



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Construction Phase - Reclamation sites

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation						
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	BROADBAND / 75
Construction	Construction of infrastructure and roads	Archaeology & heritage resources	The mine dump and related heritage resources will be impacted on	Neg	6.3	2	1	1	4	3	16							16
Construction	Operation of construction machinery	Groundwater quality	Spillage of hydrocarbons in the event of accidents	Neg	6.3	2	1	1	4	4	21							16
Construction	Construction of infrastructure and roads	Socio-economic	Creation of contractor opportunities	Pos	6.3	2	2	1	5	5	33							40
Construction	Construction of infrastructure and roads	Air quality	Movement of construction vehicles will result in an increase in dust levels on and around the site	Neg	6.3	2	2	1	5	5	33							27
Construction	Construction of infrastructure and roads	Noise	Construction activities will result in an increase in noise levels	Neg	6.3	2	2	1	5	5	33							27
Construction	Removal of vegetation	Flora	Removal of invasive species from the dumps	Pos	6.3	1	1	4	6	5	40							47
Construction	Removal of vegetation	Fauna	Removal of vegetation will result in the destructio of habitats	Neg	6.3	1	1	4	6	5	40							32
Construction	Construction of infrastructure and roads	Soil	Infrastructure could cause soil compaction.	Neg	6.3	2	1	1	4	5	27							21
Construction									0		0							0



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Operational Phase - Reclamation sites

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation						
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY
Operational	Removal of mine dumps	Archaeological and heritage site	This mining resources will be removed from its context, together with all associated mining heritage resources	Neg	6.4	2	1	1	4	3	16							12
Operational	Transport reclaimed material via pipeline/trucks	Groundwater	Breakage / accidental spillage of reclaimed material	Neg	6.4	2	2	1	5	3	20							4
Operational	Reclamation activities	Land capability	The land capability will improve with the removal of the material	Pos	6.4	4	1	3	8	3	32							43
Operational	Reclamation activities	Air quality	The movement of materials from the dump to the plant will increase the dust levels	Neg	6.4	3	2	2	7	5	47							32
Operational	Reclamation activities	Flora	Removal of invasive species during reclamation	Pos	6.4	1	1	4	6	5	40							47
Operational	Reclamation activities	Fauna	Removal of vegetation will result in the destruction of habitats	Neg	6.4	1	1	4	6	5	40							40
Operational	Reclamation operations	Groundwater	Wetting of dry tailings / slurry	Neg	6.4	3	2	2	7	5	47							27
Operational	Reclamation activities	Flora	Removal of natural vegetation during reclamation	Neg	6.4	2	1	4	7	5	47							37
Operational	Reclamation activities	Traffic & safety	Machinery and vehicles used on the site could lead to an increase in road and pedestrian accidents	Neg	6.4	5	2	2	9	4	48							32
Operational	Reclamation activities	Socio-economic	Creation of employment opportunities	Pos	6.4	3	3	2	8	5	53							60
Operational	Reclamation activities	Land use	Land use will change to an active mine reclamation site	Pos	6.4	3	2	3	8	5	53							0
Operational	Reclamation activities	Noise	The reclamation activities especially the water canons (if used) will increase noise levels	Neg	6.4	4	2	2	8	5	53							43

Operational	Reclamation activities	Soil	Removal of dumps will expose the natural soil layer and allow for natural vegetation to re-establish itself after rehabilitation	Pos	6.4	5	1	5	11	5	73	Ensure that all the mine material is removed from the site				5	1	5	11	5	73	
Operational	Reclamation activities	Topography	Removal of dumps will result in a change in the topography	Pos	6.4	3	3	5	11	5	73	No mitigation is necessary							0			0
Operational	Reclamation activities	Visual	Removal of dumps will cause a change in the visual aspect	Pos	6.4	4	2	5	11	5	73	No mitigation is necessary							0			0



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Operational Phase - Tailings dam

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation							
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY	Significance / 100
Operational	Operation of tailings dam	Groundwater quality	Possible leachates from the tailings dam will deteriorate groundwater quality	Neg	6.4	3	2	3	8	3	32		1	2	3	6	3	24	
Operational	Operation of tailings dam	Surface water quality	Possible leachates from the tailings dam will deteriorate surface water quality	Neg	6.4	3	2	3	8	3	32		1	2	3	6	3	24	
Operational	Operation of tailings dam	Surface water quality	Possible overflows from return water dams and trenches during continuous heavy rainfall	Neg	6.4	3	2	2	7	4	37	The surface water reticulation system should be maintained to ensure that it operates according to design		3	2	2	7	2	19
Operational	Operation of tailings dam	Noise	Increase in noise levels due to cycloning and the movement of vehicles on site	Neg	6.4	1	2	3	6	5	40	Machinery should be maintained to minimise the creation of noise.		1	2	3	6	4	32
Operational	Operation of tailings dam	Visual aspect	The height increase of the tailings dam will change the visual aspect of the area	Neg	6.4	1	2	5	8	5	53	The tailings dam should be vegetated to improve its appearance		1	2	5	8	3	32
Operational	Operation of tailings dam	Socio Economic	Health impacts on local community due to an increase in dust levels	Neg	6.4	3	2	4	9	5	60	Ensure vegetation cover is established on slopes. Minimise dry beach area of tailings dam.		3	2	4	9	4	48
Operational	Operation of tailings dam	Air quality	Increase in tailings material on the tailings dam will result in an increase in dust levels	Neg	6.4	2	2	5	9	5	60	Slopes of the tailings dam should be covered with vegetation. Dust monitoring should take place		2	2	5	9	4	48
Operational	Operation of tailings dam	Topography	The height of the tailings dam will increase causing a change in the topography	Neg	6.4	2	2	5	9	5	60	No mitigation is possible						0	
Operational	Operation of tailings dam	Soil	Degradation of soil structure under the tailings dam	Neg	6.4	3	1	5	9	5	60	No mitigation is possible						0	
Operational	Operation of tailings dam	Land capability	Decrease in land capability	Neg	6.4	2	1	5	8	5	53	No mitigation is possible						0	
Operational	Operation of tailings dam	Groundwater quality	An increase in piezometric water level and contaminant load to the subsurface can be expected because of the additional tailings that will be deposited on the existing tailings dam	Neg	6.4	4	2	5	11	5	73	Mitigation can be achieved, to a limited extent, by removing return water to lined return water dams as soon as possible		4	2	5	11	4	59



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Operational Phase - Plant

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation							
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY	Significance / 100
Operational	General plant operations	Groundwater quality	Accidental spillage of hydrocarbons could result in groundwater contamination	Neg	6.4	2	1	1	4	4	21	Spillages should be cleaned up	11.2	2	1	1	4	3	16
Operational	General plant operations	Groundwater quality	Incorrect handling and disposal of sewerage, domestic and hazardous waste.	Neg	6.4	2	2	1	5	4	27	A waste management plan should be followed to ensure that waste are disposed of according to the correct procedure	11.2	2	2	1	5	3	20
Operational	General plant operations	Interested & affected parties	Increase in noise levels and movement around the plant will impact on IAPs	Neg	6.4	1	2	1	4	5	27	Measures should be put in place to minimise impacts on IAPs in the vicinity of the plant	11.2	1	2	1	4	4	21
Operational	Transportation of reclaimed material	Soil	Leakages/breakages in the pipeline or spillages from trucks will result in soil contamination	Neg	6.4	3	2	1	6	4	32	Pipeline should be inspected regularly to prevent leakage/breakage from occurring. Truck drivers should receive adequate training	11.2	3	2	1	6	3	24
Operational	Storage of hazardous materials	Surface water quality	Failure of hydrocarbon and hazardous material storage facilities	Neg	6.4	3	2	2	7	4	37	Storage facilities should be properly maintained and banded to contain spillages	11.2	3	2	2	7	3	28
Operational	General plant operations	Groundwater quality	Failure of hydrocarbon and hazardous substance storage facilities	Neg	6.4	3	2	2	7	4	37	Storage facilities should be properly maintained and banded to contain spillages	11.2	4	2	1	7	3	28
Operational	General plant operations	Traffic & safety	Traffic to and from the site will increase due to materials being transported to the site. Vehicle movement on site will also increase. This could lead to an increase in road and pedestrian accidents.	Neg	6.4	5	2	1	8	4	43	Adequate signs should be in place and drivers and machinery operators should be made aware of the possible dangers	11.2	5	2	1	8	3	32
Operational	General plant operations	Air quality	Plant operations will cause air pollution in the form of CO, CO ₂ and NO _x emissions	Neg	6.4	2	2	3	7	5	47	Machines will be serviced, inspected and maintained properly to minimise the greenhouse gasses, such as CO, CO ₂ and NO _x emitted	11.2	2	2	4	8	4	43
Operational	General plant operations	Noise	All the activities on the plant will contribute to an increase in noise levels on and around the site	Neg	6.4	2	2	3	7	5	47	All the machinery should be fitted with silencing systems and maintained to limit noise creation	11.2	2	2	3	7	4	37
Operational	General plant operations	Socio-economic	Creation of employment opportunities	Pos	6.4	3	3	3	9	5	60	Train and recruit local people to access job opportunities. Allow small BEE companies to access procurement opportunities and provide mentorship where possible. Implement HR programmes with employees to encourage career development	11.2	4	3	3	10	5	67
Operational	General plant operations	Groundwater quantity	Existing, hard paved areas limits recharge to aquifers	Neg	6.4	2	2	5	9	5	60	No mitigation is possible					0	0	



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Decommissioning Phase - Reclamation sites

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation							
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY	Significance / 100
Decommissioning	Downscaling of workforce	Socio-economic	Loss of employment opportunities	Neg	6.5	4	2	5	11	5	73	Ensure employees are redeployed to the Knights operation, or other reclamation sites nearby. Integrate employees into LED projects and equip them with skills to locate employment outside of mining	11.3	2	2	5	9	1	12
Decommissioning	Rehabilitation	Noise	Movement of machinery on site	Neg	6.5	2	2	1	5	5	33	Measures should be put in place to limit the generation of noise		2	2	1	5	4	27
Decommissioning	Rehabilitation	Soil	Rehabilitation of the cleared area	Pos	6.5	4	1	4	9	3	36	Ensure that rehabilitation is done properly and that vegetation is re-established to prevent soil erosion		4	1	4	9	4	48
Decommissioning	Decommissioning	Socio-economic	Loss of procurement opportunities	Neg	6.5	3	3	4	10	3	40	Undertake mentorship with smaller procurement companies throughout the life of mine so as to encourage dependence on other sectors of the economy and other players within mining. Attempt to offer opportunities to suppliers at the new Benoni operation site	11.3	2	3	3	8	2	21
Decommissioning	Rehabilitation	Land capability	Rehabilitation of the cleared area	Pos	6.5	4	2	4	10	3	40	Ensure that rehabilitation is done properly to allow for development of the land		4	2	4	10	4	53
Decommissioning	Rehabilitation	Flora	Final clearance of vegetation from the site to prepare it for future development	Neg	6.5	1	1	4	6	5	40	Should the site be re-vegetated during this phase, the natural vegetation should be restored		1	1	3	5	5	33
Decommissioning	Rehabilitation	Fauna	Final clearance of vegetation from the site will result in the complete destruction of habitats on the site	Neg	6.5	1	1	5	7	5	47	Should the site be re-vegetated during this phase, it will create new habitats and fauna will move back to the area		1	1	5	7	3	28
Decommissioning	Rehabilitation	Air quality	Rehabilitation of the cleared area	Pos	6.5	3	2	4	9	4	48	Ensure that rehabilitation is done properly		3	2	4	9	5	60
Decommissioning	Rehabilitation	Traffic & safety	Movement of machinery on site	Neg	6.5	5	2	2	9	4	48	Adequate signs should be in place and drivers and machinery operators should be made aware of the possible dangers		5	2	1	8	3	32
Decommissioning	Rehabilitation	Groundwater	Rehabilitation of the tailings footprint area	Pos	6.5	2	2	4	8	5	53	No mitigation is required. Groundwater monitoring should continue.					0		0
Decommissioning	Rehabilitation	Topography	Rehabilitation of the cleared area	Pos	6.5	4	3	4	11	4	59	Ensure that rehabilitation is done properly to allow for development of the land		4	3	4	11	5	73
Decommissioning	Rehabilitation	Visual aspect	Rehabilitation of the cleared area	Pos	6.5	2	3	5	10	4	53	Ensure that rehabilitation of the cleared area is done properly to maximise this positive impact		2	3	5	10	5	67



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Decommissioning Phase - Plant

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation							
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY	Significance / 100
Decommissioning	All activities	Soil	Potential of soil contamination due to the incorrect handling and disposal of industrial and hazardous waste	Neg	6.5	2	1	1	4	3	16	Hazardous waste should be disposed of at an appropriate authorised landfill site.	11.3	2	1	1	4	3	16
Decommissioning	All activities	Soil	Potential of soil contamination due to the incorrect handling of sewerage and the removal of sewerage infrastructure	Neg	6.5	2	1	1	4	3	16	Sewerage should be handled and disposed of in a manner that will not cause soil contamination	11.3	2	1	1	4	3	16
Decommissioning	All activities	Soil	Potential of soil contamination by hydrocarbons from earth moving machinery	Neg	6.5	2	1	2	5	4	27	Hydrocarbons should be stored correctly to prevent spillages. Spillages that do occur should be removed and remediated immediately	11.3	2	1	2	5	3	20
Decommissioning	All activities	Air quality	Decommissioning activities will result in an increase in dust levels	Neg	6.5	2	2	1	5	4	27	Dust abatement techniques should be applied during the dismantling of infrastructure	11.3	2	1	1	4	3	16
Decommissioning	All activities	Air quality	Construction machines will cause air pollution in the form of CO, CO ₂ , and NO _x	Neg	6.5	2	2	1	5	4	27	Construction machines should be serviced, inspected and maintained properly to minimise the amount of greenhouse gasses being emitted	11.3	2	2	1	5	3	20
Decommissioning	All activities	Noise	Decommissioning activities will cause an increase in noise levels in the surrounding area	Neg	6.5	1	2	1	4	5	27	Vehicles and machinery should be equipped with standard silencing systems and serviced	11.3	1	2	1	4	3	16
Decommissioning	All activities	Soil	Movement of vehicles and machinery could result in soil compaction of unaffected areas	Neg	6.5	3	1	3	7	3	28	Equipment that minimises soil compaction should be used and movement of vehicles on unaffected areas should be avoided	11.3	2	1	3	6	3	24
Decommissioning	All activities	Interested and affected parties	Dust and noise impacts during decommissioning activities	Neg	6.5	3	1	1	5	5	33	Dust and noise impacts will be managed as described above	11.3	2	2	1	5	4	27
Decommissioning	Decommissioning	Topography	Dismantling of the plant will result in a change in topography	Pos	6.5	3	3	4	10	3	40	Ensure that all the infrastructure associated with the plant is removed and that the whole area is rehabilitated	11.3	4	3	4	11	4	59
Decommissioning	All activities	Surface water quality	Possible spillages of hydrocarbons from earth moving machinery	Neg	6.5	3	2	3	8	4	43	Hydrocarbon spillages should be remediated immediately	11.3	2	2	3	7	3	28
Decommissioning	All activities	Surface water quality	Possible contamination due to the incorrect handling and disposal of hazardous, industrial and domestic waste	Neg	6.5	3	2	3	8	4	43	The waste management system should be followed to ensure waste is handled and disposed of in an appropriate manner	11.3	2	2	3	7	3	28
Decommissioning	All activities	Surface water quality	Possible contamination due to the incorrect handling and disposal of sewerage	Neg	6.5	3	2	3	8	4	43	The waste management system should be followed to ensure that the sewerage is handled and disposed of in an appropriate manner	11.3	2	2	3	7	3	28
Decommissioning	All activities	Groundwater quality	Possible spillages of hydrocarbons from earth moving machines	Neg	6.5	3	3	2	8	4	43	Hydrocarbon spillages should be remediated immediately	11.3	2	2	2	6	3	24
Decommissioning	All activities	Groundwater quality	Possible contamination due to the incorrect handling and disposal of hazardous, industrial and domestic waste	Neg	6.5	3	3	2	8	4	43	The waste management system should be followed to ensure waste is handled and disposed of in an appropriate manner	11.3	2	2	2	6	3	24
Decommissioning	All activities	Groundwater quality	Possible contamination due to the incorrect handling and disposal of sewerage	Neg	6.5	3	3	2	8	4	43	The waste management system should be followed to ensure that the sewerage is handled and disposed of in an appropriate manner	11.3	2	2	2	6	3	24
Decommissioning	All activities	Traffic & safety	Traffic to and from the site will increase due to material being transported from the site. Vehicle movement on site will also increase. This could lead to an increase in road and pedestrian accidents.	Neg	6.5	5	2	1	8	4	43	Adequate signs should be in place and drivers and machinery operators should be made aware of the possible dangers	11.3	5	2	1	8	3	32
Decommissioning	Decommissioning	Socio-economic	Loss of procurement opportunities	Neg	6.5	3	3	5	11	3	44	Undertake mentorship with smaller procurement companies throughout the life of mine so as to encourage dependence on other sectors of the economy and other players within mining.	11.3	2	3	5	10	3	40
Decommissioning	Rehabilitation	Visual	Removal of all the infrastructure and rehabilitation of the impacted areas will result in a change of the visual aspect of the area	Pos	6.5	3	3	3	9	4	48	Ensure that rehabilitation is done properly and effectively	11.3	4	3	5	12	5	80
Decommissioning	Rehabilitation	Flora	Final clearance of vegetation from the site to prepare it for future development	Neg	6.5	1	1	4	6	5	40	Should the site be re-vegetated during this phase, the natural vegetation should be restored	1	1	3	5	5	33	
Decommissioning	Rehabilitation	Fauna	Final clearance of vegetation from the site will result in the complete destruction of habitats on the site	Neg	6.5	1	1	5	7	5	47	Should the site be re-vegetated during this phase, it will create new habitats and fauna will move back to the area	1	1	5	7	3	28	
Decommissioning	Downscaling of workforce	Socio-economic	Retrenchment of employees	Neg	6.5	4	2	5	11	5	73	Investigate opportunities to redeploy employees to other operations or extend the current life of mine. Integrate employees into LED projects and equip them with skills to locate employment outside of mining	11.3	3	3	5	11	3	44



ENVIRONMENTAL IMPACT SIGNIFICANCE DETERMINATION
Decommissioning Phase - Tailings

Activity and Impact Description				Positive or Negative Impact	Impact significance before mitigation						Mitigation	Impact significance after mitigation						
Mining Phase	Activity/Operation of facility	Impacted Environment	Impact		EIA Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY		Significance / 100	EMP Reference	Severity	Spatial Scale	Duration	CONSEQUENCE	PROBABILITY
Decommissioning	Closure of tailings dam	Air quality	Vegetation of the tailings dam will decrease the amount of material blown from the dump.	Pos	6.5	2	2	5	9	4	48	Ensure that the tailings dam is properly covered with vegetation to limit the amount of dust blown from the tailings	2	2	5	9	5	60
Decommissioning	Closure of tailings dam	Surface water	Increase in the amount of surface water run-off since water will not infiltrate into the tailings dam	Neg	6.5	3	2	5	10	5	67	The trench around the tailings dam should be maintained to ensure that run-off from it do not enter the environment	1	2	5	8	3	32
Decommissioning	Closure of tailings dam	Groundwater	It is anticipated that groundwater quality around the tailings dam will deteriorate because of the additional contaminant load available to seep into the underlying aquifer	Neg	6.5	3	2	5	10	5	67	Monitoring of groundwater in the vicinity of the tailings dam should continue for compliance purposes, until the groundwater system has recovered to specific catchment objectives	3	2	5	10	5	67