APPENDIX M: FINANCIAL PROVISION

Project Reference: T014-12 29 August 2014

Tharisa Mine
Tharisa Minerals (Pty) Ltd

CALCULATION OF THE FINANCIAL CLOSURE LIABILITY FOR THARISA MINE AS PART OF EIA/EMP AMENDMENT REPORT

1. INTRODUCTION

This financial closure liability calculation is an initial estimate that has been prepared by SLR Consulting (Pty) Ltd and submitted as part of the EIA/EMP Amendment Report for the Tharisa Mine.

The calculations of the financial closure liability associated with the Tharisa Mine have been completed in accordance with the *Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine* as published by the DMR (previously known as the Department of Minerals and Energy (DME)), dated January 2005.

2. INPUT TO THE FINANCIAL CLOSURE LIABILITY CALCULATION

The DMR procedure for calculating financial closure liability is summarised as follows:

- Step 1: Determine the primary mineral and saleable mineral by-products.
- Step 2: Determine the risk class of the mine.
- Step 3: Determine the area sensitivity in which the mine is located.
- Step 4.1: Determine the level of information available for calculating the financial liability.
- Step 4.2: Determine the closure components associated with the mine.
- Step 4.3: Determine the unit rates for the associated closure components.
- Step 4.4: Determine and apply various weighting factors (site specific).
- Step 4.5: Identify the areas of disturbance.
- Step 4.6: Identify any specialist studies required.
- Step 4.7: Calculate the closure liability using the DMR template provided.

The areas shaded in grey in the following sub-chapters are the values/information used in the calculation of the current financial liability associated with Tharisa Mine.

2.1. STEP 1: MINE TYPE AND SALEABLE MINERAL BY-PRODUCT

DMR require that the type of mineral mined or processed, and the saleable mineral by-products (not trace elements) be identified.

Mine/Process type	Chrome and Platinum Mine – Opencast
Saleable mineral by-product	Chrome ore and PGM concentrate

2.2. STEP 2: RISK RANKING

According to the DMR guideline, Tharisa Mine (due to its minerals mined (chrome and platinum) and tonnages (greater than 10,000 tonnes per month)) is classified as a Class A – High risk facility.

The risk ranking class is used later to determine the multiplication factors applied to the master rate (see Step 4.3).

Primary risk ranking	Class A [1] – High risk (Large mine, greater than 10,000 tonnes per month)
Revised risk ranking	N/A

2.3. STEP 3: ENVIRONMENTAL SENSITIVITY OF THE MINE AREA

Tharisa Mine is classified as having a Medium environmental sensitivity based on the classification criteria below.

- A low biophysical sensitivity (based on the pre-mining environment of the project area).
- A medium social sensitivity (based on the proximity of the project area to local communities).
- A medium economic sensitivity (based on the area's existing economic activity).

The environmental sensitivity ranking is used later to determine the multiplication factors applied to the master rate (see Step 4.3).

[1] Class A – High risk = A high probability of occurrence of an impact with a severe consequence.

Sensitivity	Sensitivity Criteria		
	Biophysical	**Social**	**Economic**
Low	• Largely disturbed from natural state, • Limited natural fauna and flora remains, • Exotic plant species evident, • Unplanned development, • Water resources disturbed and impaired.	• The local communities are not within sighting distance of the mining operation, • Lightly inhabited area (rural).	• The area is insensitive to development, • The area is not a major source of income to the local communities.
Medium	• Mix of natural and exotic fauna and flora, • Development is a mix of disturbed and undisturbed areas, within an overall planned framework, • Water resources are well controlled.	• The local communities are in proximity of the mining operation (within sighting distance), • Peri-urban area with density aligned with a development framework, • Area developed with an established infrastructure.	• The area has a balanced economic development where a degree of income for the local communities is derived from the area, • The economic activity could be influenced by indiscriminate development.
High	• Largely in natural state, • Vibrant fauna and flora, with species diversity and abundance matching the nature of the area, • Well planned development, • Area forms part of an overall ecological regime of conservation value, • Water resources emulate their original state.	• The local communities are in close proximity of the mining operation (on the boundary of the mine), • Densely inhabited area (urban/dense settlements), • Developed and well-established communities.	• The local communities derive the bulk of their income directly from the area, • The area is sensitive to development that could compromise the existing economic activity.

2.4. STEP 4.1: LEVEL OF INFORMATION AVAILABLE

The level of information available allows DMR to either accept (and/or independently review) the financial closure liability submitted, otherwise follow the 'rule-based' approach.

Extensive	Information available must include the following: • An Approved EMP, or in the process of being approved, • A detailed Closure Plan based on the EMP, • A detailed breakdown of costs envisaged for rehabilitation and closure.
Limited [2]	Information available is less comprehensive than that given above

Since no detailed Closure Plan for Tharisa Mine has been developed and/or approved by the relevant Authorities, and hence no detailed breakdown of costs prepared and sufficiently motivated, the step-by-step 'rule-based' DMR approach for calculating closure liability should be followed.

[2] Limited information available requires that DMR follow the 'rule-based' approach (see Step 4.3).

2.5. STEP 4.2: CLOSURE COMPONENTS TO BE USED

The closure components relevant to Tharisa Mine are identified from the list below.

No.	Description of Closure Components [3]	Applicable
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	Yes
2 (A)	Demolition of steel buildings & structures	Yes
2 (B)	Demolition of reinforced concrete buildings & structures	Yes
3	Rehabilitation of access roads	Yes
4 (A)	Demolition & rehabilitation of electrified railway lines	No
4 (B)	Demolition & rehabilitation of non electrified railway lines	No
5	Demolition of housing &/or administration facilities	Yes
6	Opencast rehabilitation including final voids & ramps	Yes
7	Sealing of shafts, adits & inclines	No
8 (A)	Rehabilitation of overburden & spoils	Yes
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	Yes
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	No
9	Rehabilitation of subsided areas	No
10	General surface rehabilitation	Yes
11	River diversions	No
12	Fencing (i.e. high level security perimeter fencing)	No
13	Water management	Yes
14	2 to 3 years of maintenance & aftercare	Yes

Further details of the DMR specified closure components are summarised in Appendix C.

2.6. STEP 4.3: UNIT RATES FOR CLOSURE COMPONENTS

The unit (Master) rates for each closure component is taken from the DMR guideline (and inflated by the Consumer Price Index (CPI) to account for escalation since January 2005) and a Multiplication Factor applied depending on the Risk Ranking and the Environmental Sensitivity. The average annual percentage change in the CPI as provided by Statistics South Africa is:

January to December									upto June
2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
3.4%	4.6%	7.2%	11.5%	7.1%	4.3%	5.0%	5.6%	5.7%	3.1%

[3] The Closure Components selected are in-line with the decommissioning and closure objectives detailed in Chapter 4 and 6 of the *Environmental Impact Assessment and Environmental Management Programme Amendment Report for the Proposed Construction and Operation of a Chrome Sand Drying Plant, Changes to the Tailings Dam Design and other Operational and Surface Infrastructure Changes* (SLR Project T014-12, Report No. 2, August 2014), prepared for Tharisa Minerals (Pty) Ltd.

i.e. a total of 74.5% since January 2005 (i.e. 1.034 x 1.046 x 1.072 … etc.).

No.	Description	Unit	Master Rate (at June 2014)	Multiplication Factor [4]
1	Dismantling of process plant & related structures (incl. overland conveyors & power lines)	m³	R 11.90	1.00
2 (A)	Demolition of steel buildings & structures	m²	R 165.74	1.00
2 (B)	Demolition of reinforced concrete buildings & structures	m²	R 244.25	1.00
3	Rehabilitation of access roads	m²	R 29.66	1.00
4 (A)	Demolition & rehabilitation of electrified railway lines	M	R 287.87	1.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	M	R 157.02	1.00
5	Demolition of housing &/or administration facilities	m²	R 331.49	1.00
6	Opencast rehabilitation including final voids & ramps	Ha	R 168,709.21	0.52
7	Sealing of shafts, adits & inclines	Ha	R 88.98	1.00
8 (A)	Rehabilitation of overburden & spoils	Ha	R 115,845.83	1.00
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	Ha	R 144,283.88	1.00
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	Ha	R 419,068.79	0.80
9	Rehabilitation of subsided areas	Ha	R 97,003.43	1.00
10	General surface rehabilitation	Ha	R 91,769.43	1.00
11	River diversions	Ha	R 91,769.43	1.00
12	Fencing	M	R 104.68	1.00
13	Water management	Ha	R 34,893.32	0.67
14	2 to 3 years of maintenance & aftercare	Ha	R 12,212.66	1.00
15 (C)	Concrete slabs and light structures [5]	m²	R 154.13	1.00

2.7. STEP 4.4: WEIGHTING FACTORS TO BE USED

Weighting Factors based on the specific mine/process location are selected from the tables below.

Nature of the terrain/accessibility	Flat – Generally flat over the mine area	Undulating - A mix of sloped and undulating areas within the mine area	Rugged – Steep natural ground slopes (greater than 1:6) over the majority of the mine area
Weighting Factor 1	1.00	1.10	1.20

[4] Multiplication factor based on Risk Ranking = Class A and Environmental Sensitivity = Medium.

[5] Additional component added. Rate based on SLR's experience with similar type projects and various consultations with demolition contractors and rehabilitation practitioners.

Proximity to urban area where goods and services are supplied	Urban – Within a developed urban area	Peri-urban – Less than 150 km from a developed urban area	Remote – Greater than 150 km from a developed urban area
Weighting Factor 2	1.00	1.05	1.10

2.8. STEP 4.5: AREAS OF DISTURBANCE

The area of disturbance at Tharisa Mine is shown in Appendix A.

The current mining operations at Tharisa Mine, consists of an Eastern and Western portion, that already has the following infrastructure and mining related activities:

- East and West open pits,
- 100 ktpm chrome spiral plant and 300 ktpm platinum plant,
- Tailings storage facility (TSF 1),
- Eastern and central waste rock dumps,
- Access roads, haul roads and parking areas,
- Office and admin buildings,
- Laydown area and workshop,
- Topsoil stockpiles/berms.

Further details of the current liability for Tharisa Mine are detailed in the *Calculation of the Current Financial Closure Liability associated with Tharisa Mine as at 31 March 2014* (SLR Project 710.20002.00039, 31 March 2014).

Future infrastructure and developments, include:

- Chrome sand drying plant,
- North eastern and western waste rock dumps,
- Additional tailings storage facility, TSF 2,
- Stream diversion (that will remain post closure),
- Additional topsoil stockpiles/berms.

It is currently assumed that all plant infrastructure will be demolished and no handover of any facilities (for post closure use) has been allowed for.

Only the residential houses of the Maditlokwe community, the Tharisa Training Centre building, as well as, the low level bridge (for crossing the Sterkstroom river) and access road (12m haul road reduced to a width of 6m) are assumed to remain for post closure use. This issue still needs to formally agreed with the local municipality.

2.9. STEP 4.6: IDENTIFY CLOSURE COSTS FROM SPECIALIST STUDIES

The risk ranking identifies what type of specialist studies should be carried out to ensure successful closure of the mine and/or process operation.

Risk Ranking	Specialist Studies
Class A (High risk)	• Water pollution potential studies • Overall quantified risk assessment
Class B (Medium risk)	• Screening level risk assessment
Class C (Low risk)	

3. STEP 4.7: CALCULATE THE CLOSURE LIABILITY

The increase in the financial liability over the remaining life of mine is largely due to changes in the footprint area of the pits, waste rock dumps (WRD's) and TSF 2. These changes in footprint area are summarised in the table below.

Date	Year	East Pit		West Pit		TSF 2	Eastern WRD	Central WRD	North East WRD	Western WRD
		Open (ha)	Back-filled (ha)	Open (ha)	Back-filled (ha)	(ha)	(ha)	(ha)	(ha)	(ha)
Mar-14	Current	93.3	0	37.8	0	0	63.0	18.4	0	0
Jan-16	Year 1	104.6	0	39.8	0	46.0	78.0	52.5	0	0
Jan-17	Year 2	112.9	0	45.7	0	130.0	78.0	70.0	47.5	0
Jan-18	Year 3	117.4	1.9	48.8	0	130.0	78.0	70.0	62.0	24.0
Jan-19	Year 4	121.9	7.6	51.9	0	130.0	78.0	70.0	95.0	47.0
Jan-20	Year 5	105.3	32.9	57.1	0	130.0	78.0	70.0	95.0	58.0
Jan-21	Year 6	88.6	58.1	62.3	0	130.0	78.0	70.0	95.0	58.0
Jan-22	Year 7	86.6	67.9	57.5	11.5	130.0	78.0	70.0	95.0	58.0
Jan-23	Year 8	84.5	77.6	52.6	22.9	130.0	78.0	70.0	95.0	58.0
Jan-24	Year 9	83.8	83.8	57.1	28.4	130.0	78.0	70.0	95.0	58.0
Jan-25	Year 10	83.1	90.0	61.6	33.9	130.0	78.0	70.0	95.0	58.0
Mar-34	LOM	76.8	173.1	39.4	67.4	130.0	78.0	70.0	95.0	58.0

The anticipated ramp up in the financial closure liability at Tharisa Mine over the life of mine (at CV, as at August 2014) is summarised in the table below. The liability calculations are provided in Appendix B.

The financial closure liability associated with the unplanned closure of Tharisa Mine (as at January 2016) will be approximately R 145,471,638 (including VAT) – calculated at Current Value (CV) as at August 2014.

The financial closure liability associated with the planned closure of Tharisa Mine (as at LOM, March 2034) is anticipated to ramp up to approximately R 229,214,273 (CV including VAT).

Date	Year	Financial Liability incurred during the year (incl. VAT)	Progressive Financial Liability (incl. VAT)	Progressive Liability as a % of LOM Liability
Mar-14	Current	n/a	R 117,384,200	51.2 %
Jan-16	Year 1	R 28,087,438	R 145,471,638	63.5 %
Jan-17	Year 2	R 33,826,428	R 179,298,066	78.2 %
Jan-18	Year 3	R 8,623,513	R 187,921,579	82.0 %
Jan-19	Year 4	R 12,473,197	R 200,394,776	87.4 %
Jan-20	Year 5	R 4,196,150	R 204,590,926	89.3 %
Jan-21	Year 6	R 2,108,931	R 206,699,857	90.2 %
Jan-22	Year 7	R 2,218,723	R 208,918,580	91.1 %
Jan-23	Year 8	R 2,158,480	R 211,077,060	92.1 %
Jan-24	Year 9	R 2,344,214	R 213,421,274	93.1 %
Jan-25	Year 10	R 2,344,213	R 215,765,487	94.1 %
Mar-34	LOM	R 13,448,786	R 229,214,273	100.0 %

4. CONCLUSION

The financial closure liability for the unplanned closure of Tharisa Mine (as at January 2016) has been calculated to be approximately R 145,471,638 (CV including VAT) as per the *Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine* as published by the Department of Mineral Resources (DMR).

The financial closure liability for the planned closure of Tharisa Mine (as at LOM, March 2034) is anticipated to ramp up to approximately R 229,214,273 (CV including VAT).

The calculated liabilities are considered to be Class 1 estimates (with an accuracy of between +25% and -15%) based on the overall generic approach as stipulated by the DMR Guideline Document.

The DMR Closure Components selected are in-line with the decommissioning and closure objectives detailed in Chapter 4 and 6 of the *Environmental Impact Assessment and Environmental Management Programme Amendment Report for the Proposed Construction and Operation of a Chrome Sand Drying Plant, Changes to the Tailings Dam Design and other Operational and Surface Infrastructure Changes* (SLR Project T014-12, Report No. 2, August 2014), prepared for Tharisa Minerals (Pty) Ltd.

The financial closure liabilities only consider the routine costs associated with decommissioning of plant and infrastructure, the restoration of any environmental damage caused predominantly at the pre-production stage, the surface rehabilitation (shaping and vegetation) of waste deposits and material stockpiles, backfilling and/or making voids and open pits safe, and the maintenance and aftercare of all the rehabilitated sites.

Site specific aspects such as surface and groundwater remediation have not been costed at this stage – the likelihood of such remediation would only be identified during the ongoing operation of the mine through surface and groundwater monitoring and/or by carrying out risk assessment and water pollution potential studies. To date, there has been no indication that either surface or groundwater remediation will be required at Tharisa Mine.

Stephen van Niekerk (Pr Eng)

For SLR Consulting (Africa) (Pty) Ltd

APPENDIX A: Areas of Disturbance for Tharisa Mine

45000 50000 -2845000 -2850000

N

Legend

- Mine infrastructure Area
- Tharisa Mining Right Area
- Eskom Powerline
- Roads
- Rivers - Perennial
- Rivers - Non-Perennial
- 100m River Offset

Infrastructure Key

Approved Mine Facilities

1 Waste Rock Dump (East 1)
2 Waste Rock Dump (East 2)
3 East Mine Pit Outline
4 Waste Rock Dump (West 1)
5 Waste Rock Dump (West 2)
6 West Mine Pit Outline
7 Topsoil Berm
8 Tailings Storage Facility

Changes At The Mine - Still to be Implemented

1 Chrome sand drying plant
2 Pit high wall (East Mine)
3 Pit high wall (West Mine)
4 Waste rock dump (Western)
5 Waste rock dump (Central)
6 Waste rock dump (Eastern)
7 Waste rock dump (North Eastern)
8 Topsoil berm north of West mine
9 Topsoil berm south of West Mine
10 Road Deviation
11 Tailings storage facility

Changes At The Mine - Already Implemented

1 Topsoil berm
2 Tailings storage facility
3 Truck parking area with access loop to plant
4 Plant layout within approved plant boundary

0 500 1 000 Meters

Scale: 1 : 35 000 @ A3

Projection: Transverse Mercator
Datum: Hartebeeshoek, Lo27

THARISA PLATINUM MINES (Pty) Ltd

Figure 2

Local Setting

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APPENDIX B: Closure Liability for Tharisa Mine

SLR Consulting (Africa) (Pty) Ltd

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Current Liability (Mar 2014)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	93.3	R 168 709.21	0.52	1	R 8 185 095.95
		ha	West Pit	37.8	R 168 709.21	0.52	1	R 3 316 148.20
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	63.0	R 115 845.83	1	1	R 7 298 287.08
		ha	Central WRD	18.4	R 115 845.83	1	1	R 2 131 563.21
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	0.0	R 144 283.88	1	1	R 0.00
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 91 769.43	1	1	R 1 220 533.48
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	13.1	R 34 893.32	0.67	1	R 306 258.68
14	2 to 3 years of maintenance & aftercare	ha	All Areas	450.7	R 12 212.66	1	1	R 5 504 246.96
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	1 567	R 154.13	1	1	R 241 514.46
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 80 381 418.21
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 4 019 070.91
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 84 400 489.12
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 10 128 058.69
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 94 528 547.81
23	Contingency	10.0% of Subtotal 2						R 8 440 048.91
							Subtotal 4 (Subtotal 3 plus contingency)	R 102 968 596.72
24	VAT	14.0% of Subtotal 4						R 14 415 603.54
							GRAND TOTAL (Subtotal 4 plus VAT)	R 117 384 200.26

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 1 (Jan 2016)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
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		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	104.6	R 168 709.21	0.52	1	R 9 176 431.26
		ha	West Pit	39.8	R 168 709.21	0.52	1	R 3 491 605.78
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	52.5	R 115 845.83	1	1	R 6 081 905.90
		ha	North East WRD	0.0	R 115 845.83	1	1	R 0.00
		ha	Western WRD	0.0	R 115 845.83	1	1	R 0.00
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	46.0	R 144 283.88	1	1	R 6 637 058.64
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
		ha	West Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	14.4	R 34 893.32	0.67	1	R 337 585.90
14	2 to 3 years of maintenance & aftercare	ha	All Areas	559.1	R 12 212.66	1	1	R 6 828 099.57
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	1 567	R 154.13	1	1	R 241 514.46
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 99 614 910.34
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 4 980 745.52
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 104 595 655.86
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 12 551 478.70
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 117 147 134.56
23	Contingency	10.0% of Subtotal 2						R 10 459 565.59
							Subtotal 4 (Subtotal 3 plus contingency)	R 127 606 700.15
24	VAT	14.0% of Subtotal 4						R 17 864 938.02
							GRAND TOTAL (Subtotal 4 plus VAT)	R 145 471 638.17

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 2 (Jan 2017)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00 (Flat)**

Proximity (Weighting factor 2): **1.05 (Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	112.9	R 168 709.21	0.52	1	R 9 904 580.20
		ha	West Pit	45.7	R 168 709.21	0.52	1	R 4 009 205.63
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	47.5	R 115 845.83	1	1	R 5 502 676.76
		ha	Western WRD	0.0	R 115 845.83	1	1	R 0.00
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
		ha	West Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	15.9	R 34 893.32	0.67	1	R 370 783.41
14	2 to 3 years of maintenance & aftercare	ha	All Areas	722.3	R 12 212.66	1	1	R 8 821 206.08
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 122 778 302.55
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 6 138 915.13
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 128 917 217.68
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 15 470 066.12
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 144 387 283.80
23	Contingency	10.0% of Subtotal 2						R 12 891 721.77
							Subtotal 4 (Subtotal 3 plus contingency)	R 157 279 005.57
24	VAT	14.0% of Subtotal 4						R 22 019 060.78
							GRAND TOTAL (Subtotal 4 plus VAT)	R 179 298 066.35

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 3 (Jan 2018)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00 (Flat)**

Proximity (Weighting factor 2): **1.05 (Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	117.4	R 168 709.21	0.52	1	R 10 299 359.75
		ha	West Pit	48.8	R 168 709.21	0.52	1	R 4 281 164.87
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	62.0	R 115 845.83	1	1	R 7 182 441.25
		ha	Western WRD	24.0	R 115 845.83	1	1	R 2 780 299.84
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	1.9	R 91 769.43	1	1	R 174 361.93
		ha	West Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	16.6	R 34 893.32	0.67	1	R 388 551.09
14	2 to 3 years of maintenance & aftercare	ha	All Areas	770.3	R 12 212.66	1	1	R 9 407 413.88
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 128 683 443.07
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 6 434 172.15
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 135 117 615.23
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 16 214 113.83
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 151 331 729.05
23	Contingency	10.0% of Subtotal 2						R 13 511 761.52
							Subtotal 4 (Subtotal 3 plus contingency)	R 164 843 490.57
24	VAT	14.0% of Subtotal 4						R 23 078 088.68
							GRAND TOTAL (Subtotal 4 plus VAT)	R 187 921 579.26

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 4 (Jan 2019)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00 (Flat)**

Proximity (Weighting factor 2): **1.05 (Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	121.9	R 168 709.21	0.52	1	R 10 694 139.30
		ha	West Pit	51.9	R 168 709.21	0.52	1	R 4 553 124.11
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	47.0	R 115 845.83	1	1	R 5 444 753.85
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	7.6	R 91 769.43	1	1	R 697 447.71
		ha	West Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	17.4	R 34 893.32	0.67	1	R 406 318.77
14	2 to 3 years of maintenance & aftercare	ha	All Areas	839.6	R 12 212.66	1	1	R 10 253 751.39
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 137 224 739.12
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 6 861 236.96
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 144 085 976.08
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 17 290 317.13
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 161 376 293.20
23	Contingency	10.0% of Subtotal 2						R 14 408 597.61
							Subtotal 4 (Subtotal 3 plus contingency)	R 175 784 890.81
24	VAT	14.0% of Subtotal 4						R 24 609 884.71
							GRAND TOTAL (Subtotal 4 plus VAT)	R 200 394 775.53

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 5 (Jan 2020)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	105.3	R 168 709.21	0.52	1	R 9 237 841.41
		ha	West Pit	57.1	R 168 709.21	0.52	1	R 5 009 313.81
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	32.9	R 91 769.43	1	1	R 3 019 214.41
		ha	West Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	16.2	R 34 893.32	0.67	1	R 379 667.25
14	2 to 3 years of maintenance & aftercare	ha	All Areas	864.5	R 12 212.66	1	1	R 10 557 846.68
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 140 098 145.51
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 004 907.28
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 147 103 052.78
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 17 652 366.33
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 164 755 419.11
23	Contingency	10.0% of Subtotal 2						R 14 710 305.28
							Subtotal 4 (Subtotal 3 plus contingency)	R 179 465 724.39
24	VAT	14.0% of Subtotal 4						R 25 125 201.41
							GRAND TOTAL (Subtotal 4 plus VAT)	R 204 590 925.81

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 6 (Jan 2021)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	88.6	R 168 709.21	0.52	1	R 7 772 770.65
		ha	West Pit	62.3	R 168 709.21	0.52	1	R 5 465 503.51
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	58.1	R 91 769.43	1	1	R 5 331 804.17
		ha	West Pit (Backfilled area)	0.0	R 91 769.43	1	1	R 0.00
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	15.1	R 34 893.32	0.67	1	R 352 781.95
14	2 to 3 years of maintenance & aftercare	ha	All Areas	878.2	R 12 212.66	1	1	R 10 725 160.16
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 141 542 282.37
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 077 114.12
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 148 619 396.49
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 17 834 327.58
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 166 453 724.07
23	Contingency	10.0% of Subtotal 2						R 14 861 939.65
							Subtotal 4 (Subtotal 3 plus contingency)	R 181 315 663.72
24	VAT	14.0% of Subtotal 4						R 25 384 192.92
							GRAND TOTAL (Subtotal 4 plus VAT)	R 206 699 856.64

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 7 (Jan 2022)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	86.6	R 168 709.21	0.52	1	R 7 597 313.07
		ha	West Pit	57.5	R 168 709.21	0.52	1	R 5 044 405.33
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	67.9	R 91 769.43	1	1	R 6 231 144.63
		ha	West Pit (Backfilled area)	11.5	R 91 769.43	1	1	R 1 055 348.50
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	14.4	R 34 893.32	0.67	1	R 336 884.55
14	2 to 3 years of maintenance & aftercare	ha	All Areas	892.7	R 12 212.66	1	1	R 10 902 243.76
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 143 061 601.78
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 153 080.09
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 150 214 681.87
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 18 025 761.82
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 168 240 443.70
23	Contingency	10.0% of Subtotal 2						R 15 021 468.19
							Subtotal 4 (Subtotal 3 plus contingency)	R 183 261 911.88
24	VAT	14.0% of Subtotal 4						R 25 656 667.66
							GRAND TOTAL (Subtotal 4 plus VAT)	R 208 918 579.55

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 8 (Jan 2023)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00 (Flat)**

Proximity (Weighting factor 2): **1.05 (Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	84.5	R 168 709.21	0.52	1	R 7 413 082.61
		ha	West Pit	52.6	R 168 709.21	0.52	1	R 4 614 534.27
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	77.6	R 91 769.43	1	1	R 7 121 308.15
		ha	West Pit (Backfilled area)	22.9	R 91 769.43	1	1	R 2 101 520.06
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	13.7	R 34 893.32	0.67	1	R 320 519.58
14	2 to 3 years of maintenance & aftercare	ha	All Areas	906.8	R 12 212.66	1	1	R 11 074 442.30
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 144 539 668.91
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 226 983.45
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 151 766 652.36
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 18 211 998.28
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 169 978 650.64
23	Contingency	10.0% of Subtotal 2						R 15 176 665.24
							Subtotal 4 (Subtotal 3 plus contingency)	R 185 155 315.88
24	VAT	14.0% of Subtotal 4						R 25 921 744.22
							GRAND TOTAL (Subtotal 4 plus VAT)	R 211 077 060.10

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 9 (Jan 2024)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	83.8	R 168 709.21	0.52	1	R 7 351 672.46
		ha	West Pit	57.1	R 168 709.21	0.52	1	R 5 009 313.81
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	83.8	R 91 769.43	1	1	R 7 690 278.65
		ha	West Pit (Backfilled area)	28.4	R 91 769.43	1	1	R 2 606 251.95
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	14.1	R 34 893.32	0.67	1	R 329 403.42
14	2 to 3 years of maintenance & aftercare	ha	All Areas	922.3	R 12 212.66	1	1	R 11 263 738.57
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 146 144 920.81
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 307 246.04
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 153 452 166.85
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 18 414 260.02
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 171 866 426.87
23	Contingency	10.0% of Subtotal 2						R 15 345 216.68
							Subtotal 4 (Subtotal 3 plus contingency)	R 187 211 643.55
24	VAT	14.0% of Subtotal 4						R 26 209 630.10
							GRAND TOTAL (Subtotal 4 plus VAT)	R 213 421 273.65

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **Year 10 (Jan 2025)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00 (Flat)**

Proximity (Weighting factor 2): **1.05 (Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	83.1	R 168 709.21	0.52	1	R 7 290 262.31
		ha	West Pit	61.6	R 168 709.21	0.52	1	R 5 404 093.36
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	90.0	R 91 769.43	1	1	R 8 259 249.14
		ha	West Pit (Backfilled area)	33.9	R 91 769.43	1	1	R 3 110 983.84
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	14.5	R 34 893.32	0.67	1	R 338 287.26
14	2 to 3 years of maintenance & aftercare	ha	All Areas	937.8	R 12 212.66	1	1	R 11 453 034.84
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 147 750 172.70
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 387 508.63
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 155 137 681.33
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 18 616 521.76
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 173 754 203.09
23	Contingency	10.0% of Subtotal 2						R 15 513 768.13
							Subtotal 4 (Subtotal 3 plus contingency)	R 189 267 971.23
24	VAT	14.0% of Subtotal 4						R 26 497 515.97
							GRAND TOTAL (Subtotal 4 plus VAT)	R 215 765 487.20

Template for "rules-based" approach of the quantum for financial provision

CALCULATION OF THE QUANTUM

Mine: **Tharisa Mine**

Evaluators: **SLR Consulting (Pty) Ltd** Date: **LOM (Mar 2034)**

Risk Class: **High (Class A)** Escalation (CPI): **74.5%**

Area Sensitivity: **Medium (for Biophysical, Social and Economic Criteria)** Terrain (Weighting factor 1): **1.00** **(Flat)**

Proximity (Weighting factor 2): **1.05** **(Peri-Urban)**

No.	Description:	Unit:	Operational Area	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
				Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & power lines)	m^3	100 ktpm Plant	76558	R 11.90	1	1	R 910 934.75
		m^3	300 ktpm Plant	191393	R 11.90	1	1	R 2 277 313.07
		m^3	Chrome Plant	750	R 11.90	1	1	R 8 923.97
2 (A)	Demolition of steel buildings & structures	m^2	Fleet Parking Area	6658	R 165.74	1	1	R 1 103 518.73
		m^2	100 ktpm Plant	4174	R 165.74	1	1	R 691 812.43
		m^2	300 ktpm Plant	10435	R 165.74	1	1	R 1 729 531.09
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	100 ktpm Plant	6034	R 244.25	1	1	R 1 473 824.10
		m^2	300 ktpm Plant	15084	R 244.25	1	1	R 3 684 316.01
		m^2	Chrome Plant	100	R 244.25	1	1	R 24 425.32
3	Rehabilitation of access roads	m^2	Access and Haul Roads	223375	R 29.66	1	1	R 6 625 151.29
4 (A)	Demolition & rehabilitation of electrified railway lines	m	N/A	0	R 287.87	1	1	R 0.00
4 (B)	Demolition & rehabilitation of non electrified railway lines	m	N/A	0	R 157.02	1	1	R 0.00
5	Demolition of housing &/or administration facilities	m^2	300 ktpm Plant	6549	R 331.49	1	1	R 2 170 905.43
6	Opencast rehabilitation including final voids & ramps	ha	East Pit	76.8	R 168 709.21	0.52	1	R 6 737 570.94
		ha	West Pit	39.4	R 168 709.21	0.52	1	R 3 456 514.26
7	Sealing of shafts, adits & inclines	m^3	N/A	0	R 88.98	1	1	R 0.00
8 (A)	Rehabilitation of overburden & spoils	ha	Waste Rock Dumps near TSF 1	11.5	R 115 845.83	1	1	R 1 332 227.01
		ha	Eastern WRD	78.0	R 115 845.83	1	1	R 9 035 974.48
		ha	Central WRD	70.0	R 115 845.83	1	1	R 8 109 207.86
		ha	North East WRD	95.0	R 115 845.83	1	1	R 11 005 353.53
		ha	Western WRD	58.0	R 115 845.83	1	1	R 6 719 057.94
		ha	ROM Stockpile Pad	19.0	R 115 845.83	1	1	R 2 201 070.71
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	TSF 1	70.7	R 144 283.88	1	1	R 10 200 870.56
		ha	TSF 2	130.0	R 144 283.88	1	1	R 18 756 904.85
		ha	Dirty Water Dams	7.1	R 144 283.88	1	1	R 1 024 415.57
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	N/A	0	R 419 068.79	0.80	1	R 0.00
9	Rehabilitation of subsided areas	ha	N/A	0	R 97 003.43	1	1	R 0.00
10	General surface rehabilitation	ha	100 ktpm Plant	7.0	R 91 769.43	1	1	R 642 386.04
		ha	PGM Stockpile (at 100 ktpm plant)	7.3	R 91 769.43	1	1	R 669 916.88
		ha	Old IMEC area	7.9	R 91 769.43	1	1	R 724 978.54
		ha	Top Soil Stockpiles	37.3	R 91 769.43	1	1	R 3 422 999.92
		ha	Norite Borrow Area	1.8	R 91 769.43	1	1	R 165 184.98
		ha	Haul Roads	22.4	R 91 769.43	1	1	R 2 055 635.34
		ha	300 ktpm Plant	19.4	R 91 769.43	1	1	R 1 780 327.04
		ha	Mobile Office Establishment	0.3	R 91 769.43	1	1	R 27 530.83
		ha	Laydown Area	1.5	R 91 769.43	1	1	R 137 654.15
		ha	Fleet Parking Area	13.3	R 419 068.79	1	1	R 5 573 614.89
		ha	East Pit (Backfilled area)	173.1	R 91 769.43	1	1	R 15 885 289.19
		ha	West Pit (Backfilled area)	67.4	R 91 769.43	1	1	R 6 185 259.92
11	River diversions (to be decommissioned)	ha	N/A	0	R 91 769.43	1	1	R 0.00
12	Fencing	m	N/A	0	R 104.68	1	1	R 0.00
13	Water management	ha	In-pit evaporation dams (10% of total pit area)	11.6	R 34 893.32	0.67	1	R 271 658.46
14	2 to 3 years of maintenance & aftercare	ha	All Areas	1 025.9	R 12 212.66	1	1	R 12 528 970.40
15 (A)	Specialist study (Water pollution potential study)	Sum	All Areas	1	R 580 987.43	1	1	R 580 987.43
15 (B)	Specialist study (Overall quantified risk assessment)	Sum	All Areas	1	R 348 592.46	1	1	R 348 592.46
15 (C)	Concrete Slabs & Light Structures	m^2	TSF Infrastructure	3 134	R 154.13	1	1	R 483 028.92
		m^2	300 ktpm Plant	40 199	R 154.13	1	1	R 6 195 685.83
							Subtotal 1 (Sum of items 1 to 15 Above)	R 156 959 525.11
16	Multiply Subtotal 1 by Weighting Factor 2 (step 4.4)	5.0% of Subtotal 1						R 7 847 976.26
							Subtotal 2 (Subtotal 1 plus Weighting Factor 2 value)	R 164 807 501.37
17	Preliminary and general (P&G)	12.0 % of Subtotal 2						R 19 776 900.16
							Subtotal 3 (Subtotal 2 plus P&G item only)	R 184 584 401.53
23	Contingency	10.0% of Subtotal 2						R 16 480 750.14
							Subtotal 4 (Subtotal 3 plus contingency)	R 201 065 151.67
24	VAT	14.0% of Subtotal 4						R 28 149 121.23
							GRAND TOTAL (Subtotal 4 plus VAT)	R 229 214 272.90

APPENDIX C: Details of DMR Closure Components

1. INTRODUCTION

Generally accepted closure methods, based on experience in the field, have been used as the basis for determining the Master rates for the various closure components in the DMR "rules-based" approach.

The details enclosed in the approved EMP will however take precedence over these generally accepted closure methods.

2. GENERALLY ACCEPTED CLOSURE METHODS USED TO DETERMINE THE DMR MASTER RATE

2.1. COMPONENT 1: PROCESSING PLANT

The common method of valuation to determine the Master rate for processing plants is that:

- All infrastructure and concrete buildings should be broken down to natural ground and buried adjacent to the plant site,
- Foundations, structures and conveyors should be broken down to natural ground level,
- The areas are to be covered with 1,0m subsoil, top soiled with 300mm of topsoil and vegetation established, or as noted in the relevant EMP,
- The monitoring and maintenance of these areas has been costed under the appropriate areas,
- Top soiling and vegetation for the areas are included under general surface rehabilitation,
- No credits are allowed for scrap steel and equipment that can be re-used or sold.

2.2. COMPONENTS 2(A) AND 2 (B): STEEL AND REINFORCED CONCRETE BUILDINGS AND STRUCTURES

The common method of valuation to determine the Master rate for steel and reinforced concrete buildings and structures is that:

- All structures should be demolished to 1m below ground level,
- The rubble is to be buried adjacent to the sites, provided this adheres to the National Waste Management Strategy,
- Silos should be imploded and buried,
- The areas should be shaped, top soiled with 300mm of topsoil and vegetated or as stated in the relevant EMP document,
- Monitoring and maintenance is costed in the relevant areas,

2.3. COMPONENT 3: ACCESS ROADS

(No details provided in DMR guideline)

2.4. COMPONENT 4 (A) AND 4 (B): RAILWAYS

The valuation of the removal of railway lines is based on:-

- The removal of the ballast, sleepers and rail,
- All culverts, bridges and structures are to remain,
- No rehabilitation to the general earthworks, neither cut nor fill,
- Removal of the electrification of the railway lines, including sub-stations and signalling,
- General clean up and making certain of adequate drainage,
- No credit is allowed for second-hand rail and ballast.

2.5. COMPONENT 5: HOUSING AND ADMINISTRATION FACILITIES

Same as for Component 2(A) and 2(B): Steel and Reinforced Concrete Buildings and Structures

2.6. COMPONENT 6: OPENCAST REHABILITATION

Some form of beneficial land use is desirable after mining. Hence, in-filling of opencast pits is advocated in order to facilitate post-mining beneficial land use. In-filling normally constitutes the following modes of action:

- Concurrent in-filling and subsequent spoils rehabilitation as routinely conducted for opencast pits on collieries.
- In-filling by obtaining material from adjacent opencast pits and/or other parts of the same opencast pit as routinely conducted on iron ore mines.

Difficulties could be experienced with concurrent infilling in those cases where the ore body is limited to a single opencast pit and various grades of ore need to be sourced from the pit. This requires access to the full pit and in-filling could sterilise ore reserves. In these cases rehabilitation should be facilitated as follows:

- Excess material from the opencast pit is deposited in close proximity to the pit for in-filling of the opencast pit once the ore body has been removed.
- Excess material is deposited in such a manner in relation to the opencast pit that mine residue deposit rehabilitation can be conducted with respect to this material. In this case the opencast pit perimeter walls must still be rendered safe for humans and domestic animals. This is normally achieved by means of the following:
    - Sloping the perimeter walls of the opencast pit at 1:3 (18º) to the pit floor or to the stable groundwater level that could establish within a reasonable period within the opencast pit.
    - Providing enviro berms along the opencast pit perimeter when perimeter wall flattening is not feasible as in those cases where opencast mining has been conducted on steep mountain sides.

Notwithstanding the above, owing to removal of the mined product off-site, notably less material remains on site for pit in-filling than was originally removed from the opencast pit. This could be despite bulking of the removed material. Hence final voids with respect to most opencast pits would be unavoidable. These voids should be addressed in the same manner as making the opencast pit safe as described above.

2.7. COMPONENT 7: SEALING OF SHAFTS, ADITS AND INCLINES

The sealing of vertical and incline shafts are primarily a safety consideration and this should be conducted in such a manner that potential safety risks are largely obviated.

Normally, inert building rubble arising from the demolition of surface infrastructure should be deposited into the shafts. A mass concrete cap of 1 000 mm thickness is placed onto the building rubble deposited into the shaft. It should be noted that, in specific circumstances, dedicated engineering design and specification of these caps could be required.

Allowance should also be made for methane venting of the underground mine workings with a methane formation potential by means of strategically placed venting boreholes.

2.8. COMPONENTS 8 (A), 8 (B) AND 8 (C): OVERBURDEN AND SPOILS, PROCESS PLANT WASTE: BASIC, SALT-PRODUCING AND PROCESS PLANT WASTE: ACIDIC, METAL-RICH.

2.8.1. Component 8A: Overburden and spoils

Overburden and spoils normally have a low pollution potential and hence only need to be shaped to create a stable landform. The Master rate thus includes shaping and grassing/vegetation of the overburden and spoils.

2.8.2. Component 8B: Process plant waste: basic, salt-producing

The Master rate for basic, salt-producing process plant waste includes shaping and grassing/ vegetation of the dumps as well as establishing an armoured cover on the reshaped surface of the dump.

2.8.3. Component 8C: Process plant waste: acidic, metal-rich

The Generally accepted closure methods for acidic, metal-rich plant waste are primarily aimed at the following:

- Limiting seepage of contaminants from the processing waste deposit
- Prevention of contaminated seepage entering local surface and groundwater sources.

The Master rate includes allowances for slope modification, armouring and evaporative covers, lined pollution control dams and lined cut-off trenches.

2.8.4. Closure elements specific to 8 (A), 8 (B) or 8 (C)

Generally, average modified outer slopes of 1:3 (18°) are required. Although not specifically stated, benches at regular intervals are also required. This should ensure that the modified outer slopes between benches do not exceed 35 to 40 m in order to curb stormwater flow velocities on the outer slopes. Benches should be at least 5 m wide, sloping inwards at a slope of about 1:10.

Current generally accepted closure methods allows for a dedicated cover to be provided on the modified outer slopes of the residue deposit. The cover has to fulfil the following primary functions:

- Protection of the integrity/stability of the modified outer slope.
- Limiting the ingress of air and water into residue material that has the potential to contaminate local groundwater by means of contaminated seepage arising from the footprint area of the deposit.
- Separation of the deposited residue from uncontaminated surface runoff arising from the outer slopes of the residue deposit.
- Contribution to the aesthetic appeal of the rehabilitated residue deposit.

Covers fulfilling the above functions could be of varying nature, comprising of natural and/or synthetic material. If natural materials are to be used, current practice allows for an evaporative cover, varying in thickness between 750 and 1 000 mm, with an outer cover layer of 300 m thickness of armouring or topsoil with vegetation. The armouring also requires vegetation, but this is not essential for the long-term integrity of the outer cover layer. Depending on the nature of the deposited material covered, capillary breaker layers between the evaporative cover and the deposited material could also be required.

Current generally accepted closure methods indicates that operational pollution control dams are properly lined to prevent the migration of the contaminated water impounded in the dam to the shallow groundwater or the nearby receiving surface water environment. Mostly, synthetic (HDPE) liners are provided for this purpose. However, these liners have a finite life and eventual failure of these liners would result in the salts and other contaminants that accumulated in the pollution control dam(s) over the years to be dissipated into the receiving water environment. Hence, from a holistic view the provision of a pollution control dam served a limited function, only postponing the release of contaminants into the receiving water environment. However, contaminant release has been spread-out over a period of about 50 years, starting from mine residue deposit rehabilitation to final disintegration of the liner in the pollution control dam(s). This situation would most likely allow for an acceptable residual impact, with salt/contaminant release into the receiving water environment at a rate that does not exceed the “natural” assimilative capacity of the receiving water resource. The only exception could be extremely sensitive water resources.

Stormwater runoff arising from the upper and outer slopes of the rehabilitated residue deposit should be managed for the following primary reasons:

- Prevention of uncontrolled runoff from the residue deposit, thereby creating surface erosion and resultant damage to the cover and under extreme cases exposing the deposited material.
- Routing of the runoff arising from the rehabilitated residue deposit into the surrounding surface water drainage regime in a manner that would limit the creation of secondary erosion in the receiving surface water environment and/or possible damage to downstream surface infrastructure.
- Allowing for the control routing of the runoff collected on the rehabilitated residue deposit across cut-off, seepage or solution trenches provided to handle excess contaminated seepage from the residue deposit.

In addition to the above, upslope stormwater diversion measures could also be required to route upslope runoff past the residue deposit to prevent possible cover damage and other specific local drainage requirements. Toe paddocks could also be required along the outer perimeter toe of the rehabilitated residue deposit to capture sediment arising from the cover material whilst vegetation on the cover is still in the process of establishment.

Current practice allows for two broad approaches to handle runoff arising from the rehabilitated residue deposit. These are as follows:

- Collection of the runoff arising from the benches in chutes to route this water to the toe of the residue deposit. Chutes must be constructed from concrete or other suitable material to cater for the high flow velocities that could be encountered.
- Collection of runoff arising from the modified outer slopes on the benches itself and allowing this water to evaporate on the benches. Under these circumstances bench width could be wider than the normal 5 m width, with parapet walls provided on the outer edges of the benches. These walls must be designed for at least the 1:200 year rainfall events. The residue deposit material must also be suitable for this type of stormwater contaminant and must not be susceptible to slumping under saturated conditions.

In very sensitive environmental situations and/or where the seepage from the residue deposit could be highly contaminated, a cut-off drain around the perimeter of the residue deposit may be required. Abstraction of the seepage collected in the cut-of drain by means of pumps at predetermined spacing would be required. The collected seepage has to be routed to a pollution control dam for disposal.

2.9. COMPONENT 9: SUBSIDED AREAS

(No details provided in DMR guideline, but presumed to be similar to Component 10: General Surface Rehabilitation)

2.10. COMPONENT 10: GENERAL SURFACE REHABILITATION

Final surface rehabilitation of areas disturbed by mining and related activities should be aligned to the selected final land use.

Irrespective of the final land use, general surface rehabilitation normally should ensure the following:

- Surface topography that emulates the surrounding areas and aligned to the general landscape character. Steep slopes in excess of 6 percent should also be avoided if possible.
- Landscaping that would facilitate surface runoff and result in free draining areas. If possible, the drainage lines should be reinstated.
- An area without unnecessary remnants of structures and surface infrastructure to give the rehabilitated area a “neat” appearance. Special attention must be given to shape and/or removal of heaps of excess material being the legacy of prolonged mining and related activity.
- An area suitable for revegetation.

The unit cost for general rehabilitation allows for shaping and landscaping of disturbed areas. The Master rate allows for the shaping of material to a depth/thickness of about 500 mm. An extra over allowance in the unit cost of 50 percent has been made to cover the removal and/or destruction of surface infrastructure remnants and/or other undesirable objects such as trees, foundations, concrete slabs, etc.

2.11. COMPONENT 11: RIVER DIVERSIONS

Although not desirable, river diversions are unavoidable in some cases to allow mining, especially opencast mining, to proceed.

Wetland areas are normally associated with river diversions and during the operational period some form of riparian habitat could most likely have established within the stream diversion area. Hence considerations should be given whether a stream diversion should be changed at mine closure. This could require dedicated assessments to guide decision-making in this regard. Moreover, removal of stream diversions could result in stream flow over mined areas that could result in undesirable water quality effects.

In the event that river diversions should be removed at closure, the Master rate is the same as for general surface rehabilitation.

2.12. COMPONENT 12: FENCING

(No details provided in DMR guideline)

2.13. COMPONENT 13: WATER MANAGEMENT

Current practice is to provide in-pit evaporation dams for opencast pits. Ideally these dams should coincide with pit final voids. The dams should be sized that groundwater inflow into the pit plus rehabilitated spoils recharge can be evaporated from the dam. The dam perimeter as in the case of opencast pits must be shaped to render it safe. The same approach as for opencast pits is generally followed.

Underground mine workings has the potential to eventually fill up with water and decant. Depending on the decant mode and the type of product mined, this water could be of a poor quality. Hence provision should be made to collect and handle this water to limit degradation of water resources in the vicinity of potential decant. Collection and neutralisation (with associated metal removal) is an established management practice to deal with this water. However, the elevated salt content normally associated with this water is still a matter of concern. Hence, advanced treatment such as desalination of this water is currently considered and in some cases pilot pants have been established to assess feasibility. Treatment technologies not producing brine are currently favoured. However, this is not possible with all types of excess mine water.

It should be noted that the filling of a mine could involve a notable period of time and the required treatment capacity to handle the excess mine water could only be required decades after mine closure. Hence the future implementation of these plants most likely by third parties should also receive consideration.

Note: Costs associated with brine producing treatment technologies were also assessed. Although the capital costs associated with these technologies could be lower than for non-brine producing technologies, the operating and maintenance costs are notably higher. Hence the overall costs for water management and treatment in the guideline document are not notably different, based on the water treatment method, to warrant distinction.

2.14. COMPONENT 14: MAINTENANCE AND AFTERCARE

Maintenance and aftercare is planned for 2 to 3 years after mine production ceases, and covers:

- Annually fertilising of rehabilitated areas,
- Monitoring of surface and subsurface water quality surface,
- Control of wattle and all other alien plants,
- General maintenance, including rehabilitation of cracks and subsidence.