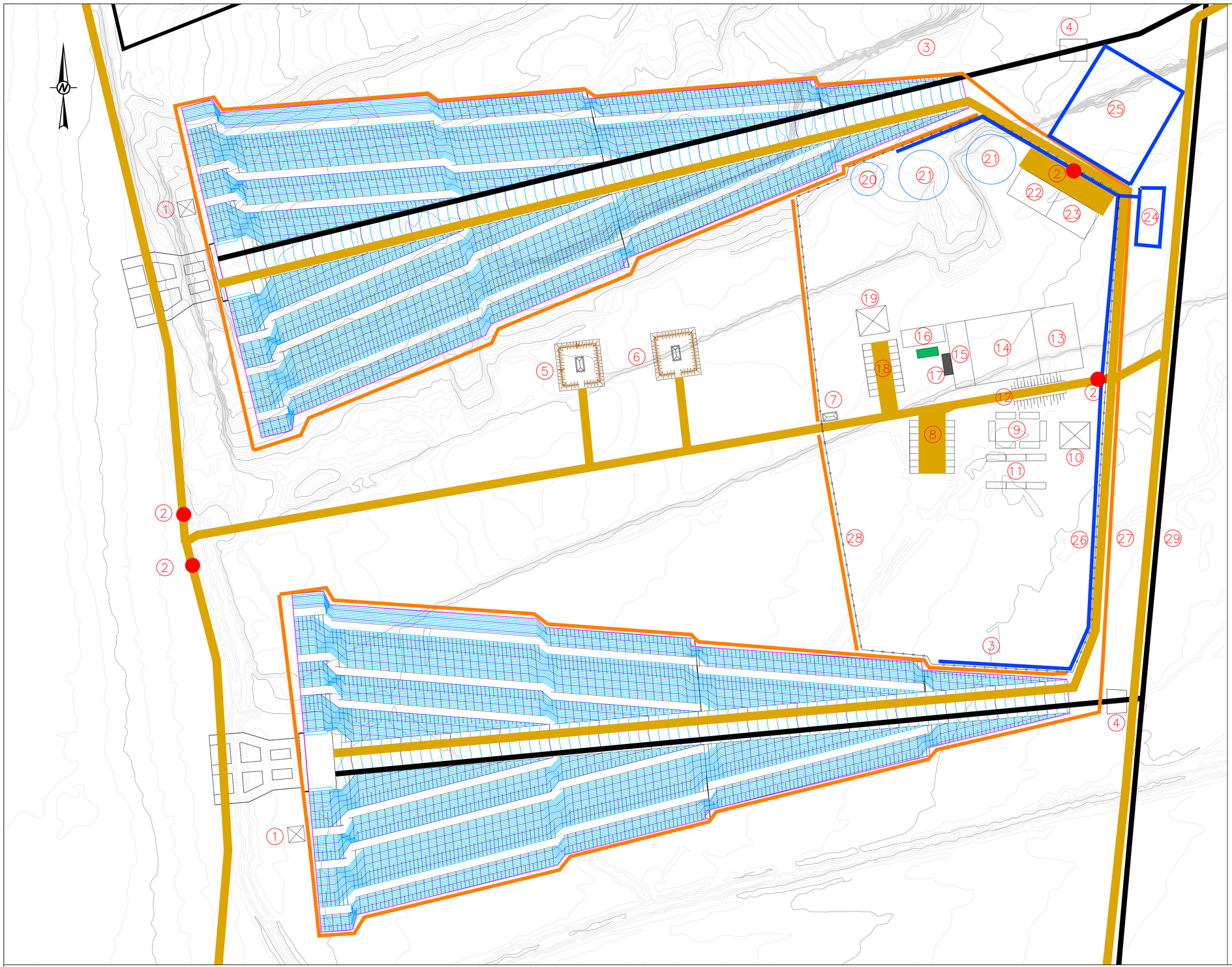

ITEM	DESCRIPTION
1	Ventilation fans
2	Culvert Structure
3	Underground Adit Entrance
4	ROM Bin
5	Explosives Store
6	Detonator Store
7	Security and Entrance Gate
8	Employee and Visitor Parking
9	Underground Offices
10	Waste Water Treatment
11	Change House and Waiting Place
12	Brake Test Ramp
13	Workshop Stores
14	Proposed Workshop
15	Washbay
16	Diesel Bay and Refueling Station
17	Oil Trap
18	Mine LDV Parking
19	Generator
20	Potable water tank
21	Service Water Dam
22	Stone Dust Store
23	Cable Workshop
24	Silt Trap
25	Pollution Control Dam
26	Dirty Water Channel
27	Clean and Dirty water separation berm
28	Security Fence
29	Conveyor Belt

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: SCHEDULED CLOSURE
NORTH WESTERN UNDERGROUND
INFRASTRUCTURE LAYOUT DRAWING

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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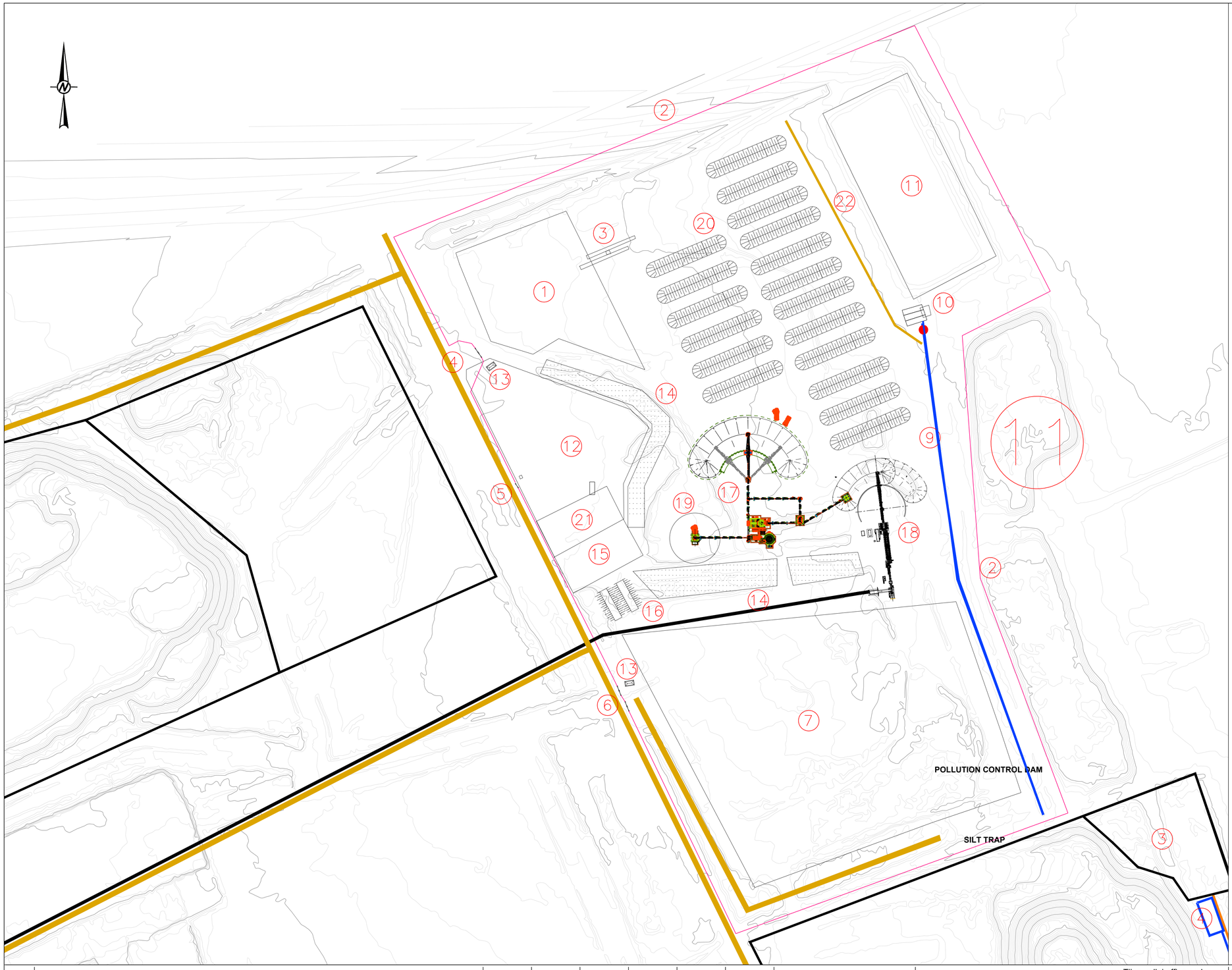

ITEM	DESCRIPTION
1	Tarpaulin and Waiting Area
2	Security Fence
3	New Weigh Bridge Position
4	Tarpaulin/Weighbridge Gate
5	Main Office Entrance Gate
6	ROM Gate
7	ROM Area
8	Coarse Discard Dump
9	Existing Dirty Water Channel
10	Existing and Proposed Silt Trap and Culvert
11	Pollution Control Dam
12	EXisting Mine Office Area
13	Guard House
14	Topsoil Stockpile
15	Proposed Mbuyelo Workshop Area
16	Brake Test Ramp
17	Proposed Wash Plant Position
18	Current Crusher Plant Position
19	Temporary Discard Stockpile
20	Sales Product Stockpile Area
21	Existing Frazer Workshop
22	Proposed Dirty Water Diversion Berm

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: SCHEDULED CLOSURE
OFFICE AND PLANT INFRASTRUCTURE
LAYOUT DRAWING

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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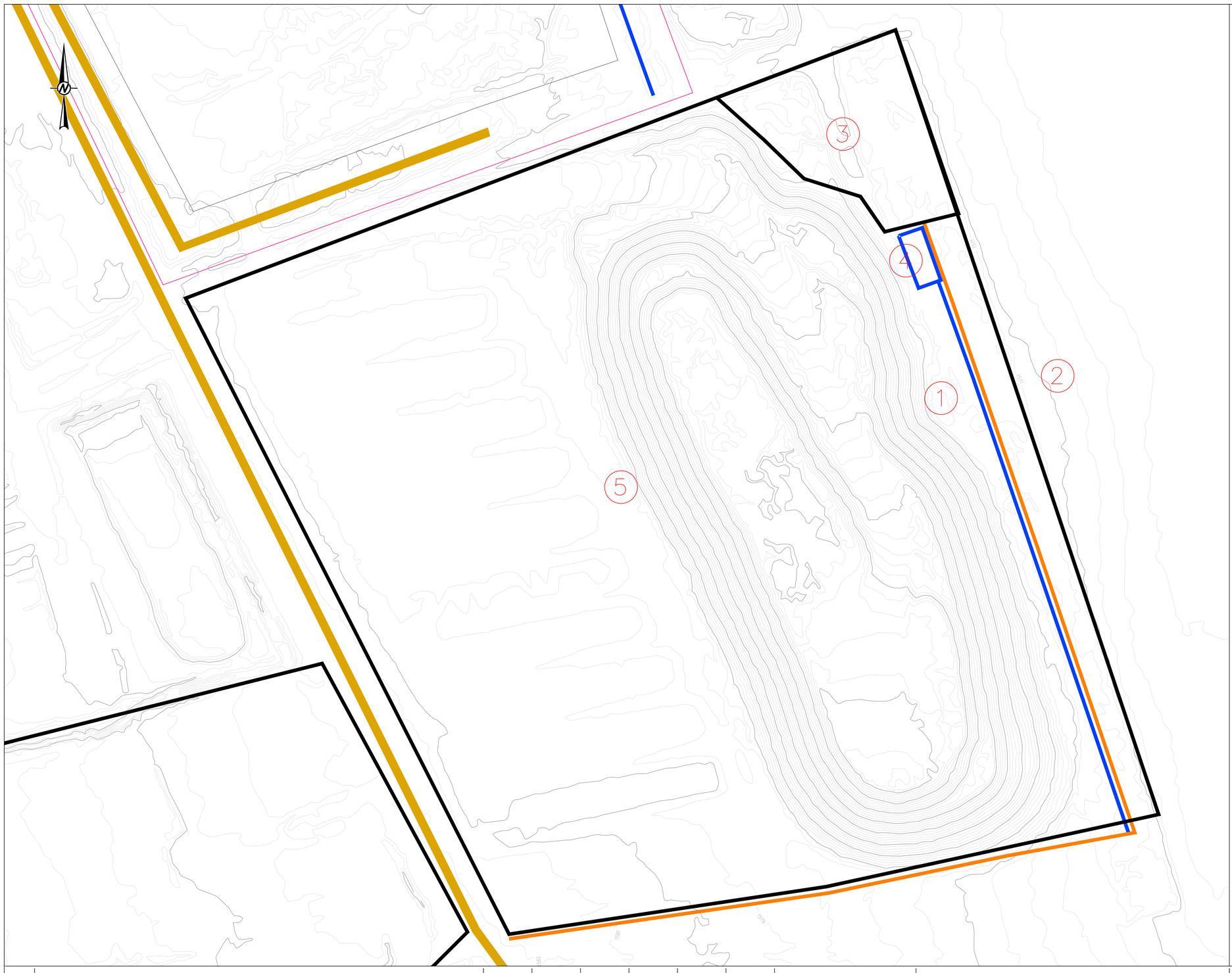

ITEM	DESCRIPTION
1	Dirty Water Channel
2	Clean and Dirty water separation berm
3	Pollution Control Dam
4	Silt Trap
5	Hards Stockpile of 18 ha at 60 m high

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE
RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: SCHEDULED CLOSURE HARD STOCKPILE LAYOUT DRAWING

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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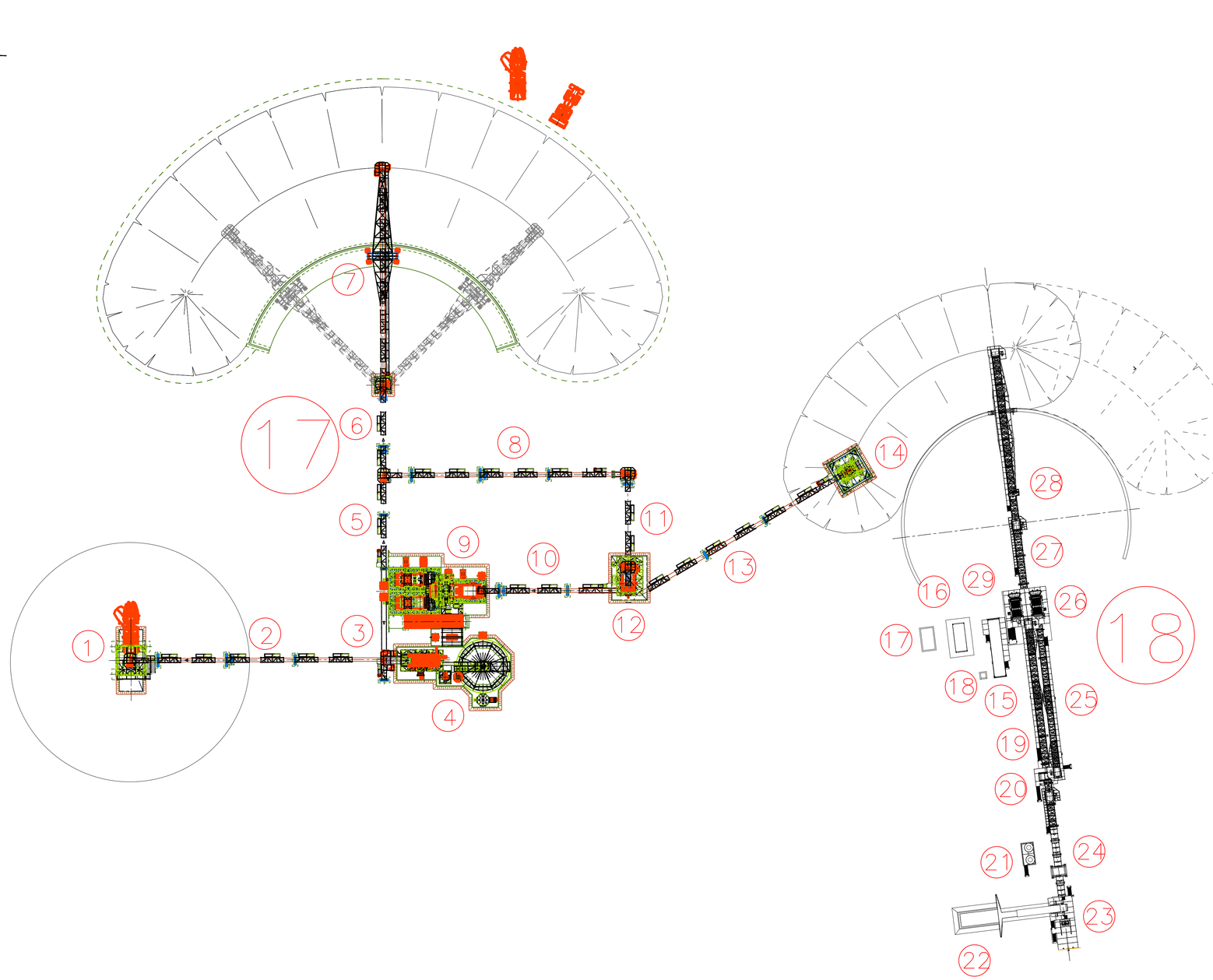

ITEM	DESCRIPTION
1	Temporary Discard Chute
2	Conveyor Nr 5
3	Conveyor Nr 9
4	Filter Press
5	Conveyor Nr 8
6	Conveyor Nr 7
7	Conveyor Nr 6
8	Conveyor Nr 3
9	Screening Area 2
10	Conveyor Nr 4
11	Conveyor Nr 2
12	Cyclone Plant
13	Conveyor Nr 1
14	Screening Area 1
15	Office Container
16	Container
17	Steel Building
18	Power Box
19	Conveyor CV2
20	Secondary Crusher
21	JoJo Water Tanks on Stands
22	Reclaim Feeder
23	Primary Crusher
24	Conveyor CV1
25	Conveyor CV3
26	Scalping Screen
27	Conveyor CV4
28	Conveyor CV5
29	Steel Structure

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: SCHEDULED CLOSURE
CRUSHING AND SCREENING PLANT LAYOUT DRAWING

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
E018	001	CON	011	00

ITEM	DESCRIPTION
1	TOPSOIL STOCKPILE
2	TOPSOIL STOCKPILE
3	TOPSOIL STOCKPILE
4	TOPSOIL STOCKPILE
5	TOPSOIL STOCKPILE
6	HARDS STOCKPILE
7	OVERBURDEN STOCKPILE
8	PIT REHABILITATION

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE
RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: UNSCHEDULED CLOSURE
OPEN PIT REHABILITATION

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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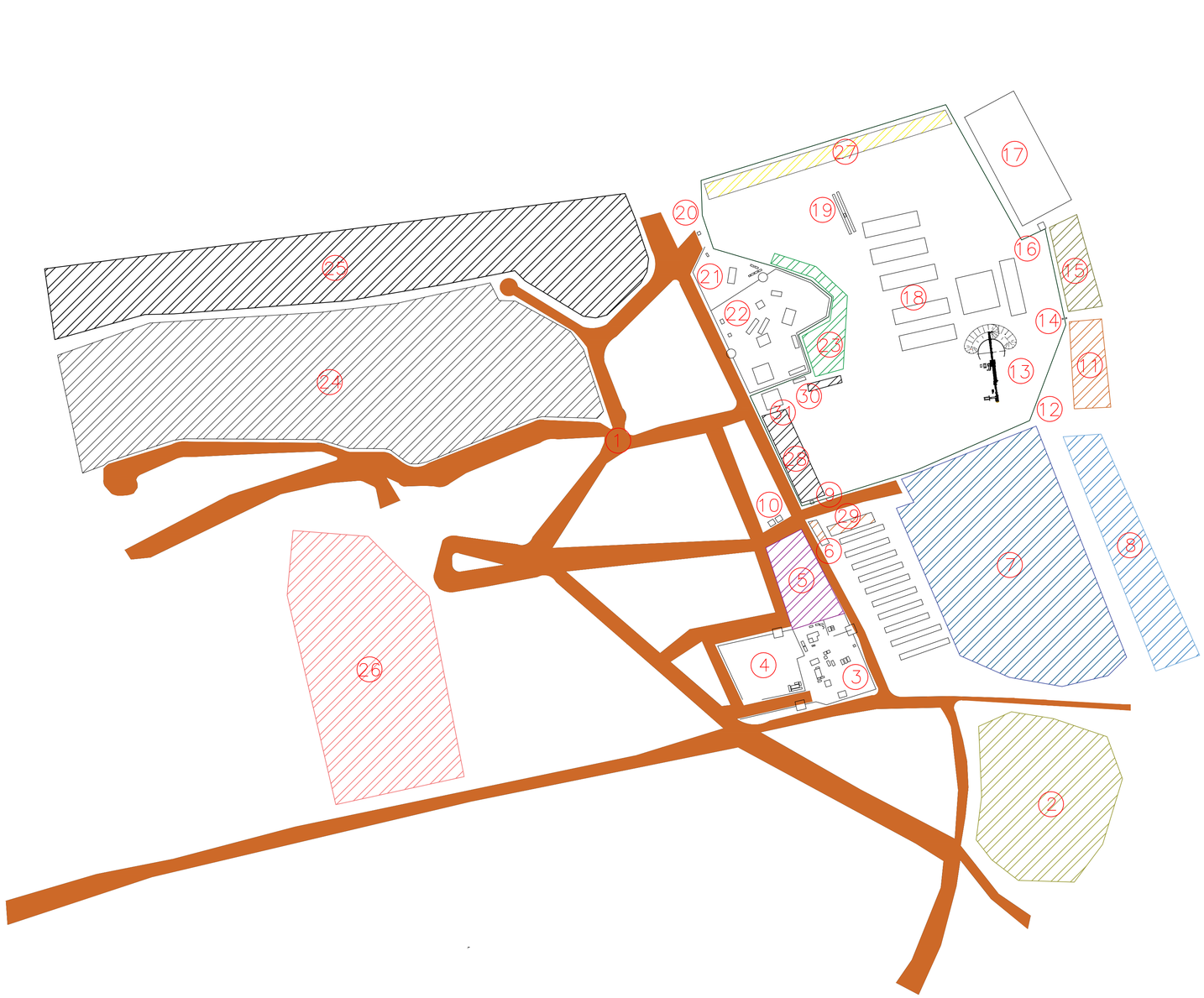

ITEM	DESCRIPTION
1	Roads and Haul Roads
2	Overburden 1
3	Contractors Camp
4	Hard Park
5	Overburden 5
6	Old Chicken Run
7	Overburden 2
8	Topsoil Stockpile 7
9	Abandoned Guardhouse
10	Abandoned Buildings
11	Topsoil Stockpile 5
12	Dirty Water Channel
13	Crushing and Screening Plant
14	Refuel Area and Generator Container
15	Topsoil Stockpile 3
16	Silt trap and Culvert
17	Pollution Control Dam
18	Stockpile
19	Weighbridge
20	Guard House and Paved Area
21	Health and Safety Area
22	Office Area
23	Topsoil Stockpile 2
24	Mining Area
25	Overburden 4
26	Overburden 3
27	Topsoil Stockpile 1
28	Topsoil Stockpile 4
29	Topsoil Stockpile 6
30	Waste Area
31	Mbuyelo Workshop

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: UNSCHEDULED CLOSURE SIDE WIDE LAYOUT

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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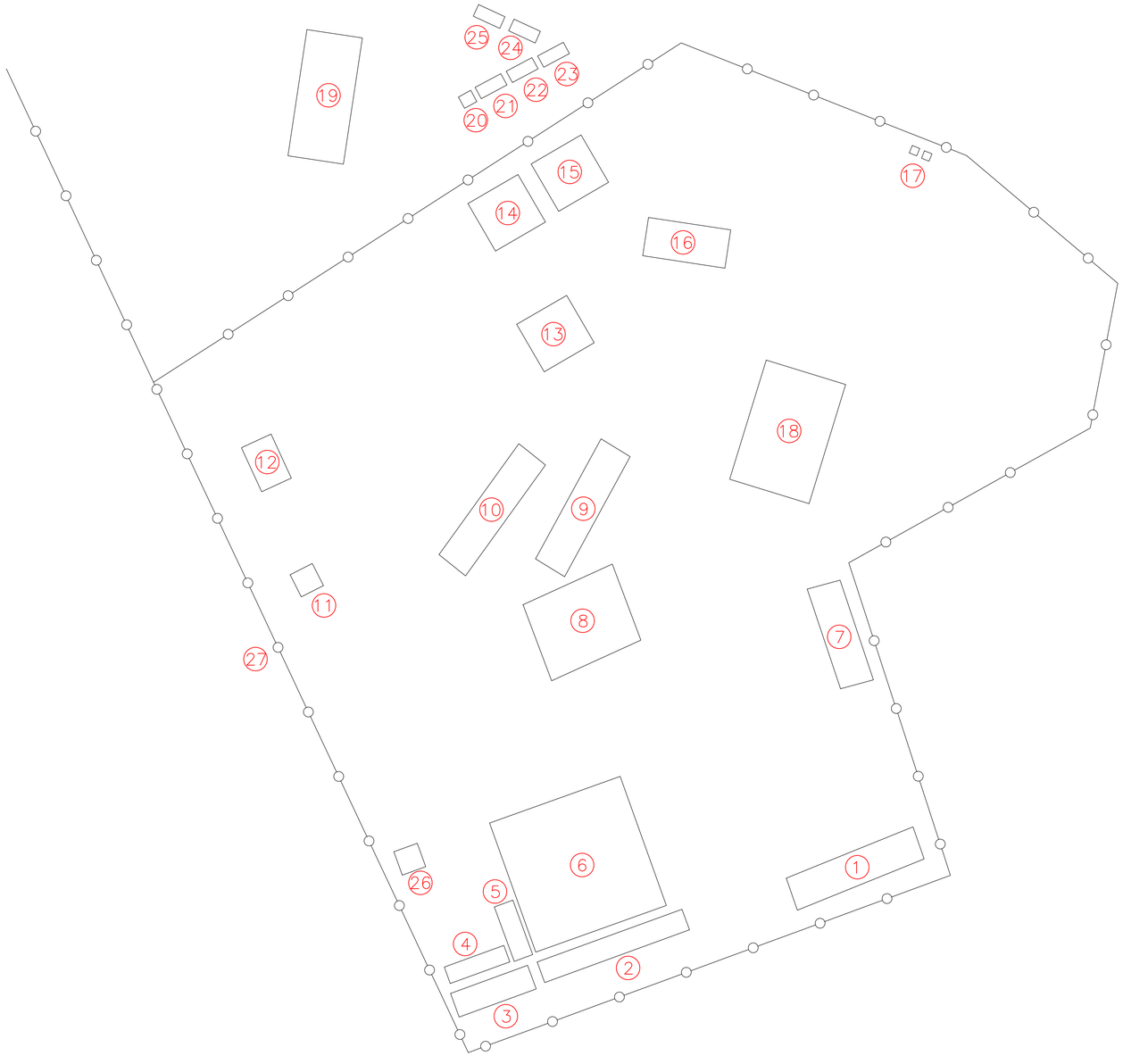

ITEM	DESCRIPTION
1	Car Ports
2	Prefab Building
3	Container
4	Prefab Building
5	Prefab Building
6	Workshop
7	Car Ports
8	Lapa and Storage
9	Car Ports
10	Car Ports
11	Guard House
12	Steel Structure Lookout Point
13	Board Room
14	JoJo Tank Slab
15	Abandoned Brick Buildings
16	Prefab Building
17	Dog Houses
18	Main Office Building
19	Health and Safety Building
20	Prefab Building
21	Prefab Building
22	Container
23	Container
24	Container
25	Ablution Building with Septic Tank
26	Septic Tank
27	Security Fencing
28	Prefab Building

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: UNSCHEDULED AND SCHEDULED CLOSURE OFFICE AND HEALTH AND SAFETY AREA

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
E018	001	CON	002	00

ITEM	DESCRIPTION
1	Washbay
2	Waste area
3	Steel Structure
4	Containers
5	Steel Structure
6	Workshop
7	Containers
8	Brick Building
9	Container
10	Container
11	Containers
12	Guard House
13	Brick Building
14	Brick Building
15	Container
16	JoJo Tank Slab
17	Abandoned Brick Buildings
18	Brick Building
19	Septic Tank
20	Container
21	Office Building
22	Container
23	Prefab Building
24	Container
25	Braai Area
26	Diesel Bay and Refueling Station
27	Containers
28	Shade Netting
29	Containers
30	Security Fencing

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
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LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE
RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: UNSCHEDULED CLOSURE
HARD PARK AND CONTRACTORS CAMP

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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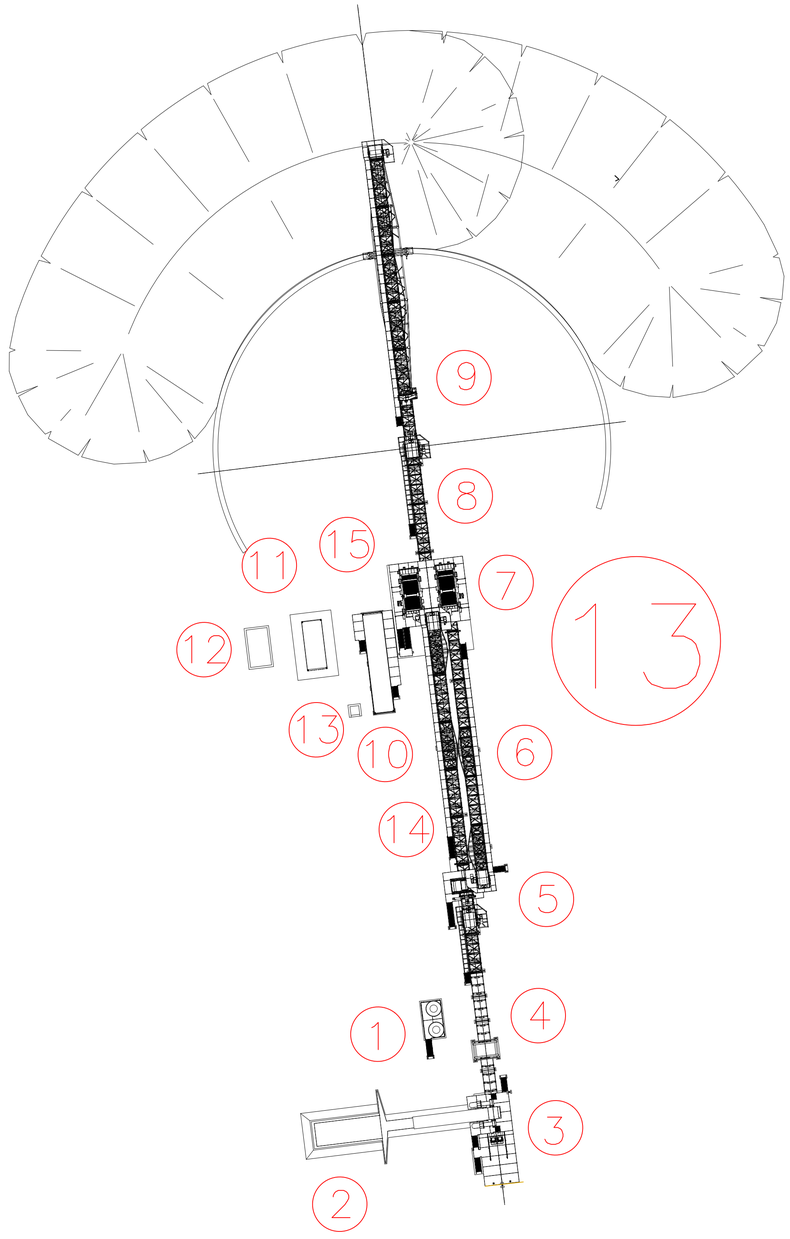

ITEM	DESCRIPTION
1	JoJo Water Tank Structrue on Slabs
2	Reclaim Feeder
3	Primary Crusher
4	Conveyor CV1
5	Secondary Crusher
6	Conveyor CV3
7	Scalping Screen
8	Conveyor CV4
9	Conveyor CV5
10	Office Container
11	Container
12	Steel Building
13	Power Box
14	Conveyor CV2
15	Steel Structure

REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	MVDW	RDB				

BEAL
CONSULTING ENGINEERING & PROJECT MANAGEMENT

BEAL CONSULTING ENGINEERS & PROJECT MANAGEMENT (PTY) LTD
PRETORIA OFFICE

Tijgervallei office park
Building 98 unit 9/10
Silverlakes rd
Hazeldean
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LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE
RDB	JLR	N.T.S	A1

CLIENT: TSHEDZA MINING (Pty) Ltd.

PROJECT: CLOSURE COSTING OF MANUNGU COLLIERY

DRAWING TITLE: UNSCHEDULED CLOSURE
CRUSHING AND SCREENING PLANT

PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
E018	001	CON	004	00

UNIT RATES FOR DEMOLITION, EARTHWORKS, REHABILITATION AND RELATED WORK, as at SEPTEMBER 2018				
Ref nr	**Aspect**	**Unit Rate**	**Unit**	**Comment**
A	**Concrete**			
A1	**Demolition of concrete structures**			
A1.1	Very heavy concrete with thickness greater than 750 mm	R 1 638	/m^3	Demolition cost of reinforeced concrete, excluding screening & sorting and disposal of waste
A1.2	Heavy concrete with thickness 500 - 750 mm	R 1 227	/m^3	Demolition cost, excluding screening & sorting and disposal of waste
A1.3	Medium concrete with thickness between 250 and 500 mm	R 816	/m^3	Demolition cost, excluding screening & sorting and disposal of waste
A1.4	Light concrete thickness less than 250 mm	R 518	/m^3	Demolition cost, excluding screening & sorting and disposal of waste
A2	**Demolition of concrete floors, bases and foundations**			Based on unit rates A1
A2.1	Strip foundation	R 171	/m	Reinforced (0.35 m x 0.6m x 1 m x Medium concrete unit rate)
A2.2	Column footing	R 1 376	/unit	(1.5 m x 1.5 m x 0.75 m) x (Medium concrete unit rate)
A2.3	Bases and floors after removal of super structures	R 285	/m^2	Reinforced (0.35 m x 1 m^2 x Medium concrete unit rate)
A2.4	Heavy duty floors and bases after removal of super structure	R 408	/m^2	0.5 m x 1 m^2 x Medium concrete unit rate
A2.5	Concrete slabs < 200 mm thick , no reinforcement	R 104	/m^2	Excludes disposal (Light concrete unit rate x 0.20 m)
A2.6	Concrete slabs < 250 mm, no reinforcement	R 129	/m^2	Excludes disposal (Light concrete unit rate x 0.25 m)
A2.7	Dam concrete liner 150 mm thickness	R 78	/m^2	Removal of 150 mm thick concrete liner, excluding disposal. [0.150 m x Light concrete unit rate]
A3	**Concrete crushing**			
A3.1	Crush concrete to aggregate	R 219	/m^3	Crushing concrete to 75 mm aggregate.
B	**Steel structures and equipment**			
B1	**Demolition of steel buildings and related infrastructure (Including Sheeting)**			Based on unit rated of B2
B1.1	Light plant or structures	R 328	/m²	Up to 300 kg of steel per square metre. Includes sheeting
B1.2	Light/medium plant or structures	R 683	/m²	Up to 500 kg of steel per square metre. Includes sheeting
B1.3	Medium plant or structures	R 1 311	/m²	Up to 800 kg of steel per square metre. Includes sheeting
B1.4	Medium/heavy plant or structures	R 2 330	/m²	Up to 1200 kg of steel per square metre. Includes sheeting
B1.5	Heavy plant structures	R 3 366	/m²	Up to 1500 kg of steel per square metre. Includes sheeting
B1.6	Very heavy plant structures	R 4 039	/m^2	Up to 1750 kg of steel per square metre. Includes sheeting
B2	**Demolition of steel structures**			
B2.1	Steel structures: light	R 1 093	/t	As per Jet demolition
B2.2	Steel structures: medium	R 1 639	/t	As per Jet demolition
B2.3	Steel structures: medium/heavy	R 1 941	/t	As per Jet demolition
B2.4	Steel structures: heavy	R 2 244	/t	As per Jet demolition
B3	**Demolition of permanent shed type structures**			
B3.1	0m – 5m high	R 77	/m^2	Includes sheeting. Cost based on unit rate B1.1, light steel 80 kg/m2
B3.2	5m – 10m high	R 138	/m^2	Includes sheeting. Cost based on unit rate B1.1, light steel 80 kg/m2
B3.3	10m – 15m high	R 223	/m^2	Includes sheeting. Cost based on unit rate B1.1, light steel 80 kg/m2
B3.4	15m – 20m high	R 328	/m^2	Includes sheeting. Cost based on unit rate B1.1, light steel 80 kg/m2
B4	**Crane hire and use**			

B4.1	120 ton Crane hire	R 45 957	/d	Rate per 10 h/day, Include site establishment and personnel accommodation, assuming a minimum of 10 days on site. As per Johnson Crane hire
B4.2	220 ton Crane hire	R 71 459	/d	Rate per 10 h/day, Include site establishment and personnel accommodation, assuming a minimum of 10 days on site. As per Johnson Crane hire
B5	**Demolition of steel tanks and dams with rubber lining**			
B5.1	≤5m diameter	R 6 973	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.2	5m - 10m diameter	R 22 980	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.3	10 - 15m diameter	R 50 185	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.4	15 - 20m diameter	R 91 459	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.5	20 - 25m diameter	R 149 499	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.6	25 - 30m diameter	R 227 001	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.7	30 - 35m diameter	R 326 661	/tank	Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.8	35 - 45m diameter	R 611 046		Cost includes an allowance for removal of liner, and excludes demolition of support structure and concrete base
B5.7	Unlined steel tanks - 5m dia	R 6 054	/tank	
B6	**General steel aspects**			
B6.1	Cladding and sheeting	R 20	/m^2	Steel sheeting
B6.2	Car ports (IBR roof)	R 52	/m^2	Excluding paving
B6.3	Car ports (shade net)	R 32	/m^2	Excluding paving
B6.4	Substations	R 638	/m^2	Soft strip substation infrastructure before demolition, excludes brick building and disposal of waste
C	**Demolition of buildings and structures**			
C1	Normal one storey brick buildings	R 414	/m^2	Soft strip before demolition, excludes disposal of waste. As per Jet Demolition (0.8m3m2 of light concrete)
C2	Normal double storey brick buildings	R 741	/m^2	Soft strip before demolition, excludes disposal of waste As per Jet Demolition
C3	Single brick wall (110mm)	R 17	/m	Free standing single brick wall 110 mm thick x 2000 mm high x per running meter
C4	Double brick wall (220mm)	R 24	/m	Free standing double brick wall 220 mm thick x 2000 mm high x per running meter
C5	Prefabricated Buildings	R 104	/m^2	As per Jet Demolition (factor of 0.25 of brick buildings)
C6	Fibre reinforced walls	R 8	/m	As per Jet Demolition (half the cost of single brick wall)
C7	Removal of timber structures	R 207	/m^2	As per Jet Demolition (half the cost of brick building)
	Disposal of Asbestos			
C6	Upfront preperation for asbestos removal	R 303 482	sum	Preparing area for removal of asbestos material
C8	Asbestos	R 194	/m^2	Removal of asbestos material, excluding disposal
D	**Linear infrastructure**			
D1	**Conveyors**			
D1.1	**Demolition of overland conveyors**			
D1.1.1	Overland conveyors - light, without cladding	R 414	/m	Single conveyor including dismantling of steel and demolition of concrete footings, excludes disposal of waste. Assumes 180kg / m
D1.1.2	Overland conveyors - light, with cladding	R 476	/m	Single conveyor including dismantling of steel and demolition of concrete footings, excludes disposal of waste. Assumes 180kg / m and 15% for cladding
D1.1.3	Overland conveyors - medium, without cladding	R 469	/m	Single conveyor including dismantling of steel and demolition of concrete footings, excludes disposal of waste. Assumes 230kg / m
D1.1.4	Overland conveyors - medium, with cladding	R 539	/m	Single conveyor including dismantling of steel and demolition of concrete footings, excludes disposal of waste. Assumes 230kg / m and 15% for cladding

D1.1.5	Overland conveyors - heavy, without cladding	R 545	/m	Single conveyor including dismantling of steel and demolition of concrete footings, excludes disposal of waste. Assumes 300kg / m
D1.1.6	Overland conveyors - heavy, with cladding	R 627	/m	Single conveyor including dismantling of steel and demolition of concrete footings, excludes disposal of waste. Assumes 300kg / m and 15% for cladding
D1.2	**Demolition of suspended conveyors**			
D1.2.1	Suspended conveyors - light, without cladding	R 517	/m	Single conveyor including dismantling of steel, support structures and demolition of concrete footings, excludes disposal of waste. Included a 25% premium on overland conveyors
D1.2.2	Suspended conveyors - light, with cladding	R 595	/m	Single conveyor including dismantling of steel, support structures and demolition of concrete footings, excludes disposal of waste. Included a 25% premium on overland conveyors
D1.2.3	Suspended conveyors - medium	R 586	/m	Single conveyor including dismantling of steel, support structures and demolition of concrete footings, excludes disposal of waste. Included a 25% premium on overland conveyors
D1.2.4	Suspended conveyors - heavy, without cladding	R 681	/m	Single conveyor including dismantling of steel, support structures and demolition of concrete footings, excludes disposal of waste. Included a 25% premium on overland conveyors
D1.2.5	Suspended conveyors - heavy, with cladding	R 783	/m	Single conveyor including dismantling of steel, support structures and demolition of concrete footings, excludes disposal of waste. Included a 25% premium on overland conveyors
D2	**Demolition of overland power lines**			
D2.1	Minor power lines	R 28	/m	< 11 kV (local lines, usually wooden poles). Assume 1 km / day, therefore approximately 20 poles demolished per day
D2.2	Major power lines	R 70	/m	> 11 kV (not usually used because transferred to service provider). Assume 500 m per day, 25% added premium for additional steel handling at a cost of R25 000 / day
D3	**Demolition of pipelines**			
D3.1	Overland steel pipeline on plinths (< 200 mm)	R 41	/m	5m plinths spacing, includes disposal of waste @ 10 km
D3.2	Overland steel pipeline on plinths (200-350mm)	R 89	/m	5m plinths spacing, includes disposal of waste @ 10 km
D3.3	Overland steel pipeline on plinths (350-500mm)	R 144	/m	5m plinths spacing, includes disposal of waste @ 10 km
D3.4	Overland steel pipeline on plinths (500-600mm)	R 226	/m	5m plinths spacing, includes disposal of waste @ 10 km
D3.5	Suspended steel pipeline	R 181	/m	Includes removal of support structures
D3.6	HDPE pipelines (< 350mm)	R 19	/m	Assume 1.5 km a day at R15 000 labour plus R10000 cutting cost
D3.7	HDPE pipelines (350mm - 500mm)	R 28	/m	Assume 1 km a day at R15 000 labour plus R10000 cutting cost
D4	**Demolition of cabling**			
D4.1	Copper cables	R 1 093	/t	Removal and dismantling of copper cables
D5	**Railway lines**			
D5.1	Demolition of electrified medium gauge railway line	R 258	/m	Demolish rail tracks, sleepers and collect ballast for local stockpiling for re-use. Assumed removal of overhead powerlines at 0.75 of overhead powerlines
D5.2	Demolition of non-electrified medium gauge railway line	R 205	/m	Demolish rail tracks, sleepers and collect ballast for local stockpiling for re-use.
E	**Removal of roads, paving and walkways**			
E1	Tar roads	R 67	/m^2	Layerworks buried in trench next to road , but excludes the disposal of tar as this will be stockpiled for beneficial re-use by local Municipalities. Assume asphalt thickness of 750 mm
E2	Haul roads	R 27	/m^2	Include ripping, dozing (D9), shaping/level and vegetation of road, excludes veneer clean-up at a road width of 45 m
E3	Gravel road with engineered surface	R 53	/m^2	Roads where layerworks is stabilised with cement. ripping, profiled and vegetated
E4	Normal gravel roads	R 11	/m^2	Gravel roads without layerworks or stabilisation of layerworks - ripping, profiled and vegetated
E5	Two track gravel road	R 7	/m	
E6	Hard stand	R 63	/m^2	Excluding disposal
E7	Brick paving	R 23	/m^2	

F	**Shafts, inclines and dam impoundments**			
F1	**Plugging/sealing of shafts**			
F1.1	Sealing of vertical shaft of 2 m diameter	R 1 335 166	sum	Refer to shaft calculator
F1.2	Sealing of vertical shaft of 2.5 m diameter	R 1 525 904	sum	
F1.3	Sealing of vertical shaft of 3.5 m diameter	R 1 952 260	sum	
F1.4	Sealing of vertical shaft of 5 m diameter	R 2 715 212	sum	
F1.5	Sealing of vertical shaft of 5.5 m diameter	R 2 962 050	sum	
F1.6	Sealing of vertical shaft of 7 m diameter	R 3 870 860	sum	
F1.7	Sealing of vertical shaft of 8 m diameter	R 4 510 394	sum	
F1.8	Sealing of vertical shaft of 10 m diameter	R 5 935 319	sum	
F1.9	Sealing of vertical shaft of 12.5 m diameter	R 7 910 019		
F1.11	Incline shaft reinforced plug (3.5mx5m dimension)	R 289 523	sum	For 3.5x5m dimension, includes venting, excludes portal filling
F1.12	Incline shaft reinforced plug (3.5mx8m dimension)	R 463 237	sum	For 3.5x8m dimension, includes venting, excludes portal filling
F1.13	Adits (1.5x1.5)	R 37 224	sum	Routine adits of 1.5mx1.5m derived from incline shaft plug rate
F2	**Removal of dam liners and plugging and sealing of penstock**			
F2.1	Single HDPE liner	R 5	/m^2	Removal and disposal of single HDPE liner
F2.2	Three HDPE liners	R 15	/m^2	Removal and disposal of three HDPE liners
F2.3	Plug outlet and seal penstock of tailings dam	R 84 149	sum	
G	**Rehabiliation of disturbed areas**			
G1	**Profiling**			
G1.1	Shaping/levelling of infrastructural footprint areas (500 mm)	R 102 774	/ha	Includes stockpiling of material, backfilling of excavations in cut to fill operation and final profiling, at an average depth of 500 mm over footprint area
G1.2	Shaping/levelling of infrastructural footprint areas (750 mm)	R 154 161	/ha	Includes stockpiling of material, backfilling of excavations in cut to fill operation and final profiling, at an average depth of 750 mm over footprint area
G1.3	Reshaping / profiling of dumps (general)	R 191 439	/ha	
G1.4	Import cover material and spread (300 mm)	R 144 737	/ha	3000 m3 over 2 km average @ R /m3
G1.5	Import cover material and spread (500 mm)	R 241 228	/ha	5000 m3 over 2 km average @ R /m3
G1.6	Shaping and levelling of cover material	R 12	/m^3	Including quality control in terms of leveling (60% of routine dozing rate)
G1.7	Profiling of general disturbed areas (excluding infratructural footprint areas)	R 2 055	/ha	Minimal dozing to enhance site drainage - no backfilling of excavations etc.
G1.8	Breach dam wall and reshape to 1:5	R 2 272	/m	Dam wall of approx. 5 m high with existing side slopes 1:3
G2	**Vegetation**			
G2.1	Establishment of vegetation (general)	R 56 495	/ha	General - on flat areas
G2.2	Establishment of vegetation on dumps	R 69 340	/ha	Averaged rate for top and sloped surfaces
G2.3	Establishment of vegetation (Natural grassland)	R 8 728	/ha	Vegetation established from the seedbed harvested from the surrounding undisturbed grasslands areas. Include auger harvesting, seeding and labour
G2.4	Establishment of woody / thorny species	R 18 092	/ha	
G2.5	Establishment of wetland vegetation (vegetation plugs)	R 201 958	/ha	Establish vegetation plugs with hydroscopic gel along scarified strips 500 mm apart in organic silt trap cells. @ R 36 /m2
G2.6	Removal of exotic/alien vegetation/small trees (<10ha)	R 6 691	/ha	For small areas <10ha
G2.8	Removal of exotic/alien vegetation/small trees (>100ha)	R 3 439	/ha	For substantial areas >100ha
G2.10	Removal of individual trees	R 56	/no	
G2.11	Hydroseeding	R 22 657	/ha	Seeding slurry (artificial seed and compost mix) is transported in a tank, either truck mounted and sprayed over prepared surface. @ R 3.70 /m2
G2.12	Stabilize PH levels of soil with lime	R 505	t	As obtained from Willem de Fry
G3	**Water management (pans, riparian areas, re-instatement of drainage lines)**			

G3.1	Reinstatement of drainage lines	R 1 542	/ha	Using a drainage denisty of 0.2 on average (Pittman et al.)
G3.2	Routing of storm water along dump toe	R 303	/m	
G3.3	Reinstatement of wetlands		/ha	Please refer to wetland calculator
G3.4	**Boreholes**			
G3.4.1	Drilling of general boreholes (< 35m)	R 61 471	/unit	The rate includes site establishment and related costs, labour and PVC casing
G3.5	Equipping of scavanger borehole (Pump, electrical and piping)	R 56 099	/unit	Nominal allowance
G3.6	Pumping of water	R 2	/m^3	
G3.6	**Plug and seal of boreholes**			
G3.6.1	Surface plug (5m)	R 7 532	sum	The rate includes site establishment and related costs, all plug material and labour.
G3.6.2	Full depth plug (35m)	R 18 012	sum	The rate includes site establishment and related costs, all plug material and labour.
G4	**Surface subsidence**			
G4.1	Placement of composite rock grid with geotextile	R 61	/m^2	10% added for stitching of overlaps
G4.2	Rehabilitation of sinkholes and subsided areas	R 497 768	/ha	Infilling and stabilisation of cracks. Assumed double rate of rip, general shaping & levelling, and vegetation. Assume 1 m3 of infill material would be required for every 100 m2 (3km haul distance)
G4.3	Placement of geotextile over surface	R 48	/m^2	A8 bidim material
G5	**Demolition waste handling and disposal**			
G5.1	Disposal of inert demolition waste at an appropriate disposal facility	R 123	/m^3	Excluding transport
G5.2	Disposal of hazardous waste (disposal to Holfontein)	R 1 396	/m^3	Excluding transport
H	**Earthworks**			
H1	**Excavation**			
H1.1	Minor excavation	R 37	/m^3	(< 10 000 m3). As per Fraser Alexander
H1.2	Bulk excavation	R 24	/m^3	(> 100 000 m3)
H1.4	Trench excavation	R 47	/m^3	Continuos trench excavation. As per Fraser Alexander
H1.5	Removal of gunited embankments	R 104	/m^2	Excludes disposal. As per Fraser Alexander
H1.6	Clean-up of contaminated materials/soils	R 49	/m^3	Excavation only, load and haul and disposal to be determined separately. As per Fraser Alexander
H1.7	Dragline	R 6	/m^3	
H2	**Materials transport**			
H2.1	**General load and haul**			
H2.1.1	Load and haul (1km haul)	R 37	/m^3	Small volumes on site (< 10 000 m3). As per Fraser Alexander
H2.1.2	Load and haul (2 km haul)	R 44	/m^3	Small volumes on site (< 10 000 m3). As per Fraser Alexander
H2.1.3	Load and haul (3 km haul)	R 51	/m^3	Small volumes on site (< 10 000 m3). As per Fraser Alexander
H2.1.4	Extra over rates for overhaul beyond free haul distance	R 7	/m^3	Small volumes on site (< 10 000 m3). As per Fraser Alexander
H2.2	**Bulk load and haul (restricted to 5km)**			
H2.2.1	0 - 1km (CAT 777)	R 30	/m^3	Bulk volumes (> 50 000 m3)
H2.2.2	1 - 2km (CAT 777)	R 32	/m^3	Bulk volumes (> 50 000 m3)
H2.2.3	2 - 3km (CAT 777)	R 34	/m^3	Bulk volumes (> 50 000 m3)
H2.2.4	3 - 4km (CAT 777)	R 37	/m^3	Bulk volumes (> 50 000 m3)
H2.2.5	4 - 5km (CAT 777)	R 40	/m^3	Bulk volumes (> 50 000 m3)
H3	**Ripping**			
H3.1	General ripping	R 5 447	/ha	D 7 dozer - 3 ripper tines to depth of 500 mm. As per Fraser Alexander
H3.2	Deep ripping (heavy)	R 16 452	/ha	D 9 dozer - 1 ripper tine to depth of 1 m. As per Fraser Alexander
H3.3	Ripping for alleviation of compaction	R 3 540	/ha	D 6 dozer - 3 ripper tines to depth of 500 mm. As per Fraser Alexander
H3.4	Scarify upper surface of dumps	R 3 012	/ha	4X4 Tractor for vegetation preparation . As per Fraser Alexander
H4	**Dozing rates**			
H4.1	Flat dozing for profiling	R 21	/m^3	Small volumes, cut to fill including final profiling- Dozing of loose material D6/7. As per Fraser Alexander
H4.2	Down dozing of material	R 15	/m^3	Small volumes - no profiling – Dozing of loose material D6/7. As per Fraser Alexander

H5	**General earthworks**			
H5.1	Compaction	R 28	/m^3	Compaction in layers of 250 mm thickness. As per Fraser Alexander
H5.3	Blasting	R 20	/m^3	
I	**Fencing**			
I1	**Erect fence**			
I1.1	Security fencing	R 177	/m	
I1.2	Stock fencing	R 35	/m	
I1.3	Concrete palisade	R 1 122	/m	
I2	**Dismantle fence**			
I2.1	Security fencing	R 45	/m	Include in inert demolition
I2.2	Stock fencing	R 14	/m	Include in inert demolition
I2.3	Concrete palisade	R 156	/m	Include in inert demolition
J	**Post-closure aspects**			
J1	Rehabilitation monitoring	R 3 000	ha	As per Agreenco
J2	Care and maintenance	R 9 131	ha	As per Agreenco
K	**Post-closure monitoring (Site Specific)**			**Refer to project information tab for calculation**
K1	Surface water	R 106 720	/yr	Duration and intervals are indicated as per calculation and line item discription
K2	Groundwater	R 261 120	/yr	Duration and intervals are indicated as per calculation and line item discription
L	**Other**			
L1	Not applicable	R 0	N/A	
L2	Sum allowance	R 0	/sum	Only to be used for post-closure aspects and additional allowances
M	**Site Specific**			**Refer to project information tab for calculation**
M1	Load and Haul - 1 km	R 41	/m^3	Site specific Small Volume load and haul distance 1 km, Refer to project information tab for the calculation
M2	Load and Haul - 25 km	R 237	/m^3	Site specific Small Volume load and haul distance 5 km, Refer to project information tab for the calculation.
M3	Load and Haul - 5 km	R 74	/m^3	Site specific Small Volume load and haul distance 10 km, Refer to project information tab for the calculation
M4	Load and Haul - 8 km	R 98	/m^3	Site specific Small Volume load and haul distance 15 km, Refer to project information tab for the calculation
M5	Load and Haul - 225 km	R 1 868	/m^3	Site specific Small Volume load and haul distance 225 km, Refer to project information tab for the calculation
N	**Site Specific**			
N1	Sorting and screeing- Unscheduled	R 193 764	sum	
N2	Load and haul steel to Delmas	R 117	/m^3	Assumne 12km from mine to Delmas
N3	Load and haul to Delmas Botleng Waste disposal site	R 175	/m^3	Ensure Landfill is still in operation, 20km
N4	Load, haul and dispose of containers 2x12m	R 27 620	sum	Load, haul and dispose of containers 2x12m at Delmas
N5	Load, haul and dispose of containers 2x6m	R 13 810	sum	Load, haul and dispose of containers 2x6m at Delmas
N6	Load, haul and dispose of containers 2x3m	R 6 905	sum	Load, haul and dispose of containers 2x3m at Delmas
N8	Sorting and screeing -Scheduled	R 592 380	/sum	
N9	Load and Haul (1 km)	R 18	/m^3	Rate Received from Humphrey Mohlahlo (1 km)
N10	Load and Haul (0.5 km)	R 16	/m^3	Rate Received from Humphrey Mohlahlo (0.5km)
N11	Load and Haul (1.5 km)	R 19	/m^3	Rate Received from Humphrey Mohlahlo (1.5 km)

E018 Manungu Coal Mine Closure Costs, as at September 2018

TSHEDZA MINING (PTY) LTD

Ref.			Closure Component (Select)	Unscheduled Closure (2018)							Scheduled Closure (2040)						
				Applicable	Quantity	Unit	Unit rate code	Unit rate	Total cost	Notes	Applicable	Quantity	Unit	Unit rate code	Unit rate	Total cost	Notes
Unscheduled	Scheduled																
Drawing nr	Drawing nr	1	**Infrastructural Areas**														
E018-000-002	E018-000-002	1.1	**Office area**														
		1.1.1	**Demolition of other buildings and structures**														
11	11		**Guard house**														
			Demolition of prefab building	Yes	4	/m2	C5	R104	R414	One 2x2m building	Yes	4	/m2	C5	R 104	R 414	One 2x2m building
16	16		**Offices**														
			Demolition of prefab building	Yes	24	/m2	C5	R104	R2 485	Two 2x6m building	Yes	24	/m2	C5	R 104	R 2 485	Two 2x6m building
18	18		**Main Office Building**														
			Demolition of normal one storey building	Yes	200	/m2	C1	R414	R82 836		Yes	200	/m2	C1	R 414	R 82 836	
13	13		**Boardroom**														
			Demolition of normal one storey building	Yes	128	/m2	C1	R414	R53 015	Grass roof	Yes	128	/m2	C1	R 414	R 53 015	Grass roof
14,15	14,15		**Area next to boardroom**														
			Demolition of concrete slab beneath JoJo Tanks	Yes	25	/m2	A2.3	R285	R7 136	Assume 200mm thick reinforced concrete slab	Yes	25	/m2	A2.3	R 285	R 7 136	Assume 200mm thick reinforced concrete slab
			Demolition of light steel structure (pump and rood)	Yes	2	/m²	B1.1	R328	R738	Assume light steel structure and pump	Yes	2,25	/m²	B1.1	R 328	R 738	Assume light steel structure and pump
			Demolition of normal one storey building	Yes	16	/m2	C1	R414	R6 627	Abandoned structures	Yes	16	/m2	C1	R 414	R 6 627	Abandoned structures
			Demolition of double brick wall	Yes	8	/m	C4	R24	R192	Abandoned concrete dam	Yes	8	/m	C4	R 24	R 192	Abandoned concrete dam
			Demolition of concrete slab	Yes	5	/m2	A2.3	R285	R1 427	Concrete slab beneath abandoned concrete dam. Assume 200mm thick reinforced concrete slab and 2,5m diameter dam	Yes	5	/m2	A2.3	R 285	R 1 427	Concrete slab beneath abandoned concrete dam. Assume 200mm thick reinforced concrete slab and 2,5m diameter dam
			Walkways														
			Demolition of brick paving between buildings	Yes	250	/m2	E7	R23	R5 727	Assume 250m of 1m wide brick paving walkways	Yes	250	/m2	E7	R 23	R 5 727	Assume 250m of 1m wide brick paving walkways
17	17		**Dog houses**														
			Demolition of light steel structure	Yes	8	/m²	B1.1	R328	R2 623	Assume light steel structure for dog houses	Yes	8	/m²	B1.1	R 328	R 2 623	Assume light steel structure for dog houses
8	8		**Lapa**														
			Demolition of Lapa	Yes	55	/m2	C7	R207	R11 390	Steel roof	Yes	55	/m2	C7	R 207	R 11 390	Steel roof
			Demolition of brick wall	Yes	13	/m	C4	R24	R312	Rock walls in Lapa	Yes	13	/m	C4	R 24	R 312	Rock walls in Lapa
			Demolition of concrete floor	Yes	55	/m2	A2.3	R285	R15 700	Lapa floor, assume 200m thick reinforced concrete	Yes	55	/m2	A2.3	R 285	R 15 700	Lapa floor, assume 200m thick reinforced concrete
8	8		**Storage Area**														
			Demolition of normal one storey building	Yes	165	/m2	C1	R414	R68 339	Rock walls	Yes	165	/m2	C1	R 414	R 68 339	Rock walls
			Demolition of light steel structure	Yes	12	/m²	B1.1	R328	R3 934	Light steel structure roof connected to storage room	Yes	12	/m²	B1.1	R 328	R 3 934	Light steel structure roof connected to storage room
6	6		**Workshop**														
			Demolition of light steel structure	Yes	291	/m²	B1.1	R328	R95 403		Yes	291	/m²	B1.1	R 328	R 95 403	
			Demolition of double brick wall	Yes	146	/m	C4	R24	R3 509	Assume double brick wall, 4mm high	Yes	146	/m	C4	R 24	R 3 509	Assume double brick wall, 4mm high
			Demolition of concrete floor	Yes	291	/m2	A2.3	R285	R83 069	Assume 250mm thick reinforced concrete slab	Yes	291	/m2	A2.3	R 285	R 83 069	Assume 250mm thick reinforced concrete slab
			Demolition of light steel structure inside workshop	Yes	29	/m²	B1.1	R328	R9 540	Assume light steel structures, 10% of floor area	Yes	29	/m²	B1.1	R 328	R 9 540	Assume light steel structures, 10% of floor area
5	5		Demolition of prefab building	Yes	4	/m2	C5	R104	R414	One 2x2m building	Yes	4	/m2	C5	R 104	R 414	One 2x2m building
4	4		Demolition of prefab building	Yes	12	/m2	C5	R104	R1 243	One 2x6m building	Yes	12	/m2	C5	R 104	R 1 243	One 2x6m building
2	2		Demolition of prefab building	Yes	24	/m2	C5	R104	R2 485	One 2x12m building	Yes	24	/m2	C5	R 104	R 2 485	One 2x12m building
3	3		Load, haul and dispose of 2x 12m containers	Yes	1	sum	N4	R27 620	R27 620		Yes	1	sum	N4	R 27 620	R 27 620	
E018-000-001	E018-000-009		**Mbuyelo workshop area**														
31	15		Demolition of light steel structure	Yes	291	/m²	B1.1	R328	R95 403	Assume light steel structure, same size as existing workshop	Yes	291	/m²	B1.1	R 328	R 95 403	Assume light steel structure, same size as existing workshop
31	15		Demolition of double brick wall	Yes	146	/m	C4	R24	R3 509	Assume double brick wall, 4mm high, same as existing infrastructure	Yes	146	/m	C4	R 24	R 3 509	Assume double brick wall, 4mm high, same as existing infrastructure
31	15		Demolition of concrete floor	Yes	291	/m2	A2.3	R285	R83 069	Assume 250mm thick reinforced concrete slab, same as existing infrastructure	Yes	291	/m2	A2.3	R 285	R 83 069	Assume 250mm thick reinforced concrete slab, same as existing infrastructure
E018-000-002	E018-000-002		**Septic tank**														
26	26		Demolition of septic tank	Yes	6	/m3	A1.3	R816	R4 894	Assume 2x2m. 2m high, 250mm thick walls, concrete structure. Only demolish the first one meter of the concrete. Price for two septic tanks	Yes	6	/m3	A1.3	R 816	R 4 894	Assume 2x2m. 2m high, 250mm thick walls, concrete structure. Only demolish the first one meter of the concrete. Price for two septic tanks
		1.1.2	**Demolition of steel structures**														
1,7,9,10	1,7,9,10		**Carport**														
			Demolition of steel structure	Yes	528	/m2	B6.2	R52	R27 512	IBR Roof, carports at entrance as well as carports next to workshop	Yes	528	/m2	B6.2	R 52	R 27 512	IBR Roof, carports at entrance as well as carports next to workshop
			Load and haul of stones and loose bricks between carports	Yes	17	/m3	H2.1.2	R44	R735	Assume loose stones layer 0,05m thick, loose stones beneath office area carports only. Load and haul 2km	Yes	16,8	/m3	H2.1.3	R 51	R 859	Assume loose stones layer 0,05m thick, loose stones beneath office area carports only. Load and haul 2km
12	12		**Look out point structure at office area entrance**														
			Demolition of light steel structure	Yes	4	/m²	B1.1	R328	R1 311	Assume light steel structure	Yes	4	/m²	B1.1	R 328	R 1 311	Assume light steel structure
			Sub-total for Office area						**R702 611**							**R 702 735**	
E018-000-003	E018-000-007	1.2	**Contractor camp**														
		1.2.1	**Demolition of other buildings and structures**														
12			**Guard house**														
			Demolition of prefab building	Yes	4	/m2	C5	R104	R414	One 2x2m building	No						
26	6		**Diesel bay and refueling station**														
			Demolition of Diesel tank	Yes	3	/tank	B5.1	R6 973	R20 920	Assume rubber lined, 6x2,5m tanks	Yes	1	/tank	B5.2	R 22 980	R 22 980	Assume rubber lined, 12,87x5,2m tank
			Demolition of light steel structure (tank buckets)	Yes	127	/m²	B1.1	R328	R41 505	Assume light steel structure, 3 buckets	Yes	67	/m²	B1.1	R 328	R 21 966	Assume light steel structure, bucket
			Demolition of concrete sump	Yes	1	/m3	A1.4	R518	R427	Assume 1,5x1,5m wide, 1m deep concrete sump, 0,1m thick	No						
			Demolition of concrete refuel base	Yes	50	/m2	A2.3	R285	R14 273	Assume 350mm thick reinforced concrete slab with 500x500 sump	Yes	67,09	/m2	A2.3	R 285	R 19 152	Assume 350mm thick reinforced concrete slab
			Demolition of light steel plant for pump and steps	Yes	8	/m²	B1.1	R328	R2 459	Assume pump and steps is light steel structures, three steps	No						
25			**Braai area**														
			Demolition of double brick wall	Yes	22	/m	C4	R24	R529	Half moon braai area, assume 22m of bricks	No						No braai area
			Containers and Prefabricated buildings														
4,7,9,10,11,15, 20,24			Load, haul and dispose of 2x 6m containers	Yes	13	sum	N5	R13 810	R179 530		No						
			Load, haul and dispose of 2x 3m containers	Yes	1	sum	N6	R6 905	R6 905		No						
23			Demolition of prefab building	Yes	12	/m2	C5	R104	R1 243	One 2x6m buildings	No						
21			**Offices**														
			Demolition of one storey brick building	Yes	352	/m2	C1	R414	R145 791		No						
			Demolition of single brick wall	Yes	20	/m	C3	R17	R331		No						

	9		**Proposed open cast contractor offices**															
			Load, haul and dispose of 2x 12m containers	No						No underground offices	Yes	6	sum	N4	R 27 620	R 165 720	Assume offices is 2x12m containers
19			**Septic tank**															
			Demolition of septic tank	Yes	6	/m3	A1.3	R816	R4 894	Assume 2x2m. 2m high, 250mm thick walls, concrete structure. Only demolish the first one meter of the concrete. Price for two septic tanks	No						Assume portable toilets
17			**Two abandoned structures**															
			Demolition of one storey brick building	Yes	8	/m2	C1	R414	R3 313	2x2m, 3,5m high, 2 buildings	No						No abandoned structures
			Demolition of concrete slab beneath JoJo Tanks	Yes	6	/m2	A2.3	R285	R1 713	Assume 200mm thick reinforced concrete slab	No						
			Demolition of one storey brick building	Yes	18	/m2	C1	R414	R7 455	6x3m, 2,5m high	No						
18			**Brick building**															
			Demolition of one storey brick building	Yes	18	/m2	C1	R414	R7 455	Brick building next to office building	No						
8			**Brick building**															
			Demolition of one storey brick building	Yes	220	/m2	C1	R414	R91 119	Brick building next to workshop	No						
13			**Hut (Brick building)**															
			Demolition of one storey brick building	Yes	13	/m2	C1	R414	R5 219		No						
14			**Brick building**															
			Demolition of one storey brick building	Yes	16	/m2	C1	R414	R6 627		No						
1	4		**Wash bay**															
			Demolition of Water tank	Yes	1	/tank	B5.1	R6 973	R6 973	Assume rubber lined, 6x2,5m tanks	No						Assume that water is obtained from potable water tank
			Demolition of double brick wall	Yes	36	/m	C4	R24	R865	Assume brick wall 300mm high around water tank is 19m long and wall next to wash bay slab is 17m long	Yes	48	/m	C4	R 24	R 1 154	Assume brick wall 300mm high around 3 sides of wash bay slab
			Demolition of concrete slab beneath water tank	Yes	20	/m2	A2.3	R285	R5 566	Assume 250mm thick reinforced concrete slab	No						
			Demolition of concrete slab	Yes	221	/m2	A2.3	R285	R63 087	Assume 350mm thick reinforced concrete slab	Yes	270	/m2	A2.3	R 285	R 77 074	Assume 350mm thick reinforced concrete slab
			Demolition of light steel plant for pump and steps	Yes	9	/m²	B1.1	R328	R2 951	Assume pump and steps is light steel structures	No						
			Demolition of concrete sump/oil trap	Yes	7	/m3	A1.4	R518	R3 572	Assume 7x3m sump, 1m deep, 0,1m thick	Yes	4	/m3	A1.4	R 518	R 2 071	Assume 5,2x12,87m sump, 1m deep, 0,1m thick
2			**Waste area**															
			Demolition of concrete slab	Yes	24	/m2	A2.3	R285	R6 851	Assume 200mm thick reinforced concrete slab	No						Assume no waste area
			Demolition of double brick wall around slab	Yes	20	/m	C4	R24	R481	Assume double brick wall, 200mm high	No						
	1		**Proposed waste water treatment**															
			Demolition of concrete slab	No							Yes	294	/m2	A2.3	R 285	R 83 925	Assume 200mm thick reinforced concrete slab
			Demolition of medium steel structure	No							Yes	294	/m²	B1.3	R 1 311	R 385 546	Assume medium steel structures
		1.2.2	**Demolition of steel structures**															
6	3		**Workshop**															
			Demolition of light steel structure	Yes	247	/m²	B1.1	R328	R80 978	Assume light steel structures, 8m high at centre of roof	Yes	1600	/m²	B1.1	R 328	R 524 552	Assume light steel structures, 8m high at centre of roof, assume steel structure over entire concrete slab
			Demolition of concrete slab	Yes	247	/m2	A2.3	R285	R70 509	Assume 350mm thick reinforced concrete slab	Yes	1600	/m2	A2.3	R 285	R 456 736	Assume 350mm thick reinforced concrete slab
			Demolition of light steel structure work benches	Yes	5	/m²	B1.1	R328	R1 639	Assume light steel structures for work benches	No						Assume no steel work benches
			Demolition of light steel structure for storage	Yes	8	/m²	B1.1	R328	R2 623	Assume light steel structures for storage shed next to waste area and next to workshop	No						
3,5	2		**Proposed workshop stores**															
			Demolition of light steel structure	No							Yes	1020	/m²	B1.1	R 328	R 334 402	Assume light steel structure
			Demolition of double brick wall	No							Yes	131	/m	C4	R 24	R 3 149	Assume double brick wall
			Demolition of concrete floor	No							Yes	1020	/m2	A2.3	R 285	R 291 169	Assume 250mm thick reinforced concrete slab
	8		**Proposed potable water tank**															
			Demolition of concrete slab	No							Yes	315	/m2	A2.3	R 285	R 89 920	Assume 200mm thick reinforced concrete slab
			Demolition of steel tank	No							Yes	1	/tank	B5.4	R 91 459	R 91 459	Assume rubber lined, 20m diameter tank
	E018-000-007	1.2.3	**Rehabilitation of dirty water impoundments**															
	14		**Proposed PCD**															
			Load and haul of sediment	No							Yes	405	/m3	H2.1.3	R 51	R 20 703	0,5m sediment assume disposal at pit. NB Have to test sediment to determine waste class, hauling distance 3km
			Liner disposal	No							Yes	4206	/m2	F2.2	R 15	R 63 708	Assume double liner system
			Breach dam wall and reshape to 1:5	No							Yes	256	/m	G1.8	R 2 272	R 581 639	
			Shaping and levelling of footprint area	No							Yes	0,4	/ha	G1.1	R 102 774	R 41 110	
			Vegetation establishment	No							Yes	0,4	/ha	G2.1	R 56 495	R 22 598	Vegetation establishment on sloped and flat areas
	16		**Proposed Culvert**															
			Demolition of concrete structure	No							Yes	76,96	/m3	A1.4	R 518	R 39 844	Assume light concrete
	12		**Proposed dirty water channel**															
			Demolition of concrete dirty water channels (total length of channel)	No							Yes	3345	/m2	A2.5	R 104	R 346 356	Assume 100mm thick concrete, 1m wide at bottom and side slopes of 1:1,5, assume 465m long trench
	13		**Proposed Silt trap**															
			Demolition of concrete structure	No							Yes	3	/m3	A1.4	R 518	R 1 553	Assume 100mm thick light concrete, 6,5m wide, 8,5m long and 1,5m deep. Assume only demolish 1m below ground level
			Sub-total for Contractor camp						**R788 216**							**R 3 688 483**	
	E018-000-006	1.3	**Southern Underground Infrastructure**															
		1.3.1	**Demolition of other buildings and structures**															
	21		**Proposed Security office**															
			Demolition of one storey brick building	No							Yes	46	/m2	C1	R 414	R 19 052	One 9,1x5m building
	15		**Proposed Diesel bay**															
			Demolition of Diesel tank	No							Yes	1	/tank	B5.2	R 22 980	R 22 980	Assume rubber lined, 12,87x5,2m tank
			Demolition of light steel structure (tank buckets)	No							Yes	66,93	/m²	B1.1	R 328	R 21 943	Assume light steel structure, bucket
			Demolition of concrete refuel base	No							Yes	270	/m2	A2.3	R 285	R 77 074	Assume 350mm thick reinforced concrete slab
	18		**Proposed open cast contractor offices**															
			Load, haul and dispose of 2x 12m containers	No							Yes	6	sum	N4	R 27 620	R 165 720	Assume offices is 2x12m containers
	12		**Proposed Wash bay**															
			Demolition of double brick wall	No							Yes	65	/m	C4	R 24	R 1 562	Assume brick wall 300mm high around 3 sides of wash bay slab 90.7m
			Demolition of concrete slab	No							Yes	500	/m2	A2.3	R 285	R 142 730	Assume 350mm thick reinforced concrete slab
	14		Demolition of concrete sump/oil trap	No							Yes	4	/m3	A1.4	R 518	R 2 071	Assume 5,2x12,87m sump, 1m deep, 0,1m thick
	16		**Proposed generator/ Sub-station**															
			Demolition of light steel structure	No							Yes	294	/m²	B1.1	R 328	R 96 386	Assume light steel structure
			Demolition of concrete slab	No							Yes	294	/m2	A2.3	R 285	R 83 925	Assume 200mm thick reinforced concrete slab
	5		**Proposed stone dust store**															
			Demolition of one storey brick building	No							Yes	486	/m2	C1	R 414	R 201 290	Assume one storey brick building
	20		**Proposed change house and waiting place**															

			Load, haul and dispose of 2x 12m containers	No							Yes	6	sum	N4	R 27 620	R 165 720	Assume six 2x12m containers
	2		**Proposed underground adit entrance**														
			Incline reinforced plug (3,5m8m dimension)	No							Yes	1	sum	F1.12	R 463 237	R 463 237	Assume venting is included, excludes portal filling
			Load and haul backfill material for portal filling	No							Yes	1300000	/m3	N9	R 18	R 22 841 000	Volume obtained from conceptual model developed by BEAL
		1.3.2	**Demolition of steel structures and conveyors**														
	10		**Proposed Workshop**														
			Demolition of light steel structure	No							Yes	1595	/m²	B1.1	R 328	R 522 913	Assume light steel structures, 8m high at centre of roof, assume steel structure over entire concrete slab
			Demolition of concrete slab	No							Yes	1595	/m2	A2.3	R 285	R 455 308	Assume 350mm thick reinforced concrete slab
	11		**Proposed workshop stores**														
			Demolition of light steel structure	No							Yes	1030	/m²	B1.1	R 328	R 337 680	Assume light steel structure
			Demolition of double brick wall	No							Yes	132	/m	C4	R 24	R 3 173	Assume double brick wall
			Demolition of concrete floor	No							Yes	1030	/m2	A2.3	R 285	R 294 024	Assume 250mm thick reinforced concrete slab
	6		**Proposed cable workshop**														
			Demolition of light steel structure								Yes	483	/m²	B1.1	R 328	R 158 349	Assume light steel structures
			Demolition of concrete slab	No							Yes	483	/m2	A2.3	R 285	R 137 877	Assume 350mm thick reinforced concrete slab
	9		**Proposed potable water tank**														
			Demolition of concrete slab	No							Yes	314,16	/m2	A2.3	R 285	R 89 680	Assume 200mm thick reinforced concrete slab
			Demolition of steel tank	No							Yes	1	/tank	B5.4	R 91 459	R 91 459	Assume rubber lined, 20m diameter tank
	7		**Proposed service water dam**														
			Demolition of concrete slab	No							Yes	1413,7	/m2	A2.3	R 285	R 403 555	Assume 200mm thick reinforced concrete slab. Price is for two dam slabs
			Demolition of steel tank	No							Yes	2	/tank	B5.6	R 227 001	R 454 003	Assume rubber lined, 30m diameter tank. Price is for two dams
	19		**Proposed carports for employee and visitor parking**														
			Demolition of steel structure	No							Yes	352	/m2	B6.2	R 52	R 18 341	Assume IBR roof carports over employee and visitor parking. Assume no steel structure over LDV parking
	13		**Proposed conveyor**														
			Demoltion of conveyor	No							Yes	4155	/m	D1.1.3	R 469	R 1 946 721	Assume medium without cladding, single conveyor icluding dismantling of steel and demolition of concrete footings
	3		**ROM Bin**														
			Demolition of light steel structure	No							Yes	146	/m²	B1.1	R 328	R 47 865	Assume light steel structure
			Demolition of concrete slab	No							Yes	146	/m2	A2.3	R 285	R 41 677	Assume 200mm thick reinforced concrete slab
	1		**Proposed ventilation fans**														
			Demolition of light steel structure	No							Yes	92	/m²	B1.1	R 328	R 30 162	Assume light steel structure for ventilation fans
			Sub-total for Southern Underground Infrastructure						**R0**							**R 29 337 478**	
	E018-000-008	**1.4**	**North westhern Underground Infrastructure**														
		1.4.1	**Demolition of other buildings and structures**														
	7		**Proposed Security building**														
			Demolition of one storey brick building	No							Yes	45	/m2	C5	R 104	R 4 660	One 9x5m building
	16		**Proposed Diesel bay and Refueling station**														
			Demolition of Diesel tank	No							Yes	1	/tank	B5.2	R 22 980	R 22 980	Assume rubber lined, 12,87x5,2m tank
			Demolition of light steel structure (tank buckets)	No							Yes	67	/m²	B1.1	R 328	R 21 966	Assume light steel structure, bucket
			Demolition of concrete refuel base	No							Yes	270	/m2	A2.3	R 285	R 77 074	Assume 350mm thick reinforced concrete slab
	9		**Proposed underground offices**														
			Load, haul and dispose of 2x 12m containers	No							Yes	6	sum	N4	R 27 620	R 165 720	Assume offices is 2x12m containers
	15		**Proposed Wash bay**														
			Demolition of double brick wall	No							Yes	64	/m	C4	R 24	R 1 538	Assume brick wall 300mm high around 3 sides of wash bay slab 90,7m
			Demolition of concrete slab	No							Yes	471	/m2	A2.3	R 285	R 134 452	Assume 350mm thick reinforced concrete slab
			Demolition of concrete sump/oil trap	No							Yes	4	/m3	A1.4	R 518	R 2 071	Assume 5,2x12,87m sump, 1m deep, 0,1m thick
	19		**Proposed generator/ Sub-station**														
			Demolition of light steel structure	No							Yes	394	/m²	B1.1	R 328	R 129 171	Assume light steel structure
			Demolition of concrete slab	No							Yes	294	/m2	A2.3	R 285	R 83 925	Assume 200mm thick reinforced concrete slab
	22		**Proposed stone dust store**														
			Demolition of one storey brick building	No							Yes	486	/m2	C1	R 414	R 201 290	Assume one storey brick building
	6		**Proposed detanator store**														
			Demolition of concrete bunkers	No							Yes	50,05	/m3	A1.3	R 816	R 40 821	Assume medium concrete 350mm thick, bunker is 2,5m above ground and 2,5m below ground. Only demolish 1m below ground
	5		**Proposed explosive store**														
			Demolition of concrete bunkers	No							Yes	50,05	/m3	A1.3	R 816	R 40 821	Assume medium concrete 350mm thick, bunker is 2,5m above ground and 2,5m below ground. Only demolish 1m below ground
	11		**Proposed change house and waiting place**														
			Load, haul and dispose of 2x 12m containers	No							Yes	6	sum	N4	R 27 620	R 165 720	Assume six 2x12m containers
	3		**Proposed underground adit entrance 1**														
			Incline reinforced plug (3,5m8m dimension)	No							Yes	1	sum	F1.12	R 463 237	R 463 237	Assume venting is included, excludes portal filling
			Load and haul backfill material for portal filling	No							Yes	1300000	/m3	H2.2.3	R 34	R 44 478 093	Voume obtained from conceptual model developed by BEAL
	3		**Proposed underground adit entrance 2**														
			Incline reinforced plug (3,5m8m dimension)	No							Yes	1	sum	F1.12	R 463 237	R 463 237	Assume venting is included, excludes portal filling
			Load and haul backfill material for portal filling	No							Yes	1300000	/m3	H2.2.3	R 34	R 44 478 093	Volume obtained from conceptual model developed by BEAL
		1.4.2	**Demolition of steel structures and conveyors**														
	14		**Proposed Workshop**														
			Demolition of light steel structure	No							Yes	1575	/m²	B1.1	R 328	R 516 356	Assume light steel structures, 8m high at centre of roof, assume steel structure over entire concrete slab
			Demolition of concrete slab	No							Yes	1575	/m2	A2.3	R 285	R 449 599	Assume 350mm thick reinforced concrete slab
	13		**Proposed workshop stores**														
			Demolition of light steel structure	No							Yes	1052	/m²	B1.1	R 328	R 344 893	Assume light steel structure
			Demolition of double brick wall	No							Yes	91	/m	C4	R 24	R 2 187	Assume double brick wall
			Demolition of concrete floor	No							Yes	1052	/m2	A2.3	R 285	R 300 304	Assume 250mm thick reinforced concrete slab. Price for two workshop stores
	23		**Proposed cable workshop**														

			Demolition of light steel structure								Yes	486	/m²	B1.1	R 328	R 159 333	Assume light steel structures
			Demolition of concrete slab	No							Yes	486	/m2	A2.3	R 285	R 138 733	Assume 350mm thick reinforced concrete slab
	10		**Proposed waste water treatment**														
			Demolition of concrete slab	No							Yes	294	/m2	A2.3	R 285	R 83 925	Assume 200mm thick reinforced concrete slab
			Demolition of medium steel structure	No							Yes	294	/m²	B1.3	R 1 311	R 385 546	Assume medium steel structures
	20		**Proposed potable water tank**														
			Demolition of concrete slab	No							Yes	314,16	/m2	A2.3	R 285	R 89 680	Assume 200mm thick reinforced concrete slab
			Demolition of steel tank	No							Yes	1	/tank	B5.4	R 91 459	R 91 459	Assume rubber lined, 20m diameter tank
	21		**Proposed service water dam**														
			Demolition of concrete slab	No							Yes	1413,7	/m2	A2.3	R 285	R 403 555	Assume 200mm thick reinforced concrete slab. Price is for two dam slabs
			Demolition of steel tank	No							Yes	2	/tank	B5.6	R 227 001	R 454 003	Assume rubber lined, 30m diameter tank. Price is for two dams
	8		**Proposed carports for employee and visitor parking**														
			Demolition of steel structure	No							Yes	352	/m2	B6.2	R 52	R 18 341	Assume IBR roof carports over employee and visitor parking. Assume no steel structure over LDV parking
	29		**Proposed conveyor**														
			Demoltion of conveyor	No							Yes	1150	/m	D1.1.3	R 469	R 538 804	Assume medium without cladding, single conveyor icluding dismantling of steel and demolition of concrete footings
	4		**ROM Bin**														
			Demolition of light steel structure	No							Yes	292	/m²	B1.1	R 328	R 95 731	Assume light steel structure. Price is for two ROM Bins
			Demolition of concrete slab	No							Yes	292	/m2	A2.3	R 285	R 83 354	Assume 200mm thick reinforced concrete slab. Price is for two slabs
	1		**Proposed ventilation fans**														
			Demolition of light steel structure	No							Yes	184	/m²	B1.1	R 328	R 60 323	Assume light steel structure for two ventilation fans
		1.4.3	**Rehabilitation of dirty water impoundments**														
	25		**PCD**														
			Load and haul of sediment	No							Yes	370	/m3	H2.1.2	R 44	R 16 190	0,5m sediment assume disposal at pit. NB Have to test sediment to determine waste class, hauling distance 3km
			Liner disposal	No							Yes	3886	/m2	F2.2	R 15	R 58 861	Assume double liner system
			Breach dam wall and reshape to 1:5	No							Yes	244	/m	G1.8	R 2 272	R 554 375	
			Shaping and levelling of footprint area	No							Yes	0,37	/ha	G1.1	R 102 774	R 38 026	
			Vegetation establishment	No							Yes	0,37	/ha	G2.1	R 56 495	R 20 903	Vegetation establishment on sloped and flat areas
	2		**Culvert**														
			Demolition of concrete structure	No							Yes	308	/m3	A1.4	R 518	R 159 458	Assume light concrete, price for four culverts
	26		**Dirty water channel**														
			Demolition of concrete dirty water channels	No							Yes	1781	/m2	A2.5	R 104	R 184 413	Assume 100mm thick concrete, 2m wide at top and side slopes of 1:1,5
	24		**Silt trap**														
			Demolition of concrete structure	No							Yes	3	/m3	A1.4	R 518	R 1 553	Assume 100mm thick light concrete, 6,5m wide, 8,5m long and 1,5m deep. Assume only demolish 1m below ground level
			Sub-total for North westhern Underground Infrastructure						**R0**							**R 96 224 773**	
E018-000-001		**1.5**	**Hard park**														
		1.5.1	**Demolition of other buildings and structures**														
27,29			Load, haul and dispose of 2x 6m containers	Yes	5	sum	N5	R13 810	R69 050		No						Included in contractors camp area
			Load, haul and dispose of 2x 3m containers	Yes	1	sum	N6	R6 905	R6 905		No						
28			Demolition of shade netting	Yes	48	/m2	B6.3	R32	R1 532	Shade netting, asssume 12x4m	No						
			Sub-total for Hard park						**R77 487**							**R 0**	
E018-000-001	**E018-000-010**	**1.6**	**Hard stockpile**														
		1.6.1	**Demolition of other buildings and structures**														
6			**Old chicken run concrete slabs**														
			Demolition of concrete slab	Yes	18150	/m2	A2.3	R285	R5 181 096	Assume 200mm thick concrete slab, reinforced	Yes	18150	/m2	A2.3	R 285	R 5 181 096	Assume 200mm thick concrete slab, reinforced
			Demolition of prefab building	Yes	12	/m2	C5	R104	R1 243	Three 2x2m buildings	Yes	12	/m2	C5	R 104	R 1 243	Three 2x2m buildings
		1.6.2	**Rehabilitation of dirty water impoundments**														
	1		**Dirty water channel**														
			Demolition of concrete dirty water channels	No							Yes	1360	/m2	A2.5	R 104	R 140 820	Assume 100mm thick concrete, 2m wide at top and side slopes of 1:1.5
	3		**Proposed PCD**														
			Load and haul of sediment	No							Yes	1806	/m3	H2.1.3	R 51	R 92 319	0,5m sediment assume disposal at pit. NB Have to test sediment to determine waste class, hauling distance 3km
			Liner disposal	No							Yes	10323	/m2	F2.2	R 15	R 156 361	Assume double liner system
			Breach dam wall and reshape to 1:5	No							Yes	408	/m	G1.8	R 2 272	R 926 987	
			Shaping and levelling of footprint area	No							Yes	0,8	/ha	G1.1	R 102 774	R 82 219	
			Vegetation establishment	No							Yes	0,8	/ha	G2.1	R 56 495	R 45 196	Vegetation establishment on sloped and flat areas
	4		**Silt trap**														
			Demolition of concrete structure	No							Yes	3	/m3	A1.4	R 518	R 1 553	Assume 100mm thick light concrete, 6,5m wide, 8,5m long and 1,5m deep. Assume only demolish 1m below ground level
			Sub-total for Hard stockpile						**R5 182 339**							**R 6 627 794**	
E018-000-001		**1.7**	**Abandoned infrastructure**														
		1.7.1	**Demolition of other buildings and structures**														
10			**Abandoned building**														
			Demolition of 1 storey brick building	Yes	32	/m2	C1	R414	R13 254		No						Assume abandoned infrastructueres was demolished
			Demolition of double brick wall of abandoned dam	Yes	8	/m	C4	R24	R192	Assume abandoned concrete dam 10m diameter	No						
			Demolition of concrete slab of abandoned dam	Yes	79	/m2	A2.3	R285	R22 420	Assume concrete slab beneath abandoned concrete dam. Assume 200mm thick reinforced concrete slab and 10m diameter dam	No						
9			**Abandoned guard house**														
			Demolition of prefab building	Yes	4	/m2	C5	R104	R414	One 2x2m buildings	No						
			Sub-total for Abandoned infrastructure						**R36 280**							**R 0**	
E018-000-001	**E018-000-009**	**1.8**	**Plant area**														
E018-000-002	**E018-000-002**	**1.8.1**	**Demolition of other buildings and structures**														
21,28	21,28		Demolition of prefab building	Yes	24	/m2	C5	R104	R2 485	two 2x6m building	Yes	24	/m2	C5	R 104	R 2 485	Assume two 2x6m building
20	20		Demolition of prefab building	Yes	4	/m2	C5	R104	R414	One 2x2m buildings	Yes	4	/m2	C5	R 104	R 414	Assume one 2x2m buildings
22,23	22,23		Load, haul and dispose of 2x 6m containers	Yes	2	sum	N5	R13 810	R27 620		Yes	2	sum	N5	R 13 810	R 27 620	Assume one 2x6m container
24	24		Load, haul and dispose of 2x 3m containers	Yes	1	sum	N6	R6 905	R6 905		Yes	1	sum	N6	R 6 905	R 6 905	Assume one 2x3m container

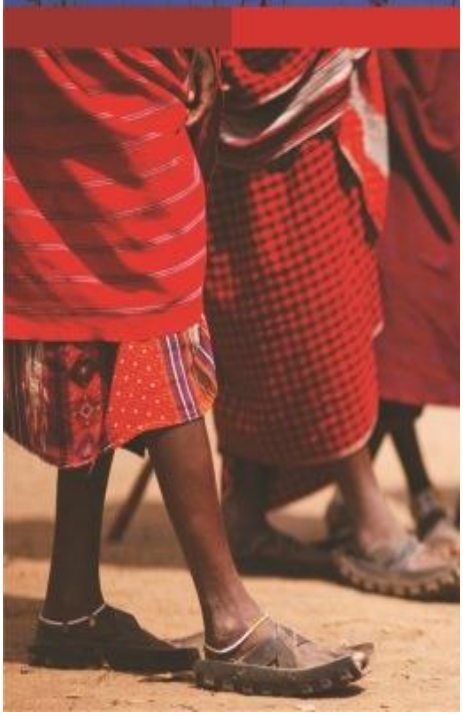
25	25		Demolition of one storey brick building	Yes	9	/m2	C1	R414	R3 728	Toilets	Yes	9	/m2	C1	R 414	R 3 728	Assume toilets
19	19		**Health and safety building**														
			Demolition of one storey brick building	Yes	60	/m2	C1	R414	R24 851		Yes	60	/m2	C1	R 414	R 24 851	Assume health and safety building
25	25		**Septic tank**														
			Demolition of septic tank	Yes	6	/m3	A1.3	R816	R4 894	Assume 2x2m. 2m high, 250mm thick walls, concrete structure. Only demolish the first one meter of the concrete. Price for two septic tanks	Yes	3	/m3	A1.3	R 816	R 2 447	Assume 2x2m. 2m high, 250mm thick walls, concrete structure. Only demolish the first one meter of the concrete
E018-000-001			**Waste area**														
30			Demolition of concrete slab	Yes	24	/m2	A2.3	R285	R6 851	Assume 200mm thick reinforced concrete slab	No						Assume no waste area
			Demolition of double brick wall around slab	Yes	22	/m	C4	R24	R529	Assume double brick wall, 200mm high	No						
	E018-000-007		**Guard house**														
20	13		Demolition of one storey brick building	Yes	2	/m2	C1	R414	R932		Yes	45	/m2	C1	R 414	R 18 638	Assume normal one storey brick building.
			Demolition of brick paving	Yes	48	/m2	E7	R23	R1 100		No						
			Demolition of side rails	Yes	36	/m²	B1.1	R328	R11 802	Assume light steel structure	No						
14	22		**Generator container**														
			Load, haul and dispose of 2x 6m containers	Yes	1	sum	N5	R13 810	R13 810	Assume one 2x6m container	Yes	1	sum	N5	R 13 810	R 13 810	Assume one 2x6m container
14	22		**Refuel area**														
			Demolition of diesel tank	Yes	2	/tank	B5.1	R6 973	R13 947	Assume two rubber lined 2x1,5m tanks	Yes	2	/tank	B5.1	R 6 973	R 13 947	Assume two rubber lined 2x1,5m tanks
			Demolition of light steel structure	Yes	12	/m²	B1.1	R328	R3 934	Assume light steel structure	Yes	12	/m²	B1.1	R 328	R 3 934	Assume light steel structure
			Demolition of double brick wall	Yes	16	/m	C4	R24	R385	Assume double brick wall 500mm high around water tank	Yes	16	/m	C4	R 24	R 385	Assume double brick wall 500mm high around water tank
			Demolition of concrete slab beneath water tank	Yes	12	/m2	A2.3	R285	R3 426	Assume 250mm thick reinforced concrete slab	Yes	12	/m2	A2.3	R 285	R 3 426	Assume 250mm thick reinforced concrete slab
		1.8.2	**Demolition of steel structures and conveyors**														
19	3		**Weigh bridge x2**														
			Demolition of steel bases	Yes	176	/m²	B1.4	R2 330	R410 066	Assume medium heavy plant structure. Assume 4x22m for one weighbridge. Value for two weighbridges	Yes	176	/m²	B1.4	R 2 330	R 410 066	Assume medium heavy plant structure. Assume 4x22m for one weighbridge. Value for two weighbridges
			Demolition of concrete footings	Yes	12	/unit	A2.2	R1 376	R16 516	Assume 1x4x1,5m footing, assume 6 footings per weighbridge. Value for two weighbridges. Demolish to 1m below ground level	Yes	12	/unit	A2.2	R 1 376	R 16 516	Assume 1x4x1,5m footing, assume 6 footings per weighbridge. Value for two weighbridges. Demolish to 1m below ground level
			Demolition of concrete ramps and slab	Yes	129	/m2	A2.3	R285	R36 824	Assume two 4x8m 200mm thick reinforced concrete slab and four 0,5x4m reinforced concrete ramps	Yes	129	/m2	A2.3	R 285	R 36 824	Assume two 4x8m 200mm thick reinforced concrete slab and four 0,5x4m reinforced concrete ramps
			Demolition of concrete walkway	Yes	68	/m2	A2.3	R285	R19 411	Assume 200mm thick reinforced concrete walkway	Yes	68	/m2	A2.3	R 285	R 19 411	Assume 200mm thick reinforced concrete walkway
			Demolition of prefab building	Yes	4	/m2	C5	R104	R414	One 2x2m building	Yes	4	/m2	C5	R 104	R 414	Assume one 2x2m building
			Demolition of side rails	Yes	52	/m²	B1.1	R328	R17 048	Assume light steel structure	Yes	52	/m²	B1.1	R 328	R 17 048	Assume light steel structure
E018-000-004	**E018-000-011**		**Crushing and screening plant**														
10	15		Demolition of light steel container stand	Yes	24	/m²	B1.1	R328	R7 868	Assume light steel structure	Yes	24	/m²	B1.1	R 328	R 7 868	Assume light steel structure
10	15		Load, haul and dispose of 2x 12m containers	Yes	1	sum	N4	R27 620	R27 620	Assume one 2x12m container	Yes	1	sum	N4	R 27 620	R 27 620	Assume one 2x12m container
11	16		Load, haul and dispose of 2x 6m containers	Yes	1	sum	N5	R13 810	R13 810	Assume one 2x6m container	Yes	1	sum	N5	R 13 810	R 13 810	Assume one 2x6m container
1	21		Demolition of light steel JoJo water stand	Yes	6	/m²	B1.1	R328	R1 967	Assume light steel structure	Yes	6	/m²	B1.1	R 328	R 1 967	Assume light steel structure
1	21		Demolition of concrete slab	Yes	6	/m2	A2.3	R285	R1 713	Assume 200mm thick reinforced concrete slab	Yes	6	/m2	A2.3	R 285	R 1 713	Assume 200mm thick reinforced concrete slab
13	18		Demolition of light steel storage structure power box	Yes	2	/m²	B1.1	R328	R738	Assume light steel structure	Yes	2,25	/m²	B1.1	R 328	R 738	Assume light steel structure
15	29		Demolition of light steel storage structure	Yes	6	/m²	B1.1	R328	R2 049	Assume light steel structure	Yes	6,25	/m²	B1.1	R 328	R 2 049	Assume light steel structure
12	17		Demolition of light steel storage structure	Yes	14	/m²	B1.1	R328	R4 498	Assume light steel structure	Yes	13,72	/m²	B1.1	R 328	R 4 498	Assume light steel structure
			Conveyors														
4	24		Demolition of conveyor CV1	Yes	22	/m	D1.2.4	R681	R14 988	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings	Yes	22	/m	D1.2.4	R 681	R 14 988	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
14	19		Demolition of conveyor CV2	Yes	31	/m	D1.2.4	R681	R21 120	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings	Yes	31	/m	D1.2.4	R 681	R 21 120	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
6	25		Demoltion of conveyor CV3	Yes	32	/m	D1.2.4	R681	R21 801	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings	Yes	32	/m	D1.2.4	R 681	R 21 801	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
8	27		Demolition of conveyor CV4	Yes	16	/m	D1.2.4	R681	R10 900	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings	Yes	16	/m	D1.2.4	R 681	R 10 900	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
9	28		Demolition of conveyor CV5	Yes	36	/m	D1.1.4	R539	R19 397	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings	Yes	36	/m	D1.1.4	R 539	R 19 397	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
9	28		Demolition of conveyor CV5 concrete half circle	Yes	59	/m2	A2.3	R285	R16 717	Assume reinforced concrete, 600mm wide, 225 deep and 97,6m long (radius of 23,3)	Yes	58,56	/m2	A2.3	R 285	R 16 717	Assume reinforced concrete, 600mm wide, 225 deep and 97,6m long (radius of 23,3)
5	20		**Secondary crusher**														
			Demolition of secondary structure	Yes	16	/m²	B1.4	R2 330	R38 304	Assume medium/heavy plant or structures, 834kg/m2	Yes	16,44	/m²	B1.4	R 2 330	R 38 304	Assume medium/heavy plant or structures, 834kg/m2
			Demolition of concrete slab	Yes	29	/m2	A2.3	R285	R8 415	Assume 225mm thick reinforced concrete slab	Yes	29,48	/m2	A2.3	R 285	R 8 415	Assume 225mm thick reinforced concrete slab
3	23		**Primary crusher**														
			Demolition of primary crusher	Yes	50	/m²	B1.4	R2 330	R117 568	Assume medium plant or structures, 181kg/m2	Yes	50,46	/m²	B1.4	R 2 330	R 117 568	Assume medium plant or structures, 181kg/m2
			Demolition of concrete slab	Yes	51	/m2	A2.3	R285	R14 507	Assume 225mm thick reinforced concrete slab	Yes	50,82	/m2	A2.3	R 285	R 14 507	Assume 225mm thick reinforced concrete slab
7	26		**Scalping screen**														
			Demolition of scalping screen	Yes	37	/m²	B1.3	R1 311	R48 521	Assume medium plant or structures, 639 kg/m2	Yes	37	/m²	B1.3	R 1 311	R 48 521	Assume medium plant or structures, 639 kg/m2
			Demolition of concrete slab	Yes	105	/m2	A2.3	R285	R30 016	Assume 225mm thick reinforced concrete slab	Yes	105,15	/m2	A2.3	R 285	R 30 016	Assume 225mm thick reinforced concrete slab
2	22		**Reclaim feeder**														
			Demolition of reclaim feeder	Yes	86	/m²	B1.3	R1 311	R112 910	Assume medium plant or structures	Yes	86,1	/m²	B1.3	R 1 311	R 112 910	Assume medium plant or structures
			Demolition of concrete slab	Yes	86	/m2	A2.3	R285	R24 578	Assume 225mm thick reinforced concrete slab	Yes	86,1	/m2	A2.3	R 285	R 24 578	Assume 225mm thick reinforced concrete slab
			Proposed washed plant														
			Conveyors														
	13		Demolition of conveyor Nr 1	No							Yes	46	/m	D1.2.4	R 681	R 31 339	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	11		Demolition of conveyor Nr 2	No							Yes	15,8	/m	D1.2.4	R 681	R 10 764	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	8		Demoltion of conveyor Nr 3	No							Yes	50	/m	D1.2.4	R 681	R 34 064	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings

	10		Demolition of conveyor Nr 4	No							Yes	22	/m	D1.2.4	R 681	R 14 988	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	2		Demolition of conveyor Nr 5	No							Yes	49	/m	D1.2.4	R 681	R 33 383	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	7		Demolition of conveyor Nr 6	No							Yes	46	/m	D1.2.4	R 681	R 31 339	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	7		Demolition of conveyor Nr 6 concrete half circle	No							Yes	315,7	/m2	A2.3	R 285	R 90 120	Assume reinforced concrete, 4,4m wide, 0,225m deep and 71,4m long (radius of 27,4)
	6		Demoltion of conveyor Nr 7	No							Yes	20	/m	D1.2.4	R 681	R 13 626	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	5		Demolition of conveyor Nr 8	No							Yes	23	/m	D1.2.4	R 681	R 15 669	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	3		Demolition of conveyor Nr 9	No							Yes	17,3	/m	D1.2.4	R 681	R 11 786	Assume suspended without cladding and sheeting. Assume heavy. Price includes dismantling of steel, support structures and demolition of footings
	14		**Screening area 1**														
			Demolition of screening area	No							Yes	62,24	/m²	B1.4	R 2 330	R 145 014	Assume medium/heavy plant or structures
			Demolition of concrete slab	No							Yes	62,24	/m2	A2.3	R 285	R 17 767	Assume 225mm thick reinforced concrete slab
	12		**Cyclone plant**														
			Demolition of cyclone plant	No							Yes	90	/m²	B1.4	R 2 330	R 209 693	Assume medium plant or structures
			Demolition of concrete slab	No							Yes	90	/m2	A2.3	R 285	R 25 691	Assume 225mm thick reinforced concrete slab
	9		**Screening area 2**														
			Demolition of screening area	No							Yes	321,5	/m²	B1.4	R 2 330	R 749 070	Assume medium plant or structures
			Demolition of concrete slab	No							Yes	321,5	/m2	A2.3	R 285	R 91 775	Assume 225mm thick reinforced concrete slab
	4		**Filter press**														
			Demolition of filter press	No							Yes	282,23	/m²	B1.4	R 2 330	R 657 574	Assume medium plant or structures
			Demolition of concrete slab	No							Yes	282,23	/m2	A2.3	R 285	R 80 565	Assume 225mm thick reinforced concrete slab
	1		**Temporary discard chute**														
			Demolition of filter press	No							Yes	115,29	/m²	B1.4	R 2 330	R 268 617	Assume medium plant or structures
			Demolition of concrete slab	No							Yes	115,29	/m2	A2.3	R 285	R 32 911	Assume 225mm thick reinforced concrete slab
E018-000-001	**E018-000-009**	**1.8.3**	**Rehabilitation of dirty water impoundments**														
17	11		**PCD**														
			Load and haul of sediment	Yes	10054	/m3	H2.1.2	R44	R439 943	0,5m sediment assume disposal at pit. NB Have to test sediment to determine waste class, hauling distance 2km	Yes	7261	/m3	H2.1.3	R 51	R 371 166	0,5m sediment assume disposal at pit. NB Have to test sediment to determine waste class, hauling distance 3km
			Liner disposal	Yes	20109	/m2	F2.2	R15	R304 588	Assume double liner, price is for three liners	Yes	27251	/m2	F2.2	R 15	R 412 767	Assume double liner system
			Breach dam wall and reshape to 1:5	Yes	605	/m	G1.8	R2 272	R1 375 031		Yes	696	/m	G1.8	R 2 272	R 1 581 331	
			Shaping and levelling of footprint area	Yes	2	/ha	G1.1	R102 774	R206 576	Assume final profiling to an avarge depth of 500mm over footprint area	Yes	2,7	/ha	G1.1	R 102 774	R 277 490	
			Vegetation establishment	Yes	2	/ha	G2.1	R56 495	R113 554	Vegetation establishment on sloped and flat areas	Yes	2,7	/ha	G2.1	R 56 495	R 152 535	Vegetation establishment on sloped and flat areas
16	10		**Culvert**														
			Demolition of concrete structure	Yes	77	/m3	A1.4	R518	R39 844	Assume light concrete	Yes	76,96	/m3	A1.4	R 518	R 39 844	Assume light concrete
12	9		**Dirty water channel**														
			Demolition of concrete dirty water channels	Yes	1102	/m2	A2.5	R104	R114 106	Assume 100mm thick concrete, 2m wide at top and side slopes of 1:1,5	Yes	1719	/m2	A2.5	R 104	R 177 993	Assume 100mm thick concrete, 2m wide at top and side slopes of 1:1,5
16	10		**Silt trap**														
			Demolition of concrete structure	Yes	3	/m3	A1.4	R518	R1 553	Assume 100mm thick light concrete, 6,5m wide, 8,5m long and 1,5m deep. Assume only demolish 1m below ground level	Yes	3	/m3	A1.4	R 518	R 1 553	Assume 100mm thick light concrete, 6,5m wide, 8,5m long and 1,5m deep. Assume only demolish 1m below ground level
			Sub-total for Plant area						**R3 783 090**							**R 6 763 306**	
E018-000-001	**E018-000-005**	**1.9**	**Roads and paved surfaces**														
1	5,9	**1.9.1**	**Rehabilitation of haul roads**														
			Doze surface area to remove 10cm of contaminated soil	Yes	12045	/m3	H4.1	R21	R247 585	Assume removal of 100mm	Yes	56120	/m3	H4.1	R 21	R 1 153 537	Assume removal of 100mm
			Load and haul	Yes	12045	/m3	N9	R18	R211 632	Assume dispose at pit (1km)	Yes	56120	/m3	H2.2.3	R 34	R 1 920 085	Assume dispose at pit (3km)
			Rehabilitation of haul roads	Yes	120451	/m2	E2	R27	R3 260 678	Assume 2,6km of haul roads, 46m wide	Yes	561200	/m2	E2	R 27	R 15 192 005	Assume 12,2km of haul roads, 46m wide
1	5,9	**1.9.2**	**Rehabilitation of normal gravel roads**														
			Gravel roads without layerworks or stabilisation of layerworks - ripping, profiled and vegetated	Yes	32831	/m2	E4	R11	R364 318	Assume 4,1km of gravel road, 8m wide	Yes	40380	/m2	E4	R 11	R 448 085	Assume 4,038km of gravel road 10m wide
1	5,9	**1.9.3**	**Rehabilitation of gravel roads with engineerd surface**														
			Roads where layerworks is stabilised with cement, ripping, profiled and vegetated	Yes	10659	/m2	E3	R53	R566 753	Assume 0,969km of engineerd surface roads, 11m wide	Yes	10659	/m2	E3	R 53	R 566 753	Assume 0,969km of engineerd surface roads, 11m wide
		1.9.4	**Proposed concrete road into shaft**														
			Demolition of concrete road into shaft	No							Yes	360	/m2	A2.3	R 285	R 102 766	Assume 6m long, 20m wide concrete road. Price is for three shaft roads
			Sub-total for Roads and paved surfaces						**R4 650 966**							**R 19 383 231**	
E018-000-001	**E018-000-005**	**1.10**	**Other linear Infrastructure**														
3,4,18,22	1,2,3,4,11	**1.10.1**	**Dismantle Security Fencing**														
			Dismantle Security Fencing	Yes	3881	/m	I2.1	R45	R174 179	Fencing around office area, plant area, PCD, contractors camp, diesel bay, around one slab of chicken run	Yes	7000	/m	I2.1	R 45	R 314 157	Assume fencing around plant and office areas, contractors camp, North Western and Southern underground infrastructure, explosive stores, detenator store, ROM area and PCDs
		1.10.2	**Demolition of overland power lines**														
			Demolition of overland power lines	Yes	2000	/m	D2.1	R28	R56 099	Minor power lines, assume 2km	Yes	2000	/m	D2.1	R 28	R 56 099	Minor power lines, assume 2km

			Sub-total for Other linear Infrastructure						**R230 278**							**R 370 256**	
		1.11	**Disposal of demolition waste**														
		1.11.1	**Establish salvage yard**														
			Establish salvage yard	Yes	1	/sum	L2	R100 000	R100 000		Yes	1	/sum	L2	R 100 000	R 100 000	
		1.11.2	**Sorting and screening of demolition waste**														
			Sorting and screening of demolition waste	Yes	1	sum	N1	R193 764	R193 764		Yes	1,00	/sum	N8	R 592 380	R 592 380	
		1.11.3	**Concrete demolition waste**														
			Transport of concrete demolition waste	Yes	7032	/m3	N9	R18	R123 546	Pit disposal (load and haul 2km)	Yes	15034,08	/m3	H2.1.3	R 51	R 768 509	Assume pit disposal (load and haul 3km)
		1.11.4	**Steel demolition waste**														
			Transport of steel demolition waste	Yes	468	/m3	N2	R117	R54 500	Assume load and haul to Delmas	Yes	3906,83	/m3	N2	R 117	R 455 349	Assume load and haul to Delmas
		1.11.5	**General demolition waste**														
			Transport of waste to dedicated demolition waste disposal site	Yes	41	/m3	N3	R175	R7 218	Assume load and haul to Delmas Botleng waste management facility, assume 20km distance	Yes	41,31	/m3	N3	R 175	R 7 218	Assume load and haul to Delmas, assume 20km distance
			Disposal of demolition waste	Yes	41	/m3	G5.1	R123	R5 065	Assume disposal at Delmas Botleng waste management facility	Yes	41,31	/m3	G5.1	R 123	R 5 065	Assume disposal at Delmas Botleng waste management facility
		1.11.6	**Hazardous waste**														
			Transport of demolition hazardous waste	No	0	N/A	L1	R0	R0	Assume no hazardous waste, all hazardous waste to be removed before closure	No	0	N/A	L1	R 0	R 0	Assume no hazardous waste, all hazardous waste to be removed before closure
			Disposal of demolition hazardous waste	No	0	N/A	L1	R0	R0		No	0	N/A	L1	R 0	R 0	
			Sub-total for Disposal of demolition waste						**R484 093**							**R 1 928 521**	
			Sub-total for Infrastructural Areas						**R15 935 359**							**R 165 026 578**	
		2	**Mining Areas**														
		2.1	**Open pit rehabilitation including final voids and ramps**														
		2.1.1	**Load and haul of waste stockpiles**														
			Load and Haul Overburden Stockpile	Yes	2218520	/m3	N9	R18	R38 979 396	1km Hauling Distance							
			Load and Haul Hards Stockpile	Yes	1932590	/m3	N9	R18	R33 955 606	1km Hauling Distance							
		2.1.2	**Dozing of stockpile**						R0								
			Dozing of Inpit Stockpiles	Yes	4744831	/m3	H4.2	R15	R72 667 770	Assume 60 % of material in pit to be dozed							
			Load and haul of inpit stockpiles	Yes	3163221	/m3	N9	R18	R55 577 789	Assume 40 % of material to be load and Haul							
		2.1.3	**Load and haul of topsoil stockpiles**														
			Load and haul of TS 1	Yes	25177	/m3	N11	R19	R482 140	1,5km Hauling Distance							
			Load and haul of TS 2	Yes	55573	/m3	N11	R19	R1 064 223	1,5km Hauling Distance							
			Load and haul of TS 3	Yes	23383	/m3	N11	R19	R447 784	1,5km Hauling Distance							
			Load and haul of TS 4	Yes	88796	/m3	N11	R19	R1 700 443	1,5km Hauling Distance							
			Load and haul of TS 5	Yes	100298	/m3	N11	R19	R1 920 707	1,5km Hauling Distance							
			Planned open pit rehabilitation including final voids and ramps														
		2.1.4	**Load and Haul of Stockpiles**														
			Load and Haul of Stockpiles								Yes	3483525	/m3	N9	R 18	R 61 205 534	Assume 40 % of material to be load and Haul
		2.1.5	**Dozing of material**														
			Dozing of material								Yes	3483525	/m3	H4.2	R 15	R 53 350 685	Assume 60 % of material in pit to be dozed
		2.1.6	**Load and haul of Topsoil Stockpiles**														
			Load and haul of topsoil stockpiles								Yes	121958	/m3	N9	R 18	R 2 142 802	Assume Within 1 km hauling distance
			Sub-total for Open pit rehabilitation including final voids and ramps						**R206 795 859**							**R 116 699 021**	

			Sub-total for Mining Areas						**R206 795 859**							**R 116 699 021**	
		3	**General Surface Rehabilitation**														
E018-000-001	**E018-000-005**	**3.1**	**Infrastructural surface areas**														
3,4,6,18	1,2,3,10,11,12,14	**3.1.1**	**Rehabilitation of infrastructural surface areas**														
			Dose surface area to remove 30cm of contaminated soil	Yes	118427	/m3	H4.1	R21	R2 434 247	Remove 30cm of surface layer from the plant area as well as the hard park and contractors camp	Yes	121958	/m3	H4.1	R 21	R 2 506 826	Assume remove 30cm of surface layer from contractors camp, North Western and Southern underground infrastructure areas, plant area, Excludes office area and PCDs, excludes clean area in contractors camp and roads
			Load and Haul of contaminated soil	Yes	118427	/m3	N9	R18	R2 080 762	Assume disposal at pit (2km), bulk volume >50000m3	Yes	121958	/m3	H2.2.3	R 34	R 4 172 661	Assume dispose at pit (3km), >50000m3
			Rip surface area	Yes	40	/ha	H3.2	R16 452	R658 069	Assume deep ripping over plant area and hard park and contractors camp	Yes	30	/ha	H3.2	R 16 452	R 493 552	Assume deep ripping in plant area and hard park area
			Rip surface area	Yes	2	/ha	H3.1	R5 447	R12 529	Assume general ripping over office area	Yes	12,5	/ha	H3.1	R 5 447	R 68 091	Assume general ripping over office, contractors camp, North Western and Southern underground infrastructure excluding PCD's, roads and Hard Park area
			Shaping/levelling of infrastructural footprint areas (500 mm)	Yes	35	/ha	G1.1	R102 774	R3 545 708	Assume shaping and levelling at office area, plant area, contractors camp, hard park, at hards stocpile area and original softs boxcut, excluding PCD	Yes	60,5	/ha	G1.1	R 102 774	R 6 217 836	Assume shaping and levelling of 50 % of - office area, plant area, contractors camp, North Western and Southern underground infrastructure, at hards stocpile area and original softs boxcut, excluding PCD
			Import topsoil material and spread (300 mm)	No	72	/ha	G1.4	R144 737	R0	Load and Haul included under mining activity	No	125	/ha	G1.4	R 144 737	R 0	Load and Haul included under mining activity
			Vegetation establishment	Yes	69	/ha	G2.1	R56 495	R3 898 124	Assume general vegetation establishment at office area, plant area, contractors camp, hard park, at hards stocpile area and overburden excluding PCD	Yes	121	/ha	G2.1	R 56 495	R 6 835 841	Assume general vegetation establishment at office area, plant area, contractors camp, North Western and Southern underground infrastructure, at hards stocpile area, original softs boxcut and proposed shaft boxcut spoils
24,25		**3.1.2**	**Rehabilitation of open pit footprint**														
			Vegetation establishment	Yes	216	/ha	G2.1	R56 495	R12 202 824		Yes	70	/ha	G2.1	R 56 495	R 3 954 619	
			Sub-total for rehabilitation of Infrastructural surface area and Pit footprint						**R24 832 263**							**R 24 249 425**	
			Sub-total for General Surface Rehabilitation						**R24 832 263**							**R 24 249 425**	
		4	**Runoff Management**														
E018-000-001	**E018-000-005**	**4.1**	**Reinstatement of drainage lines**														
2,3,4,6,7,8,11,15,17,18,22	1,2,3,4,10,11,12,14	**4.1.1**	**Drainage lines**	Yes	72	/ha	G3.1	R1 542	R110 996	Assume reinstatement of drainage lines over entire plant, stockpile, office, hard park, contractors camp, hards stockpile area, PCD and overburden area	Yes	125	/ha	G3.1	R 1 542	R 192 702	Assume reinstatement of drainage lines over office area, plant area, contractors camp, North Western and Southern underground infrastructure, at hards stocpile area, original softs boxcut and proposed shaft boxcut spoils
			Sub-total for reinstatement of drainage lines						**R110 996**							**R 192 702**	
			Sub-total for Runoff Management						**R110 996**							**R 192 702**	
			Sub-Total 1 (for infrastructure and related aspects)						**R247 674 477**							**R 306 167 726**	
		5	**P&Gs, Contingencies and Additional Allowances**														
		5.1	**Preliminaries and general**	Yes	12	/sum	L2	R29 720 937	R29 720 937	Assumed 12 % of Sub-total 1	Yes	12	/sum	L2	R 36 740 127	R 36 740 127	Assumed 12 % of Sub-total 1
		5.2	**Contingencies**	Yes	10	/sum	L2	R24 767 448	R24 767 448	Assumed 10 % of Sub-total 1	Yes	10	/sum	L2	R 30 616 773	R 30 616 773	Assumed 10 % of Sub-total 1
			Sub-Total 3 (for Additional Allowances)						**R54 488 385**							**R 67 356 900**	
		6	**Pre-site Relinquishment Monitoring and Aftercare**														
		6.1	**Surface water quality monitoring**	Yes	5	/yr	K1	R106 720	R533 600	Quarterly monitoring for 5 years	Yes	5	/yr	K1	R 106 720	R 533 600	Quarterly monitoring for 5 years
		6.2	**Groundwater quality monitoring**	Yes	5	/yr	K2	R261 120	R1 305 600	Quarterly monitoring for 5 years	Yes	5	/yr	K2	R 261 120	R 1 305 600	Quarterly monitoring for 5 years
		6.3	**Rehabilitation monitoring of rehabilitated areas**	Yes	290	ha	J1	R3 000	R870 000	Bi-annualy monitoring for 5 year	Yes	720	ha	J1	R 3 000	R 2 160 000	Bi-annualy monitoring for 5 year
		6.4	**Care and maintenance of rehabilitated areas**	Yes	100	ha	J2	R9 131	R913 085	6 weeks per year for 5 years (20 ha per year)	Yes	350	ha	J2	R 9 131	R 3 195 799	6 weeks per year for 5 years (70 ha per year)
			Sub-Total 2 (for Post-Closure aspects)						**R3 622 285**							**R 7 194 999**	
			Grand Total Excl. VAT. (for Sub-total 1 +2 +3)						**R305 785 148**							**R 380 719 624**	

E018 Manungu Coal Mine Closure Costs, as at September 2018					
Closure components		Unscheduled Closure (2018)		Scheduled Closure (2040)	
1	Infrastructural aspects	R	15 935 358,83	R	165 026 577,75
2	Mining aspects	R	206 795 858,99	R	116 699 020,89
3	General surface rehabilitation	R	24 832 263,39	R	24 249 425,45
4	Water management	R	110 996,08	R	192 701,53
	Sub-Total 1	**R**	**247 674 477,28**	**R**	**306 167 725,62**
5	**Post-Closure Aspects**				
5,1	Surface water monitoring	R	533 600,00	R	533 600,00
5,2	Groundwater monitoring	R	1 305 600,00	R	1 305 600,00
5,3	Rehabilitation monitoring	R	870 000,00	R	2 160 000,00
5,4	Care and maintenance	R	913 085,48	R	3 195 799,17
	Sub-Total 2	**R**	**3 622 285,48**	**R**	**7 194 999,17**
6	**Additional Allowances**				
6,1	Preliminary and general	R	29 720 937,27	R	36 740 127,07
6,2	Contingencies	R	24 767 447,73	R	30 616 772,56
	Sub-Total 3	**R**	**54 488 385,00**	**R**	**67 356 899,64**
	Grand Total Excl. VAT. (Sub-total 1 +2 +3)	**R**	**305 785 147,76**	**R**	**380 719 624,42**



DIGBY WELLS
ENVIRONMENTAL

Mining Right: MP30/5/1/2/2/297MR

Annual Closure Cost Assessment for Manungu Colliery as at February 2019

Closure Cost Report - Digby Wells Methodology

Project Number:

TMR5599

Prepared for:

Mbuyelo Coal (Pty) Ltd

April 2019

Digby Wells and Associates (South Africa) (Pty) Ltd
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This document has been prepared by Digby Wells Environmental.

Report Type:	**Closure Cost Report - Digby Wells Methodology**
Project Name:	**Annual Closure Cost Assessment for Manungu Colliery as at February 2019**
Project Code:	**TMR5599**

Name	Responsibility	Signature	Date
Adrienne Rall	Report Writer		April 2019
Sibongile Chabalala	Project Manager		April 2019
Michelle van Niekerk	Report Reviewer		April 2019
Leon Ellis	Senior Reviewer		April 2019

DECLARATION OF INDEPENDENCE

Digby Wells and Associates (South Africa) (Pty) Ltd

Contact person: Adrienne Rall

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2191		

I, Adrienne Rall, as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Mbuyelo Coal (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Manungu Colliery's Closure Cost Assessment.

Full name:	Adrienne Rall
Title/ Position:	Junior Mine Closure Consultant
Qualification(s):	BSc (Hons) – Environmental Water Management
Experience (years):	2

EXECUTIVE SUMMARY

Mbuyelo Coal (Pty) Ltd (*hereinafter* Mbuyelo) appointed Digby Wells Environment (*hereinafter* Digby Wells) to review and update the closure cost assessment for unscheduled closure as at February 2019 at the Manungu Colliery. This document details the closure cost assessment of the relevant costs pertaining to Manungu Colliery (*hereinafter* Manungu) as required in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended and associated regulations. These Regulations provide that the holder of a mining right must make full financial provision for rehabilitation of negative environmental impacts.

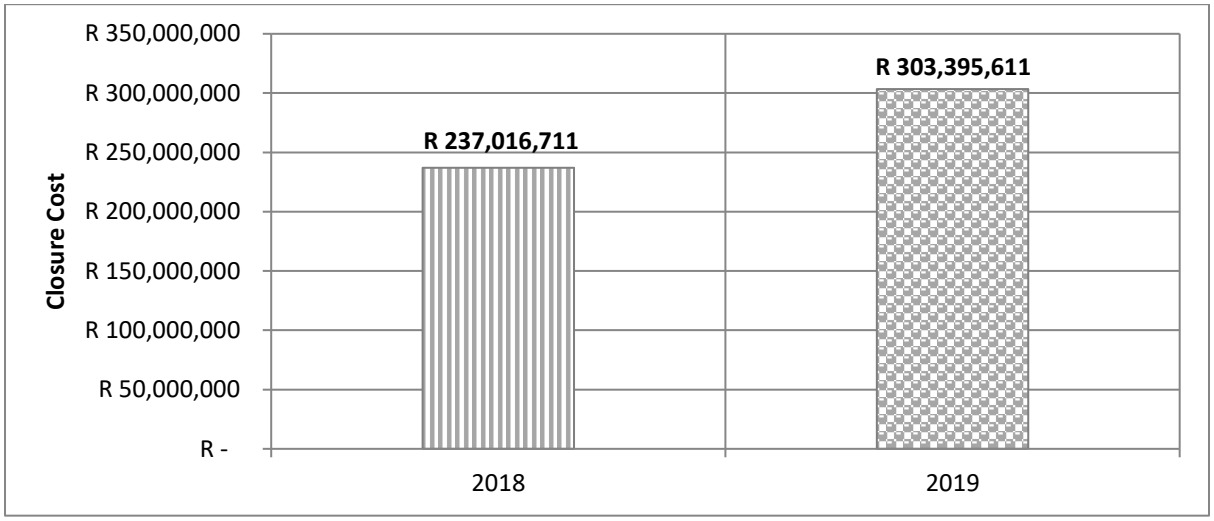
Manungu Colliery is situated on portions of the farms Weilaagte 271 IR and Welgevonden 272 IR situated in the Emalahleni Local Municipality within the Nkangala District Municipality, Mpumalanga Province.

The project involved a site visit to Manungu on the 06th of March 2019, which was followed by closure cost calculations and the compilation of a report on the quantities, types of structures and costs involved for rehabilitating the areas.

This report contains the estimated closure costs as well as the methodology and assumptions made to arrive at the final closure estimate. The unscheduled closure cost for Manungu was assessed as at February 2019.

Allowance has been made for the backfilling of the open pits, demolition and management of physical infrastructure, replacement of soil and re-vegetation, and for the general surface rehabilitation of all the disturbed areas at Manungu. The costs of rehabilitation and closure of the mine according to the Digby Wells methodology are **R 303,395,611**. The closure cost estimate increased by R 66 378 900 (28%) when compared to the previous assessment. The increase in the areas of steel buildings resulted in a major cost increase due to the addition of a steel workshop, as well as an increase in the haul roads at Manungu. The increase in the size of the Manungu Pit is also another major cost contributor. The other increase in costs can be attributed to general rehabilitation, and water management (also influenced by the increase in the size of the Manungu Pit).

It is recommended the liability figures be updated on an annual basis as a requirement by NEMA. This will ensure that all costs become more accurate over time and will reflect current market conditions.



Manungu Closure Cost Comparison 2018- 2019

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1 Introduction

Mbuyelo Coal (Pty) Ltd. (*hereinafter* Mbuyelo) appointed Digby Wells Environmental (*hereinafter* Digby Wells) to review and update the unscheduled closure cost assessment for 2019 at Manungu Colliery (*hereinafter* Manungu).

The Manungu annual closure cost assessment has been calculated by Digby Wells since 2012 and this report reflects the required annual update. The approach followed for the calculation of the closure costs was to reflect the “snapshot-in-time” principle as at February 2019. Costs have been calculated assuming that the mine would have to close immediately and would have to rehabilitate or remediate the impacts without delay.

This report analyses changes from the February 2018 closure cost assessment and contains he updated costs as well as the methodology and assumptions made to arrive at the final closure estimate.

1.1 Project Description

Tshedza Mining Resources (Pty) Ltd (which is a subsidiary of Mbuyelo) holds the Mining Right (MP30/5/1/2/2/297MR) under which Manungu operates, issued by Department of Mineral Resources (DMR), Mpumalanga Regional Office in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No.28 of 2002) (MPRDA).

Manungu is located on portions of the farms Weilaagte 271 IR and Welgevonden 272 IR. The Project falls under the jurisdiction of the Emalahleni Local Municipality (ELM) within the Nkangala District Municipality (NDM) of Mpumalanga Province. Manungu is situated approximately 60 km southwest of Witbank, 10 km southwest of Delmas and 2.8 km north of Devon. Access to the mine is via the R42 from the N12 national road

The Phase 1 resource of Manungu is estimated at 57 million tonnes, to be mined until 2033 over an 18-year period, using conventional opencast methods

1.2 Project Location

Province	Mpumalanga
Magisterial District / Local Authority	Emalahleni
District Municipality	Nkangala District Municipality
Local Municipality	Emalahleni Local Municipality
Nearest Town	Emalahleni (60 km southwest) and Delmas (10 km southwest)
Property Name and Number	Weilaagte 271 IR Welgevonden 272
GPS Co-ordinates (relative centre point of study area)	26°13'44.46" south
	28°41'13.22" east

Pre-Mining Land Use	Cultivation / Agriculture
Final Land-Use (as per EMPr)	Wilderness / Grazing

1.3 Battery Limits

The battery limits of the 2019 closure cost assessment are shown on Figure 1.1 and listed below:

- Pit 1 (Manungu Pit);
- Pit 2;
- Topsoil Dumps;
- Hards Dumps;
- Partially Backfilled Area;
- PCD;
- New Workshop Area;
- Roads;
- Fences;
- Crushing and Screening Plant;
- Hard Parks;
- Old Chicken Run;
- Admin offices;
- Explosive Magazine;
- Workshop; and
- Weighbridge.

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Figure 1-1: General Layout of Manungu Colliery

2 Terms of Reference

Mbuyelo appointed Digby Wells as the independent environmental consultants to review and update the closure cost for Manungu which was previously evaluated in February 2018.

Section 41 (1) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) has been repealed and in terms of Section 24P of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), as amended, requires that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts

In addition to Section 24P, the Financial Provisioning Regulations, 2015 (Government Notice Regulation No. 1147 published in GG 39425) pertaining to the financial provision for prospecting, exploration, mining or production operations were promulgated on 20 November 2015 under the NEMA, as amended. Changes to the Financial Provisioning Regulations, 2015 (referred to as GN R1147) were promulgated in Government Notice Regulations 1228 on 10 November 2017 (GN R1228), currently out for public comment.

In both regulations (GN R1147 or GN R1228), there is transitional provisions which indicate that the existing holders of mining rights will need to assess, review and adjust the sum of the financial provision in accordance with Regulation 11 by February 2020.

As requested by the client, this report does not address any of the requirements of the Financial Provisioning Regulations (GN R1147 or GN R 1228). This report and associated review of the financial provision is based on the Regulations applicable as of 01 December 2014.

The financial provision must guarantee the availability of sufficient funds to undertake the following:

- Rehabilitation of the adverse environmental impacts of the listed or specified activities;
- Rehabilitation of the impacts of the prospecting or mining activities, including the pumping and treatment of polluted or extraneous water;
- Decommissioning and closure of the operations;
- Remediation of latent or residual environmental impacts which become known in the future;
- Removal of building structures and other objects; and/or
- Remediation of any other negative environmental impacts.

3 Expertise of Specialist

The specialists involved in determining the Closure Cost for Manungu Colliery were Adrienne Rall and Michelle van Niekerk. Their curriculum vitae are available on request.

4 Closure Objectives

The specific closure objectives that Manungu will adopt for rehabilitation and closure as per the 2011 approved Environmental Management Plan (EMPr) are listed below in **Error! eference source not found.**.

Table 4-1: Closure Objectives

Environmental Aspect	Closure Objectives
Geology	■ To put potential acid generated material at the bottom of the pits; and ■ To replace topsoil on all disturbed areas to the pre-mining soil depths.
Topography	■ Ensure the site is free draining; and ■ Minimise erosion by sloping the surface area to a grade not less than 1:200
Soil	■ To put potential acid generated material at the bottom of the pits; and ■ To replace topsoil on all disturbed areas to the pre-mining soil depths.
Natural Vegetation	■ The natural vegetation and plant life will be re-established; and ■ The veld to be self-sustainable.
Surface Water	■ Optimization of surface water run-off during the post closure phase through the commissioning of storm water diversion measures at the high walls of the final voids, and through well established and sustained re-establishment of vegetative cover on rehabilitated land; ■ Minimizing of pit decant, in the event that the water qualities do not comply with the water quality criteria set for the Middelburg Dam Catchment, through evaporation from final void in-pit evaporation facilities; and ■ The surface water quality criteria developed for the Middelburg Dam Catchment will be used for surface water compliance assessment purposes.

Environmental Aspect	Closure Objectives
Groundwater	■ To restrict the cone of depression around the open pit to a radius of less than 250 m in any direction around the pits; ■ To stabilize the alternative water supply to external users whose ground water resources have been impacted on; and ■ To restrict the presence of polluted ground water to within the perimeter of the rehabilitated open pit, and to the low lying areas down-gradient from the pits.
Air Quality	■ Air quality should return to normal after rehabilitation.
Noise	■ Noise levels will return to normal at cessation of the mining operation.
Visual Aspect	■ To return the mining area to a state acceptable by all interested and affected parties.
Interested and Affected Parties	■ To maintain the good relationship with all the surrounding farmers and the relevant Government Departments.

5 Methodology

This report details the cost estimate as calculated using the Digby wells method of calculation which addresses each mining activity in more detail than that required by the DMR standard method. However as per the Department of Mineral Resources (DMR) Guideline Document (DME, 2005), Digby Wells assumed that the mine infrastructure has no salvage value. This is necessary as it is often difficult to determine the salvage value of the infrastructure.

The approach followed during these calculations was to assume a “snapshot in time”, i.e. costs have been calculated assuming that the operation would have to close immediately and would have to rehabilitate or remediate their impacts.

5.1 Infrastructure Measurements

A site visit was conducted by Digby Well’s personnel on the 06th of March 2019. The measurements for each mining area were based on the assessment conducted in 2018 and any changes were recorded. All infrastructural areas were visited to capture any changes and to confirm assumptions from previous assessments. The mine’s surveyor provided the latest survey drawing used by Digby Wells for measurements of voids, dumps and backfilled areas.

5.2 Rates

Digby Wells updates their internal rates database on an annual basis to reflect current market related rates. The rates are updated by quotes from demolition and civil contractors and professionals wherever possible. Rate formulation takes into consideration the total labour costs, plant costs, fuel costs and construction costs into consideration thus providing a more accurate, defendable rate. Site specific rates were used where and if possible in order to refine the closure costs.

5.3 Model Compilation

A closure cost model for Manungu was compiled in Microsoft Excel. The model consists of an input sheet, containing all measurements of each area of the mine, a standard rate sheet and a summary sheet, which summarises the costs for closure.

6 Infrastructure and Rehabilitation

The rehabilitation methodologies and assumptions documented in the DMR guidelines set out in the *"Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine"* (DME, 2005) have been used to form the basis of this report. The guidelines stipulate the closure methods for infrastructure and rehabilitation, which are described below.

6.1 Administration Infrastructure

All brick, steel and concrete structures (Figure 6-1 and Figure 6-2) need to be demolished to 1 m below ground level. The remaining rubble may be buried adjacent to the building sites or used as backfill material in the pit. Once the area is demolished the area needs to be covered with 150 mm (except at the Stockpile Area, replaced to 300 mm) of topsoil and vegetated.

Figure 6-1: Main Office Building

Figure 6-2: New Workshop Plant Infrastructure and Stockyards

6.2 Plant and stockpiles

All fixed infrastructure associated with the plant (refer to Figure 6-3 below) needs to be stripped and broken down. Concrete needs to be removed to 1 m below ground level and soil replaced to 300 mm. This includes any conveyors, foundations and any concrete between buildings. All recoverable scrap steel can be sold and recycled. The calculations do not account for any value recovered from the sale of plant, steel or other material. A potential saving is however possible at the end of life of mine.

The rehabilitation of the stockyards is to ensure that the area is not a source of pollution after closure of the mine. This will be achieved by:

- Removal of all stockpiled coal from the site;
- The sacrificial coal layer will be removed and the area topsoiled and vegetated to ensure no erosion takes place; and
- The area must be monitored thereafter to ensure that vegetation is established.

Figure 6-3: Manungu Crushing and Screening Plant

6.3 Open Pit Rehabilitation

The environmental objective of the open pit is to make it as safe as possible for humans and animals at closure, not to affect the required water control and to achieve the highest land capability possible.

Once mining of the open pit has been completed, the open pit will be filled with overburden, levelled and topsoil replaced. The areas that have been infilled will be shaped to reduce the likelihood of ponding occurring on surface and to blend in with the surrounding topography.

Figure 6-4: Manungu Open Pit and Partial Backfilled Area

6.4 Pollution Control Dams (PCD)

The PCDs will be removed at closure. The plastic lining must be removed and, unless recycled, disposed of in the designated waste site. The earth walls will be flattened and the area profiled. The pumps and pipes associated with the dam must be removed and if possible sold.

Figure 6-5: Manungu Pollution Control Dam

6.5 Access Roads

Access roads around the site should be ripped for all areas except those needed to access the facilities for inspection after closure. Roads that can and will be used by other users post closure should, however, be left provided this is agreed upon by all parties concerned.

6.6 General Rehabilitation

General surface rehabilitation must involve the shaping of the surface topography to match the surrounding landscape, followed by ripping, adding topsoil and revegetating. During the process of shaping the landscape, drainage lines must be properly reinstated into the topography. Any heaps of excess material also need to be removed, this all so that effective re-vegetation can take place.

6.7 Maintenance and Aftercare

Maintenance and aftercare must be planned for 2-3 years after the land preparation and replanting of vegetation has been completed.

Maintenance will specifically focus on fertilizing the rehabilitated area annually, control of wattle and all other alien plants and general maintenance, including rehabilitation of cracks, subsidence and erosion gullies. Continuous erosion monitoring of rehabilitated areas and

slopes should be undertaken and zones with excessive erosion should be identified. The cause of the erosion should be identified and rectified. Zones with erosion will need to be repaired with topsoil.

7 Post Closure Management

The quality of groundwater and surface water at the site should be monitored quarterly for five years or until a long term acceptable trend can be determined to ensure compliance of the various constituents with the standards. Samples should be analysed for particulate and soluble contaminants as well as biological. A hydrogeologist should determine the locations of the monitoring boreholes.

7.1 Soil Erosion Monitoring

Soil samples need to be taken annually at each area that has been rehabilitated to ensure a soil fertility supporting the final land use is attained during the 2-3 year monitoring and maintenance period.

7.2 Vegetation Monitoring

The following monitoring is recommended:

- Vegetation cover;
- Species composition;
- Erosion; and
- Alien invasive plants.

7.3 Long Term Water Issues

Each mining operation has an effect on the ground and surface water regimes. The effects vary greatly according to the mining operation and the geological setting of the operation. At this stage, this report did not attempt to quantify the groundwater impacts or the mitigation thereof.

8 Summary of Closure Costs

The 2019 closure cost estimate was calculated by means of the Digby Wells calculation method for assessment of mine closure. A summary of the calculated closure cost estimate is presented in Table 8-1.The cost for rehabilitation and closure of Manungu is **R 303,395,611 (Excl. Vat).**

A contingency of 10% on all infrastructure costs has been allowed for. A 6% allowance has been included for project management fees. These fees account for the costs required to manage the closure and rehabilitation phase as well as provide personnel to monitor and maintain the rehabilitated areas after closure. A detailed breakdown of the mine closure cost is provided in Appendix B.

Table 8-1: Summary of the Closure Cost Estimate for Manungu

Digby Wells Environmental	
Mbuyelo Coal (Pty) Ltd, Manungu Colliery, Closure Cost Assessment, February 2019, Rev: 0	
Summary	
Area 1: Admin Areas and Ancillary Infrastructure	
Infrastructure	R 1 912 459
Rehabilitation	R171 694
Area 1 Total	**R 2 084 150**
Area 2: Crushing and Screening Plant	
Infrastructure	R 340 220
Rehabilitation (Included under Stockyard Area)	-
Area 2 Total	**R340 220**
Area 3: Pits and Dumps	
Infrastructure	R205 522 806
Rehabilitation (Included as part of Stockyard)	R29 648 485
Area 3 Total	**R 235 171 291**
Area 4: Stockyards, Hard Park Areas, Contractor Camp, Roads & PCD	
Earthworks & Infrastructure	R976,558
Rehabilitation	R 4 958 954
Area 4 Total	**R 5,935,512**
Areas Total	**R 243,531,172**
Monitoring Costs (Surface water and Groundwater)	**R 1,655,200**
Monitoring Costs (Vegetation)	**R 80,925**
Maintenance Costs (Vegetation)	**R 4,551,456**
Project Management (6%)	**R 29,223,741**
Contingency (10%)	**R 24,353,117**
Grand Total	**R 303,395,611**

Figure 8-1 further indicates the cost distribution between different components that make up the closure cost for Manungu. As can be expected the costs associated with the rehabilitation of mining areas is the largest contributor to the overall cost (77.09%). It should be noted that the backfilling of the pits and revegetation of the pit and dump footprints constitute to most of the Mining Area cost.

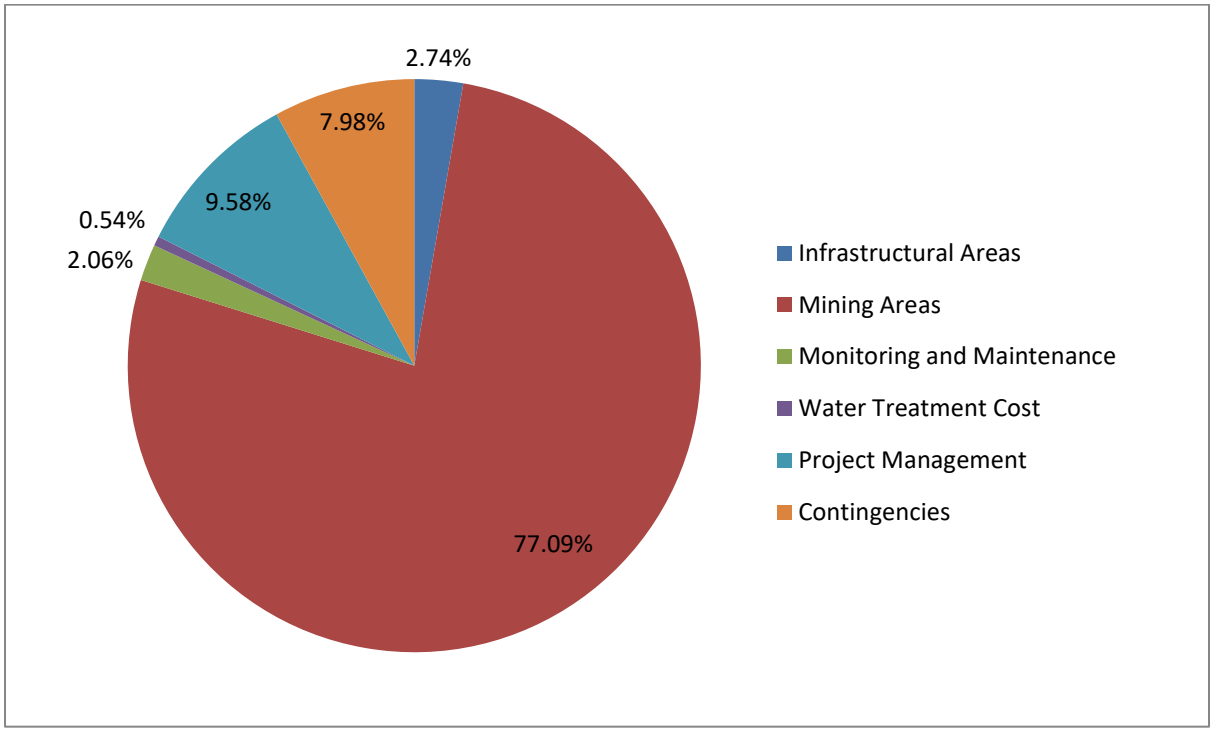


Figure 8-1: 2019 Cost Distribution for Manungu

9 Assumptions

Digby Wells made the following assumptions and noted limitations as part of the closure cost assessment as reflected in Table 9-1 below:

Table 9-1: Assumptions and Limitations

Description	Consequence
Assumptions	
General	
The calculations do not account for any value recovered from sale of plant, steel or other material.	Value recovered from sale of the mine`s operational infrastructure can be used for any other purpose.
Digby Wells allowed for a maximum load and haul distance of 1 000 m for disposing overburden and topsoil into the pit.	Any change in load and haul distance will have implications on the closure cost estimate.
The survey drawing used by Digby Wells for measurements of infrastructure and areas requiring rehabilitation are deemed accurate and up to date.	Any change (addition or removal) in the mine layout plans and information will have implications on the closure cost.
All rehabilitated (levelled and ripped) footprint areas will be top soiled to a depth of 150 mm, except at the stockpile area (300 mm) followed by the establishment of vegetation	Ability to affect the final land-use.
The contaminated sacrificial coal layer at the Run of Mine (RoM), stockpiles, roads and plant areas will be removed to a depth of 150 mm and disposed with at the pit prior to closure of the pit;	Ability to affect the final land-use.
Survey drawings and data provided by the mine's surveyor is correct.	Any change (addition or removal) in the mine layout plans and information will have implications on the financial provision estimate.
According to the most recent survey data, there is sufficient material on site to conduct rehabilitation at Manungu. The material balance needs to be consistently updated to ensure this continues to be the case.	Should soil material be lost, this will need to be imported which will result in cost implications.
Digby Wells allowed for a contingency of 10% on the closure cost estimate.	Price fluctuations with regard to plant hire, fuel prices and possible omissions from the assessment have been accounted for.
Digby Wells included a 6% allowance for project management fees.	The costs required to manage the closure and rehabilitation phase as well as provision for personnel to monitor and maintain the rehabilitated areas after closure has been accounted for.

Description	Consequence
Infrastructure area	
It is assumed that all surface infrastructure used by the mine will be demolished at closure, until such time when third party agreements are in place.	The cost to demolish and rehabilitate infrastructure could be reduced if third-party agreements are in place.
It has been assumed that prefabricated mobile rooms and containers would be removed at closure and has no cost implication.	The cost to demolish and rehabilitate infrastructure could increase slightly if these are not removed prior to closure.
Open pits	
The following dumps will be load and hauled (within 1km) into the Manungu pit: • 50% of topsoil dump (3); • 50% of topsoil dump (5); • 50% topsoil dump (6); • 50% of topsoil dump (7); • 50% of topsoil dump (8); • 50% of topsoil dump (9) • 50% of topsoil dump (10) • 50% of topsoil dump (11) • 50% of topsoil dump (12) • 50% of Maria dump (13); • 40 % of hards dump (1); and • 40% of hards dump (2)	Any change in load and haul percentages and haul distances will have implications on the closure cost estimate.
The following Dumps will be dozed into the Manungu Pit: • 100% of topsoil (2) • 50% of topsoil dump (3); • 50% of topsoil dump (5); • 50% topsoil dump (6); • 50% of topsoil dump (7); • 50% of topsoil dump (8); • 50% of topsoil dump (9) • 50% of topsoil dump (10) • 50% of topsoil dump (11) • 50% of topsoil dump (12) • 50% of Marial dump (13); • 60 % of hards dump(1); and • 60% of hards dump (2)	Any change in dozing percentages and haul distances will have implications on the closure cost estimate.

Description	Consequence
The following Dumps will be used for various rehabilitation at Manungu (load and hauled within 1 km): • 100% of topsoil (1) • 100% of topsoil dump (4); and • 50% of topsoil (5)	Any change in load and haul percentages and haul distances will have implications on the closure cost estimate.
Dumps	
All the dump material currently stockpiled on the surface will be used for backfilling and rehabilitation of the pits, thereafter the footprints will be rehabilitated via ripping, shaping, topsoiling, and revegetating	Ability to affect the final land use.
It has been assumed that the topsoil was not removed from the dump footprints prior to material placement. As a result the footprints will only need to be ripped and revegetated.	If the dump footprints need topsoil then an external supplier will need to be sourced which will cause a large increase in the closure costs.
Roads	
The roads used by the mines have been assumed to be the responsibility of Mbuyelo unless demonstrated otherwise.	Roads have been accounted for in the closure cost estimate
Pollution Control Dam	
At closure, Manungu will: ▪ Remove the HDPE liner; and ▪ Remove and rehabilitate the PCD.	Costs for the closure activities for the PCD have been accounted for
Monitoring and Maintenance	
Digby Wells included post-closure water monitoring costs and will take at existing ground and surface water monitoring points a period of 10 years after mine closure.	Early detection of any contamination on surface and groundwater.
Manungu will complete vegetation monitoring and maintenance on rehabilitated areas for three years after closure.	Establish sustainable vegetation on rehabilitated area and early corrective measures on areas that are failing to establish vegetation.
Limitations	
No due diligence was undertaken to determine whether Mbuyelo is responsible for any other areas not specified in this report.	Areas outside of those specified in this financial provision report may influence the accuracy of the presented costing.

Description	Consequence
The closure cost does not include costs associated with post closure water treatment as the available data was not sufficient to make a reliable estimate. A detailed hydrogeological assessment should be conducted at least five years prior to closure. This would identify the possibility of decant occurring and enable treatment options to be explored. The closure cost does not include costs associated with the proposed assessment or a specific treatment option	The closure costs can increase in the order of hundreds of millions of Rands if the hydrogeological model requires a reverse osmosis water treatment plan.

10 Changes since the Previous Closure Cost Assessment

The cost increased by 29 % in 2019 compared to the 2018 closure cost assessment as shown in Figure 10-1.

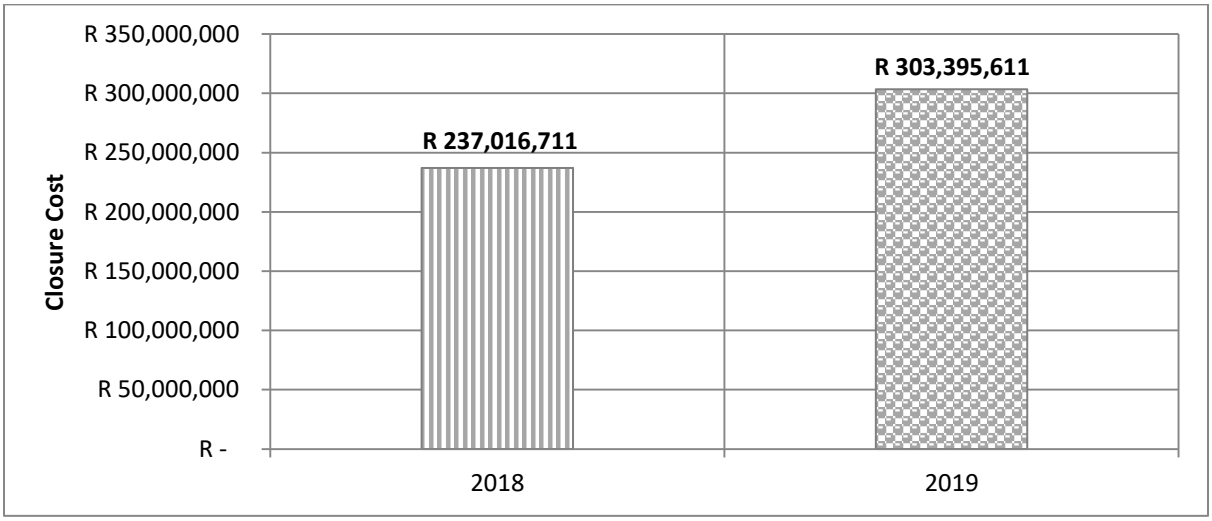


Figure 10-1: 2018 and 2019 Closure Costs

The 28 % cost increase in 2019 compared to the 2018 closure cost assessment can be attributed to the following:

- Expansion of mining has resulted in a void increase of 19.82 ha
- The surface area of the overburden and topsoil dumps has decreased by 6.8 ha due to the removal of Topsoil Dump 14, and backfill of portions of the open pit;
- There has been an increase in the area of haul roads at Manungu by 54 348 m^2;
- A weighbridge, and new workshop with an office has been constructed;
- The concrete refuelling bay has been added (previously omitted from the closure cost);

- There is only one stockpile area, whereas previously there were two;
- An additional hard park added at the workshop area; and
- The material balance indicates that there is a deficit of material on site to backfill to the surface ground level, hence rehabilitation will include backfill to below ground level, and ensuring the area is free-draining.

The changes listed above have resulted in an increase of **R 66,378,900** (28%) in the closure cost estimate as at February 2019, as displayed in Figure 10-2 below.

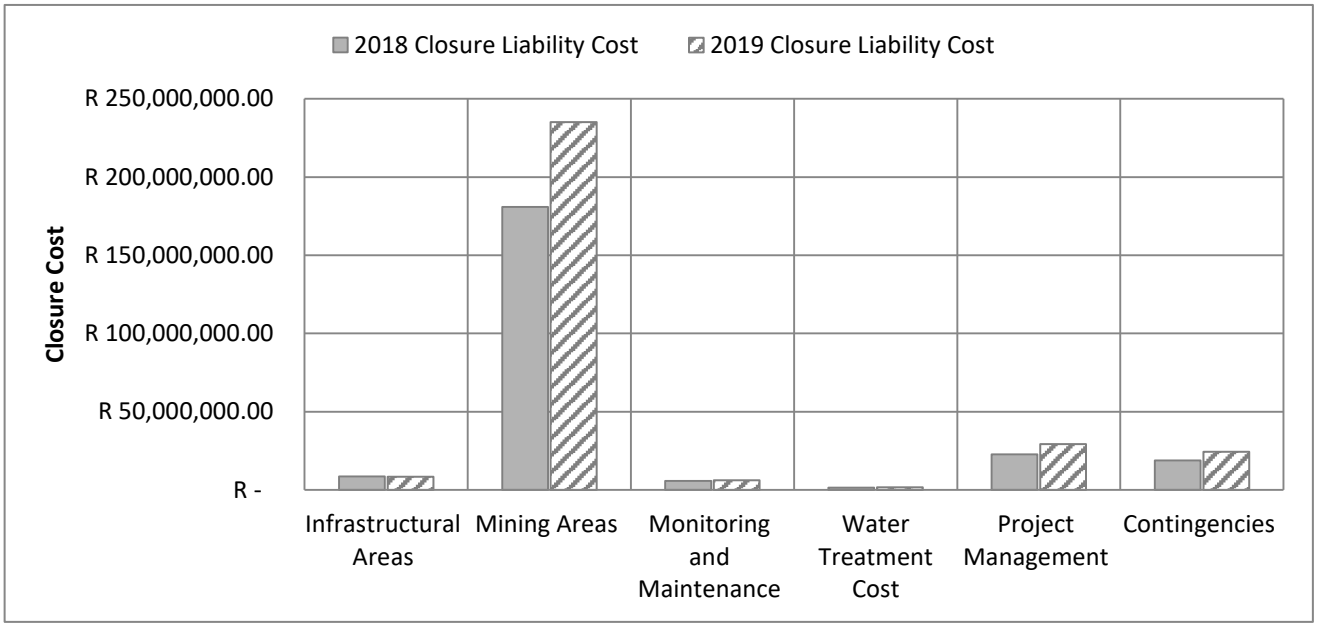


Figure 10-2: Comparison of 2018 and 2019 Closure Costs

11 Recommendations

Closure and rehabilitation is a continuous series of activities that begin with planning prior to the project's design and construction, and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem. Not only will the implementation of this concept result in a more satisfactory environmental conclusion, but it will also reduce the financial burden of closure and rehabilitation.

The recommendations based on the site visit and compilation of the closure cost assessment are as follows:

- Digby Wells would recommend that a detailed groundwater study be undertaken as soon as possible to predict the likely quantity and quality of water which may need to be treated, when the pit is backfilled at closure. This will enable the calculation of potential water treatment costs at that stage;
- The closure costs should be updated as soon as more survey data becomes available, so costs are accurate;

- A material balance should be completed to determine whether sufficient rehabilitation material (i.e. topsoil) is available;
- Concurrent rehabilitation should take place where possible so as to reduce the liability burden when the mine ceases to operate;
- A preliminary Closure Plan should be compiled to guide the assumptions with regards to the methodology used in the closure cost calculation; and
- The financial provision estimates need to be updated on an annual basis as a requirement of the NEMA. This will ensure that costs become more accurate over time and will reflect current market conditions.

Mbuyelo should also take cognisance of the regulations pertaining to the financial provision for the rehabilitation and management of negative environmental impacts associated with prospecting, exploration, mining and production operations which came into effect on 20 November 2015 (GN R1147).

It is strongly recommended that Mbuyelo begin assessing the additional requirements associated with the regulations and put in place an appropriate action plan to ensure compliance to the legislative requirements can be achieved by February 2020. If convicted of an offence in terms of the Regulations, a holder will be liable to a fine not exceeding R10 million or to imprisonment for a period not exceeding ten years, or to both such fine or such imprisonment.

12 References

Department of Mines and Petroleum, 2015: Guidelines for Preparing Mine Closure Plans, Mineral House, Western Australia.

Digby Wells Environmental, 2018. CCA Update for Manungu Colliery (2018).

DME, 2005: Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine, Pretoria, Department of Minerals and Energy.

Tshedza Mining Resources, 2008: Environmental Impact Assessment and Environmental Management Plan for the planned coal mining operation on the farms Weilaagte 271 IR and Welgevonden 272 IR, Delmas, Mpumalanga

Appendix A: Layout Plans

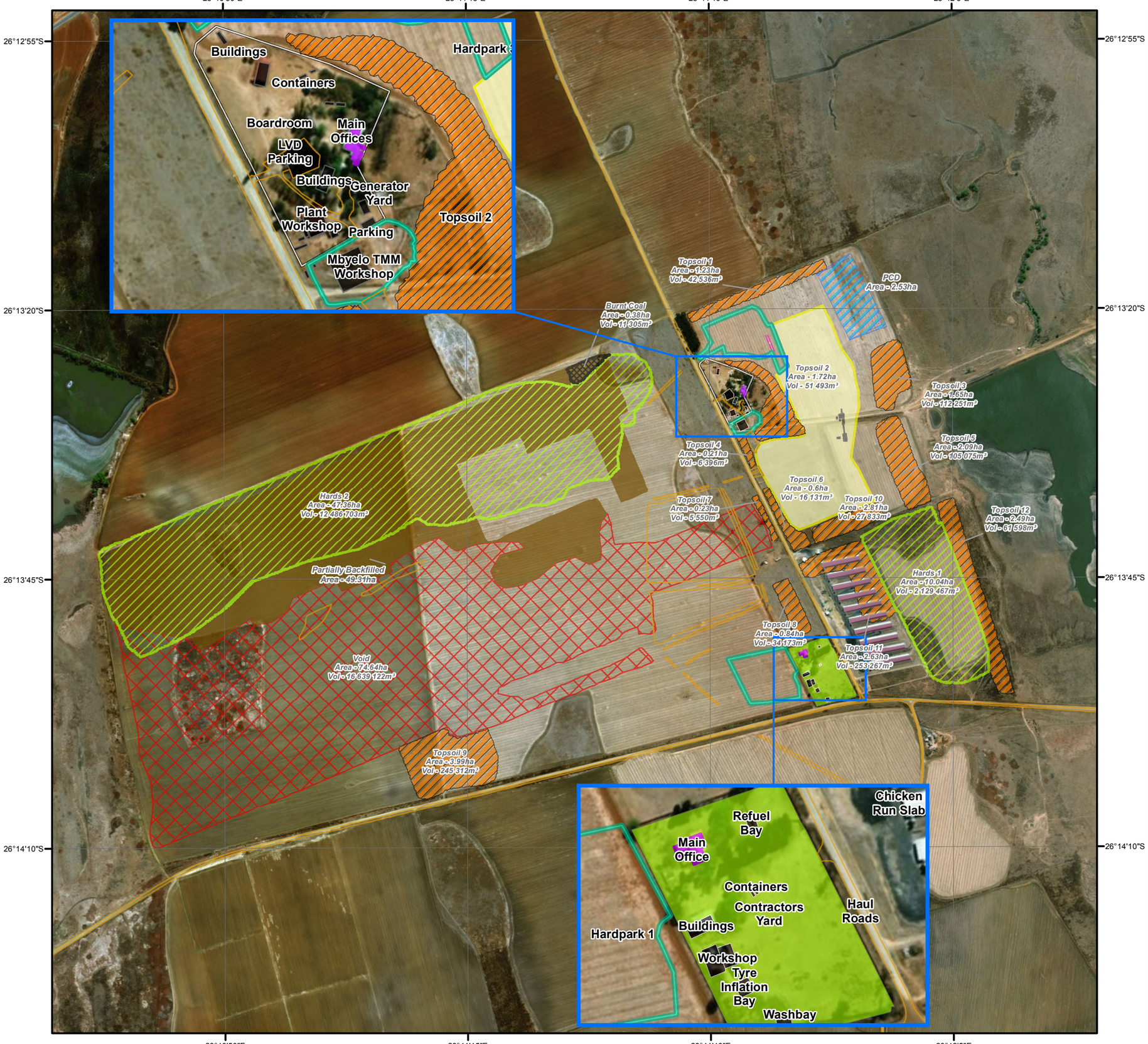
Plan 2

Mbuyelo Coal (Pty) Ltd

Manungu CCA 2019

28°40'50"E 28°41'15"E 28°41'40"E 28°42'5"E

26°12'55"S 26°13'20"S 26°13'45"S 26°14'10"S



Legend

Infrastructure

- Buildings and Workshops
- Burnt Coal
- Chicken Run Slab
- Contractors Yard
- Hardpark 1 - 3
- Hards Dump
- Haul Roads
- Main Offices
- PCD
- Partially Backfilled
- Plant
- Plant and Stockyard
- Topsoil Dumps 1 – 12
- Void
- Weighbridge

DIGBY WELLS ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 29°E

Ref #: cvs.TMR5599.201903.293
Revision Number: 1
Date: 09/04/2019

N

0 150 300 600

Metres

1:11 000

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Appendix B: Detailed Closure Cost Breakdown

	Digby Wells Environmental						
DIGBY WELLS ENVIRONMENTAL	Company:	Tsehedza Mining Resources (Pty) Ltd				Assignment:	Closure Cost Assessment
	Operation:	Manungu Colliery, Mpumalanga					Detailed Breakdown
	Date:	March 2019				Rev:	0

Ref.	Description	Class	Unit	Quantity	Rate	Amount	Comments
Area 1	**Admin Areas & Ancillary Infrastructure**						
Block 1	Infrastructure						
	Office Area 1						
	Main Office Building	101	m²	222.00	R 340.51	R 75,593.51	
	Storage Area & Lapa	101	m²	182.00	R 340.51	R 61,973.06	
	Workshop	101	m²	268.00	R 340.51	R 91,257.03	
	Board Room	101	m²	36.00	R 340.51	R 12,258.41	
	Building outside Office Area 1	101	m²	162.00	R 340.51	R 55,162.83	
	Office Area 2						
	Building 1	101	m²	335.00	R 340.51	R 114,071.29	
	Building 2	101	m²	207.00	R 340.51	R 70,485.84	
	Diesel Tank	143	m³	8.00	R 80.98	R 647.80	
	Concrete refuel base	107	m³	3.60	R 426.57	R 1,535.64	
	Carport	105	m²	50.00	R 62.18	R 3,108.88	
	New weighbridge - steel base	140	t	4.00	R 2,314.73	R 9,258.90	Same dimensions from Rirhandzu
	Old Chicken Run Concrete Slabs	107	m³	3,152.00	R 426.57	R 1,344,541.18	Covered with Topsoil Dump 11, but will be exposed at closure
	New Workshop	138	m²	72.00	R 325.35	R 23,425.07	Double storey steel workshop with brick lower section and concr
	Building	152	m	30.00	R 40.49	R 1,214.63	Brick walls as bottom half of workshop
	Office extension	101	m²	12.50	R 340.51	R 4,256.39	Assume 5 x 2.5 m office extension to workshop
	Fences	153	m	3,020.00	R 14.46	R 43,668.96	
	Rehabilitation						
	Replace soil and spread	129	m³	5,709.83	R 9.83	R 56,101.68	150mm thick
	Revegetate	131	Ha	3.81	R 30,365.83	R 115,589.06	Where Structures Have Been Removed
					Infrastructure Total	R 1,912,459.43	
					Rehabilitation Total	R 171,690.74	
					Block Total	R 2,084,150.17	
					Area Total	R 2,084,150.17	
Area 2	**Crushing & Screening Plant**						
Block 2	Infrastructure						
	Concrete foundations	108	m³	117.50	R 614.55	R 72,209.22	Info received from Pentalin Trading 56 (Pty) Ltd. In 2016
	Steel Infrastructure						
	MCC stand = 2831kg	140	t	2.83	R 2,313.59	R 6,549.77	Info received from Pentalin Trading 56 (Pty) Ltd. In 2016
	MCC shipping container = 2500kg	140	t	2.50	R 2,313.59	R 5,783.97	
	Magnet stand = 778kg	140	t	0.78	R 2,313.59	R 1,799.97	
	Magnet = 2577kg	140	t	2.58	R 2,313.59	R 5,962.11	
	Water stand = 1506kg	140	t	1.51	R 2,313.59	R 3,484.26	
	Sampler = 946kg	140	t	0.95	R 2,313.59	R 2,188.65	
	Conveyor nr 1 = 3886kg	140	t	3.89	R 2,313.59	R 8,990.60	
	Conveyor nr 1 transfer chute = 260kg	140	t	0.26	R 2,313.59	R 601.53	
	Conveyor nr 2 = 13159kg	140	t	13.16	R 2,313.59	R 30,444.49	
	Conveyor nr 2 y-chute = 613kg	140	t	0.61	R 2,313.59	R 1,418.23	
	Conveyor nr 3 = 12116kg	140	t	12.12	R 2,313.59	R 28,031.42	
	Conveyor nr 4 = 4374kg	140	t	4.37	R 2,313.59	R 10,119.63	
	Conveyor nr 4 transfer chute = 307kg	140	t	0.31	R 2,313.59	R 710.27	
	Conveyor nr 5 = 23315kg	140	t	23.32	R 2,313.59	R 53,941.28	
	Conveyor nr 5 discharge chute = 193kg	140	t	0.19	R 2,313.59	R 446.52	
	Secondary crusher feed chute = 394kg	140	t	0.39	R 2,313.59	R 911.55	
	Secondary crusher = 9000kg	140	t	9.00	R 2,313.59	R 20,822.28	
	Secondary crusher structure = 4190kg	140	t	4.19	R 2,313.59	R 9,693.93	
	Secondary crusher discharge chute = 117kg	140	t	0.12	R 2,313.59	R 270.69	
	Primary crusher maintenance platform = 9035kg	140	t	9.04	R 2,313.59	R 20,903.26	
	Primary crusher discharge chute – 114kg	140	t	0.11	R 2,313.59	R 263.75	
	Scalping screen nr 1 = 3872kg	140	t	3.87	R 2,313.59	R 8,958.21	
	Scalping screen nr 2 = 3872kg	140	t	3.87	R 2,313.59	R 8,958.21	
	Scalping screen discharge chute = 438kg	140	t	0.44	R 2,313.59	R 1,013.35	
	Scalping screen under pan = 1146kg	140	t	1.15	R 2,313.59	R 2,651.37	
	Scalping screen structure = 14303kg	140	t	14.30	R 2,313.59	R 33,091.24	
	Rehabilitation						
					Infrastructure Total	R 340,219.79	
					Rehabilitation Total	R -	Plant forms part of Stockyard 1, hence included there.
					Block Total	R 340,219.79	
					Area Total	R 340,219.79	
Area 3	**Pit & Dumps**						
Block 3	Earthworks						
	Manungu Pit						Need to include 2nd void (at new boxcut?)
	Rehabilitate pit footprint after backfilled						Included under rehabilitation, void has increased by 19.8 ha
							Partially rehabilitated void will require topsoil, shaping, vegetation, included under rehabilitation
	Overburden Dumps						
	Hards 1 - Load and Haul: 40%	128	m³	851,858.80	R 15.79	R 13,454,860.95	Decreased by 0.8 ha
	Hards 1- Doze: 60%	132	m³	1,277,788.20	R 8.64	R 11,038,477.76	
	Hards 2 - Doze: 60%	132	m³	7,492,069.80	R 8.64	R 64,722,029.72	Decreased by 3.3 ha
	Hards 2 - Load and Haul: 40%	128	m³	4,994,713.20	R 15.79	R 78,890,036.22	
	TP Stockpiles						Assume that TP 1 and 4 will be used for rehabilitation and included in the workshop area and the footprint rehabilitation assumed to be included in the workshop area. Note - Topsoil Dump 14 No longer Exists Note: Discrepancies between map figures and survey data
	TP2 - Doze: 100%	132	m³	51,493.13	R 8.64	R 444,835.67	Increased by 0.27 ha (as per last year- please advise if this will be used to rehab pit or plant)
	TP3 - Doze: 50%	132	m³	56,125.27	R 8.64	R 484,851.51	
	TP3 - Load and Haul: 50%	128	m³	56,125.27	R 15.79	R 886,482.25	Increased by 0.04 ha
	TP5 - Load and Haul : 50%	128	m³	52,537.33	R 15.79	R 829,811.70	Increased by 0.06 ha
	TP5 - Doze: 50%	132	m³	52,537.33	R 8.64	R 453,856.20	
	TP6 - Doze: 50%	132	m³	8,065.73	R 8.64	R 69,677.69	Increased by 0.06 ha
TMR5599	TP6 - Load and Haul: 50%	128	m³	8,065.73	R 15.79	R 127,395.77	

	TP7- Doze: 50%	132	m³	2,775.06	R	8.64	R 23,972.97	Excluded previously
	TP7- Load and Haul: 50%	128	m³	2,775.06	R	15.79	R 43,831.18	
	TP8 - Doze 50%	132	m³	17,086.56	R	8.64	R 147,606.32	Increased by 0.06 ha
	TP8 - Load and Haul 50%	128	m³	17,086.56	R	15.79	R 269,877.22	
	TP9 - Doze 50%	132	m³	122,655.93	R	8.64	R 1,059,592.43	Increased by 2.83 ha
	TP9 - Load and Haul 50%	128	m³	122,655.93	R	15.79	R 1,937,314.51	
	TP10 - Doze 50%	132	m³	13,916.27	R	8.64	R 120,219.01	Decreased by 1.67ha
	TP10 - Load and Haul 50%	128	m³	13,916.27	R	15.79	R 219,803.42	
	TP11 - Doze 50%	132	m³	126,633.64	R	8.64	R 1,093,954.87	Increased by 0.66 ha
	TP11 - Load and Hual 50%	128	m³	126,633.64	R	15.79	R 2,000,141.36	
	TP12 - Doze 50%	132	m³	30,799.10	R	8.64	R 266,065.32	decreased by 0.14 ha
	TP12 - Load and Haul 50%	128	m³	30,799.10	R	15.79	R 486,462.71	
	13 Maria Dump - Doze 50 %	132	m³	1,082,600.00	R	8.64	R 9,352,298.00	No change, but please confirm type of dump
	13 Maria Dump - Load and Haul 50%	128	m³	1,082,600.00	R	15.79	R 17,099,350.81	
	Topsoil Stockpiles							
	Rip area							Included under Rehabilitation.
	Revegetate							Included under Rehabilitation.
	Rehabilitation							
	Replace soil and spread	129	m³	247,120.20	R	9.83	R 2,428,070.72	Place topsoil to 150 mm
	Grade an area	126	ha	164.75	R	48,100.40	R 7,924,387.66	Shape to blend with surroundings
	Revegetate areas	131	Ha	164.75	R	30,365.83	R 5,002,673.56	Revegetate areas with topsoil
	Rip	134	m²	1,647,468.00	R	8.68	R 14,293,353.03	Rip to alleviate compaction
					Infrastructure Total		R 205,522,805.58	
					Rehabilitation Total		R 29,648,484.97	
					Block Total		R 235,171,290.55	
					Area Total		R 235,171,290.55	
Area 4	**Stockyards, Hard Park Areas, Contractor Camp, Roads & PCD**							
Block 4	Earthworks							
								Removed Stockyard 2 - Not included in new survey data
	Stockyard 2 - remove coal remains							Assumed to be 200mm thick.
	Grade area							Included under Rehabilitation. Replace 300mm topsoil.
	Stockyard 1 - remove coal remains	128	m³	25,065.60	R	15.79	R 395,903.83	Assumed to be 200mm thick.
	Grade area	126	ha					Included under Rehabilitation. Replace 300mm topsoil.
	PCD Backfill - Dozing	132	m³	47,382.00	R	8.64	R 409,320.69	Assumed to be 3m deep. Doze material.
	Remove Plastic Liner	113	m²	15,794.00	R	5.78	R 91,351.99	
	Demolish Concrete Trench	107	m³	187.50	R	426.57	R 79,981.43	Assume 0.1m thick. Replace 150mm topsoil.
	Hard Park 1							
	Rip area							Included under Rehabilitation. Replace 150mm topsoil.
	Hard Park 2							New Hardpark added by workshop
	Rip area							Included under Rehabilitation. Replace 150mm topsoil.
	Hard Park 3							
	Rip area							Included under Rehabilitation. Replace 150mm topsoil.
	Contractor Camp							
	Rip area							Included under Rehabilitation Replace 150mm topsoil.
	Roads							Included under Rehabilitation Replace 150mm topsoil.
	Rehabilitation							
	Grade an area	126	ha	12.53	R	48,100.40	R 602,832.75	Grading of stockpile area
	Replace soil and spread	129	m³	9,836.62	R	9.83	R 96,649.35	150mm thick. PCD, Hard Park Areas, Contractor Camp
	Replace soil and spread	130	m³	37,598.40	R	15.79	R 593,855.75	300 mm thick. Stockyard 1
	Revegetate areas	131	Ha	31.30	R	30,365.83	R 950,344.94	Where Structures Have Been Removed
	Rip Soil	134	m²	312,965.23	R	8.68	R 2,715,271.26	Hard Park Areas, Contractor Camp & Roads
					Earthworks Total		R 976,557.95	
					Rehabilitation Total		R 4,958,954.05	
					Block Total		R 5,935,511.99	
					Area Total		R 5,935,511.99	
	Total of Areas						**R243,531,172.50**	
	Monitoring Costs (Surface and Ground Water)						R1,655,200.00	
	Monitoring Costs (Vegetation)						R80,925.05	
	Maintenance Costs (Vegetation)						R4,551,455.67	
	Project Management (12%)						R29,223,740.70	
	Contingency (10%)						R24,353,117.25	
	Grand Total						**R303,395,611.17**	