

APPENDIX D: IMPACT ASSESSMENT

	IMPACTS				PROBABILITY		RANKING WITHOUT MITIGATION		CONFIDENCE		IMPLEMENTATION OF MANAGEMENT MEASURES			RANKING WITH MITIGATION		DEGREE REVERSABILITY & LOSS OF RESOURCE			
	Type	Description	Cumulative	Nature	Probability (P)		Significance (A + B + C) X P		Confidence		Mitigation and/or Management Measures	Mitigation Effectiveness		Significance	Loss of Resources		Reversibility		
CONSTRUCTION PHASE																			
Atmospheric Emissions	None	Dust emissions	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Emissions from vehicles and equipment (CO ₂ , NO _x , SO _x , VOC's etc.)	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Noise	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Discharge to Water	None	Sewage	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Silt	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Surface water run-off	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Contamination of water from hazardous substances	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Disturbance of natural drainage lines	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Groundwater level changes (zone of influence)	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Groundwater Contamination	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Disturbance of aquatic ecological systems	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	Alteration of Geology	Negative	Alteration of geology	Yes	Direct	Definite	30	Medium-High	570	High	100	- Mining must occur according to the planned short, medium and long terms mining plan	Very Low	20%	Medium-High	Irreplaceable	80	Irreversible	20
	Soil Alteration	None	Loss of topsoil	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100
None		Loss of land capability	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
None		Alteration of topography	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
None		Soil pollution	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Resource Consumption	None	Electricity consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Water consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Fuel consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Raw materials consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Effects on Biodiversity	None	Loss of habitat	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of fauna	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of flora	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Degradation of ecological systems	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Disruption of natural corridors	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Incidents, accidents and potential emergency situations	Negative	Pollution incidents	Yes	Indirect	Possible	10	Low	60	Medium	50	- Environmental Awareness Training - Clean-up procedures	Very Low	20%	Low	Partial	30	High Degree	70	
	Negative	Health and safety	No	Indirect	Possible	10	Low	130	Medium	50	- Induction Training - Toolbox Talks - Supervisory appointment and reporting procedure - Emergency numbers to be displayed in a communal area - Implement appropriate warning signage of potential risks - Undertake risk assessment - Demarcate an emergency assemblage point	Very Low	20%	Low	Irreplaceable	80	Irreversible	20	
	None	Storage of hydrocarbons	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Fire	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Domestic waste	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Waste Generation	None	Construction waste	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Hazardous waste	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Visual impact	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Social	Negative	Safety and security	No	Indirect	Possible	10	Low	140	None	0	- 24 hour security must be employed - Implement security procedures - Ensure that shift changes are supervised	Very Low	20%	Low	Irreplaceable	80	Irreversible	20	
	None	Traffic disruptions	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of cultural heritage	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of sense of place	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Change of land use	No	None	None	0	None	0	None	0	- Not applicable as the existing agricultural and natural land uses are expected to remain the same	None	0%	None	No Loss	0	Reversible	100	
	None	Decline/increase in economy	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Economic	None	Decline/increase in property value	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	

	Positive	Employment	Yes	Direct	Definite	30	Low-Medium	330	High	100	- This is a positive impact, no mitigation is necessary - Appropriate procurement procedures must be followed according to the approved Social and Labour Plan ("SLP")	Very Low	20%	Low-Medium	No Loss	0	Reversible	100	
OPERATIONAL PHASE																			
Atmospheric Emissions	None	Dust emissions	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Emissions from vehicles and equipment (CO2, NOx, SOx, VOC's etc.)	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	Negative	Noise	Yes	Direct	Improbable	5	Low	20	High	100	- Save for potential unlikely vibration, little to noise is expected as mining is underground - Restrict any identified noisy activity to daylight business hours	Very Low	20%	Low	Partial	30	High Degree	70	
Discharge to water	None	Sewage	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Silt	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Surface water run-off	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Contamination of water from hazardous substances	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Disturbance of natural drainage lines	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Groundwater level changes (zone of influence)	No	None	None	0	None	0	None	0	- It is expected that there will be no impact on the groundwater levels in the mining area as there is no active aquifer at these depths of the proposed underground mining	None	0%	None	No Loss	0	Reversible	100	
	None	Groundwater Contamination	No	None	None	0	None	0	None	0	- There are numerous streams in the project area that appear to be non-perennial, the Groundwater Assessment results show that none of these streams fall within the zone of influence of the contaminant plumes and therefore it is not expected that Zondereinde will have any impact on the stream water qualities.	None	0%	None	No Loss	0	Reversible	100	
Alteration of Geology	Negative	Alteration of geology	Yes	Direct	Definite	30	Medium-High	630	High	100	- Mining must occur according to the planned short, medium and long terms mining plan	Low	40%	Medium	Irreplaceable	80	Irreversible	20	
Soil alteration	None	Loss of topsoil	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of land use capacity	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Alteration of topography	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Soil pollution	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Resource consumption	None	Electricity consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Water consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Fuel consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Raw materials consumption	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Effects on Biodiversity	None	Loss of habitat	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of fauna	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of flora	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Degradation of ecological systems	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Disruption of natural corridors	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Incidents, accidents and potential emergency situations	Negative	Pollution incidents	Yes	Indirect	Possible	10	Low	120	Medium	50	- Environmental Awareness Training - Clean-up procedures	Very Low	20%	Low	Partial	30	High Degree	70	
	Negative	Health and safety	No	Indirect	Possible	10	Low	160	Medium	50	- Induction Training - Toolbox Talks - Supervisory appointment and reporting procedure - Emergency numbers to be displayed in a communal area - Implement appropriate warning signage of potential risks - Undertake risk assessment - Demarcate an emergency assemblage point - Ensure compliance with the MHSA, including the required health and safety processes.	Very Low	20%	Low	Irreplaceable	80	Irreversible	20	
	None	Storage of hydrocarbons	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Fire	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Waste generation	None	Domestic waste	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Construction waste	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Hazardous waste	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
Social	None	Visual impact	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	Negative	Safety and security	No	Indirect	Possible	10	Low-Medium	200	Medium	50	- 24 hour security must be employed - Implement security procedures - Ensure that shift changes are supervised	Low	40%	Low	Irreplaceable	80	Irreversible	20	
	None	Traffic disruptions	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	
	None	Loss of cultural heritage	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100	

	None	Loss of sense of place	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100
	None	Change of land use	No	None	None	0	None	0	None	0	Not applicable as the existing agricultural and natural land uses are expected to remain the same	None	0%	None	No Loss	0	Reversible	100
Economic	Positive	Increase in economy	Yes	Indirect	Highly Likely	25	Medium	425	High	100	- Although the production rate will not increase, the life of mine will be extended, thereby maintaining the current economic contribution	None	0%	Medium	No Loss	0	Reversible	100
	None	Decline/increase in property value	No	None	None	0	None	0	None	0		None	0%	None	No Loss	0	Reversible	100
	Positive	Employment	Yes	Direct	Definite	30	Medium	420	High	100	- Although the production rate will not increase, the life of mine will be extended, thereby maintaining the current employment structure (this may be increased if the need arises)	Very Low	20%	Medium	No Loss	0	Reversible	100