Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
	Rainfall ingress into the ramps	Surface runoff and rainfall directly into the ramps, voids and areas in the vicinity of the mining operations are inevitable. <u>Surface water quantity:</u> Rainfall and surface runoff into the respective ramps will cause a reduction in catchment yield towards the adjacent clean water areas.	Long-term (Operational Phase)	3	3	M	No	Yes	Managed; Mitigated
Surface water	Surface runoff ingress into mine working from remaining north-west catchment	Currently there is a small catchment area in the upper north-western section of the 2A extension area which generates clean runoff towards 2A Dam. The proposed 2A extension area will encroach the small catchment area and therefore it is important to divert and prevent the ingress of any clean surface runoff that will be generated from the remaining catchment into the mine workings. Due to the topographical characteristics and proposed structures that will prevent surface runoff ingress into the workings, the impact is considered as low.	Long-term (Operational Phase)	3	2	M	Yes	No	Avoided; Managed
	Removal of 2A dam as a result of proposed mining activities	The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit resulting in a reduced storage capacity for excess process water at Kleinkopje Colliery. <u>Surface water quantity:</u> The removal of the current 2A Dam from the Kleinkopje water management circuit will require that all sources that are currently connected to 2A Dam be rerouted to the plant return water dams or new pollution control dam. Surface water flood modelling and the average dry and wet season water balance indicated that the current plant return water dams do not have sufficient buffer capacity and storage capacity to contain excess mine process water. Significant overflow of the plant return water dams will occur resulting the mine process water discharge towards the Olifants River.	Long-term (Operational Phase)	5	4	H	Yes	No	Mitigated; Managed
		As per the scenarios presented in the water balances in Section 5 of the Hydrology report (Storm water management plan) (Annexure E4), for both wet and dry season scenario, a significant volume of excess water has been calculated to report to 2A Dam. It is however believed that significant seepage from 2A Dam occurs that is reflected in the high	Long-term (Operational Phase)	5	2	M (Positive impact after mitigation)	Yes	No	Mitigated; Managed

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		dewatering volume and subsequently also in the excess water. All seepage is contained in the underground affected water system and pumped back to surface for safe continuation of mining activities. <u>Surface water quantity:</u> The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit. Should 2A Dam in future be replaced with a facility designed to minimise seepage (e.g. membrane or clay of high plasticity), the dewatering requirements could substantially reduce. The management requirements for dewatering operations would also be simplified and the associated costs associated with dewatering will substantially reduce.							
Groundwater	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) • Construction of new pollution control dam	Site clearing and removal of topsoil, may lead to ponding of surface water in the cleared areas during the wet season and could potentially lead to increased infiltration to aquifers. Groundwater quality impacts during the construction phase are expected to be insignificant if the proposed management measures are implemented. The stripping and stockpiling of topsoil and subsoil from the pit and infrastructure surface areas is considered negligible since no chemical interaction is envisaged that could have an adverse impact on groundwater quality. The stripping of topsoil before the advancing pit may result in a very slight increase in groundwater recharge, which is a slight positive effect on the groundwater environment. The duration of the activity is however so limited that the effect will not be measurable. The construction of the above mentioned infrastructure will cause a very small reduction in recharge to the aquifer due to the compaction of the surface area. This impact is countered by the fact that vegetation clearing may result in ponding and slight increases in recharge. Runoff water will contribute to the catchment yield. Carbonaceous material found within the mine lease area has the potential to generate acidic leachate, which means that	Short-term (Construction Phase)	3	3	M	Yes	No	Avoided; Managed

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		any construction undertaken with carbonaceous material may be a potential source of poor quality leachate.							
Groundwater	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Blasting activities may impact negatively on the groundwater quality if significant amounts of explosives are spilled or incompletely detonated. The chemical residues in the form of NH_4 and NO_3 may potentially leach to the groundwater table. Any nitrogen contamination that may occur will be localised within the pit area during the operational phase, due to the dewatering activities within the pit acting as a sink preventing plume migration.	Long-term	4	4	H	Yes	No	Avoided; Managed
	Construction and operation of pollution control dam / upgrading of Plant Return Water Dam	Poor quality seepage from unlined return water/dirty water dams is inevitable and could have the following consequences on the local groundwater regime: • Groundwater mounding directly underneath the dam/s. • Downstream movement of a pollution plume within the weathered zone aquifer. It should be noted that the preferred option is the construction and operation of a new pollution control dam (refer Annexures D and E4). The new pollution control dam will be lined facility. The alternative option considered during the process relates to the upgrading and use of the existing Plant Return Water Dam. The Plant Return Water Dam is an unlined facility. Therefore, the two options have been rated separately (below).							
		New pollution control dam at sites 1; 2; 3; 4 or 5 (lined)	Long-term	4	2	M	Yes	No	Avoided
		Upgrading and use of existing Plant Return Water Dam (unlined)		4	4	H			
	Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	Acid base accounting data reviewed[51] showed that a likely possibility exists for AMD development from the overburden and coal seams. During the operational phase of mining, the impact on pit and PCD quality is believed to be moderate given the short residence time and contact with carbonaceous material of water in the pit. If the PCD is unlined contamination of the upper weathered or perched aquifer may occur but migration thereof will be limited during the LoM given the hydraulic conductivities of the Karoo type aquifer. Due to the pit acting as a sink during the operational phase, no seepage from the pit towards adjacent aquifers (plume migration) is likely to occur. Overburden of stockpiles and backfilling have the potential to pollute aquifers.	Long-term (permanent if not mitigated appropriately)	2	3	M	Yes	No	Mitigated; Managed
	Dewatering activity: Pumping of water collecting in the open pit extension area	During the operational phase the open pit mining will be active which will cause the dewatering of the surrounding aquifer(s), the degree of which will depend upon the depth and extent of the open pit. The aquifers affected by the cone of depression	Long-term (impact only expected during operational phase extending to rehabilitation and closure	2	3	M	Yes[52]	No	Avoided; Mianaged

[51] Landau Colliery data

[52] Aquifer dewatering cannot be prevented but surface water inflow into the pit can be reduced by implementing efficient storm water management.

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		will depend on the final depth of the pit. It is expected that the pit will not exceed a depth of 60 m. No privately owned boreholes are situated within the modelled cone of depression.	phases until equilibrium is reached)						
Groundwater	Backfilling activity - Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	A pollution plume will start to migrate during the decommissioning and closure phases when mining and dewatering has ceased. The following impacts may be expected: • Deterioration of groundwater quality within the backfilled opencast mine workings due to AMD reactions. • Downstream movement of a groundwater pollution plume. • Decant may occur at the lowest topographical point. • Risks towards receptors are deemed to be low due to absence of privately owned boreholes or natural rivers/streams in the near vicinity. Plume will start to migrate during decommissioning and closure when dewatering has ceased but dilution of the contaminant/s and absence of significant receptors reduces the final impact.	Long-term	2	3	M	Yes[53]	No	Managed
Sensitive landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	**Loss and disturbance of wetland habitat – Construction** All wetland habitats falling directly within the mining footprint will be permanently destroyed by the proposed opencast mining activities. This amounts to the direct loss of roughly 145 hectares of wetland habitat (and a further 22.7 ha of dam habitat), consisting mostly of hillslope seepage wetland habitat that has been largely modified (PES D) and which is considered of Moderate importance and sensitivity. A haul road will also be constructed around the northern and western edge of the proposed opencast pit and will cross the hillslope seepage wetland remaining upslope of the opencast pit. This will further contribute to the loss and degradation of wetland habitat.[54]	Permanent	5	4	H	No	Yes	Mitigated; Managed

[53] Recharge will largely return to ambient conditions after rehabilitation. Dilution with fresh recharge will return groundwater quality back to ambient conditions after rehabilitation, but could take decades to achieve.

[54] It is however probable that construction activities will result in further disturbances to wetland habitat outside the direct development footprints through activities such as temporary stockpiles, construction camps, vehicle turning circles, unauthorised hunting/poaching activities etc. extending beyond the development footprint. This could lead to disturbances and resultant degradation of the adjacent wetland habitat. Given the distance between the proposed activities and the wetland boundaries, this impact is considered to be of low probability.

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		Although a wetland system can be recreated over the mined out area, this wetland will differ in terms of hydrological drivers, seasonality and species composition from the natural system.							
Sensitive landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	**Increased sedimentation in adjacent wetlands – Construction** Construction activities associated with the opencast pit and associated activities (including the haul road, stockpiles and required PCD) will involve the clearing of large areas of soil, as well as the movement of soil and overburden with subsequent stockpiling. This will expose large areas and large volumes of soil to erosion by wind and water, which will likely be aggravated by an increase in surface runoff from bare soil areas and concentration of flows. Sediment could be transported downslope via surface runoff to the adjacent wetland areas, leading to: • Increased turbidity with resultant impacts on aquatic habitats, including loss of sensitive species; and • Increased sediment deposition in wetlands, leading to habitat degradation as these areas become colonised by alien and pioneer species. Severe sedimentation could also impact flow distribution within the wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Long-term	2	3	M	Yes	No	Avoided; Managed
		Increased turbidity and water quality deterioration – Construction During the construction phase, as activities are taking place adjacent to wetlands, there is a possibility that water quantity and quality can be impaired through contaminated surface runoff entering the wetlands. Typically, impairment will occur as a consequence of sediment disturbance resulting in an increase in turbidity. Water quality may also be impaired as a consequence of accidental spillages and the intentional washing and rinsing of equipment within the wetlands. It is possible that hydrocarbons will be temporarily stored and used on site, as well as cement and other potential pollutants.	Long-term	2	3	M	Yes	No	Avoided; Managed

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project							
Sensitive landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining (including stockpiling)	**Decreased flows within adjacent wetlands – Construction** The opencast pit and associated surface infrastructures will be designated a dirty water area and as such will be isolated from the surrounding catchment. In addition, the opencast pit will intercept any shallow subsurface seepage from upslope. Water inputs to downslope wetlands could thus decrease, resulting in partial desiccation of these systems. However, in the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. The 2A Dam is already classed as a dirty water systems and is isolated from downstream water resources. There will therefore be no further reduction in flow to downstream wetlands and water resources.	Long-term	2	2	L	Yes	No	Avoided; Managed
		Increased sedimentation in adjacent wetlands – Operation Various stockpiles will be required as part of the proposed mining activities, including overburden and topsoil stockpiles. Such stockpiles will be characterised by bare soil, steep side slopes that generate significant surface run-off. Run-off from these stockpiles is likely to be sediment rich. Where run-off from these stockpiles enters adjacent wetlands, sediment will be deposited and changes in vegetation are likely to occur, with pioneer species such as *Typha capensis* and *Phragmites australis* or other weedy species likely to become dominant. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Long-term	2	3	M	Yes	No	Avoided; Managed

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
Sensitive landscapes (Wetlands	Vegetation clearing; earthworks; opencast mining	**Water quality deterioration – Operation** Mining and related activities that could lead to water quality deterioration in adjacent water resources via a number of pathways: • Ineffective clean and dirty water separation; • Storm water typically contains various pollutants that could contribute to deteriorating the water quality in the wetlands where storm water is released into such as the valley bottoms; • Potential discharge of contaminated water; • Decant points from the mine workings; • Leakage/seepage/overflow out of pollution control dams; and • Overflow of dams from water treatment plant directly into the seepage wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project	Short-term[55]	3	3	M	Yes	No	Avoided; Mitigated
	Rehabilitation of opencast pit	**Altered hydrology – Decommissioning and Closure** Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are	Permanent	5	4[56]	H	No	Yes[57]	Mitigated; Managed

[55] Unless spills are exceptionally large

[56] Specialist's rating for magnitude has been rounded off to "4"

[57] Potentially irreversible

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		expected to decrease, reducing low flows and increasing seasonality.							
Sensitive landscapes (Wetlands	Rehabilitation of opencast pit	**Increased sediment transport into wetlands – Decommissioning and Closure** The rehabilitated mine impacted areas will be susceptible to erosion following rehabilitation, especially in areas that are sparsely vegetated and/or steep sloped areas. This will result in increased sediment loads in the downslope wetlands, leading to deteriorating water quality (increased turbidity and TSS) and changes in the aquatic fauna and flora. Changes in wetland vegetation can also occur as sediment thriving plants (e.g. *Phragmites australis*) become dominant. As a watercourse across the rehabilitated area will be reinstated, sediment rich flows derived from the rehabilitated area would be discharged into the Olifants River.	Long-term	2	3	M	Yes	No	Avoided; Managed
		Increased in alien vegetation – Decommissioning and Closure Following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A Pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems.	Long-term	5	3	H	Yes	No	Mitigated; Managed
		Altered hydrology – Post-Closure Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope	Permanent	5	4[58]	H	No	Yes[59]	Mitigated; Managed

[58] Specialist's rating for magnitude has been rounded off to "4"

[59] Potentially irreversible

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality							
Sensitive landscapes (Wetlands		**Water quality deterioration – Post-Closure** Post-mining, the backfilled opencast pit is likely to fill with water as groundwater levels rebound. Opencast mining permanently destroys the aquitard and strata supporting the perched water table, resulting in increased infiltration of surface water, with infiltration values of 14-20% of rainfall being recorded for rehabilitated opencast mines compared to only 1-3% under natural conditions. Water in the pits is expected to become acidic and sulphate rich due to the oxidation of pyrites in the backfilled spoils. Decanting water could potentially be acidic and is likely to be metal and sulphate rich. Decant will eventually enter the Olifants River and downstream Witbank Dam, which are already water quality stressed systems. Acidic, sulphate rich water is likely to lead to a loss of sensitive species (including sensitive aquatic fauna as well as sensitive flora such as orchids) within the affected water courses and result in changes in species composition, with salinity tolerant species likely to become dominant.	Long-term	5	4	H	Yes	No	Mitigated; Managed
	Recreation of a watercourse with wetland habitat across the rehabilitated 2A Pit area as well as rehabilitation and protection of identified pans (as part of mitigation to compensate for the proposed wetland loss)	**Positive effect from the re-creation of a watercourse with wetland habitat across the rehabilitated 2A Pit area as well rehabilitation and protection of identified pans)[60]** A positive impact is expected from the recreation of a watercourse with wetland habitat across the 2A Pit area as well as the rehabilitation and protection of two representative pans of the area. The mentioned pans as well as the re-instatement of flow to the Olifants River from the 2A Dam sub-catchment are considered important from a biodiversity support perspective. This sub-catchment is currently an isolated dirty water catchment which, following rehabilitation, will again be a clean water catchment linked to the Olifants	Permanent (Positive)	Positive			N/A	N/A	N/A (Positive)

[60] Development and implementation of a detailed Wetland Mitigation Strategy as recommended in Annexure E3 (Wetland Baseline and Mitigation Report) (Wetland Consulting Services, 2016)

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		River and downstream water resources. Although the re-created watercourse will not resemble the wetland habitat being lost to mining, the re-created water course can be design to re-instate specific desired functions to the landscape, including biodiversity support, flood attenuation and sediment trapping.							
Air quality	• Clearance of vegetation • Removal and stockpiling of topsoil and overburden • Construction of haul roads • Construction of pollution control dam • Construction of storm / process water management measures	**Impacts during site establishment:** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment.	Short-term (Construction Phase)	5	2	M	Yes	No	Avoided; Mitigated; Managed
	• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Use of haul roads within and around the open pit extension area(s) • Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	**Impacts during mine operation (extension):** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Kleinkopje Colliery is an opencast mine, contributing significantly to surface dust fallout. The inherent air quality of the area is considered poor and is impacted on by the activities of adjacent collieries, industry, and vehicle use and veld fires. Furthermore, dust generation occurs from the existing opencast operations on-site. The operational phase would result in continued air quality related impacts due to the progressive development of the opencast pit. The following activities may pose a fire risk on-site, if not management appropriately: • Maintenance activities. • Storage, off-loading and refuelling of hazardous substances (e.g. hydrocarbons (diesel and oil), chemicals etc.). • Operation and handling of explosives • Waste management activities. Furthermore, the risk of spontaneous combustion exists.	Long-term	5	2	M	Yes	No	Avoided; Mitigated; Managed

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (Operational Phase) • Rehabilitation activities during Decommisioning Phase – Haul road, Pollution Control Dam, Klippan Co-disposal Facility and Pit 2A Extension (re-shaping of final void, removal of infrastructure, replacement of topsoil and re-vegetation). • This further includes dust generation from vehicle movement along unpaved roads.	**Impacts during site rehabilitation:** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Impacts during the Decommissioning- and Closure Phase are anticipated to be short-term in nature.	Short-term to medium-term	3	2	M	Yes	No	Avoided; Mitigated; Managed
Noise, air blast and ground vibration	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting) • Construction and use of haul roads within and around the open pit extension area(s) • Construction of pollution control dam and storm water management measures	The study area is characterised by the presence of existing noise sources. There are major coal mining activities within the surrounding area (including Greenside Colliery and Landau Colliery). The proposed project is not expected to worsen the noise levels of the study area as it would be a continuation of the current Pit 2A mining activities. The current ambient noise levels are characterised by the presence of mining and related activities, and road traffic related noises. Noise levels at the proposed site are expected to be the same as that of the current Pit 2A.	Long-term	5	2	M	Yes	No	Avoided; Managed

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		Ground vibration and air blast from the existing Kleinkopje Colliery operations (including Pit 2A) are monitored on a monthly basis. The results from the latest (August 2016) report (Annexure E8) indicated that levels of ground vibration recorded at privately owned structures or houses were within the limits and within the safe blast criteria, the levels recorded at the Dam Wall were within the ground vibration limit and acceleration limits, except for one event which just exceeded the vibration limit. Air blast levels recorded were within the accepted levels currently applied in South Africa of 134 dB at the structures monitored, except for eleven events that were greater than the limit. The possibility of damage is unlikely due to ground vibration and / or air blast at the surrounding structures / buildings. No damage was observed or reported after the blast. Since the Pit 2A Extension will be a continuation of the current Pit 2A operation, the possibility of blasting impacting on structures within and surrounding the mine, still remains.	Short-term to Long-term	4	2	M	Yes	No	Avoided; Mitigated
Visual aspects	• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	The visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area. During the decommissioning phase, final voids and ramps will be profiled and vegetated thus reducing the impact on visual aesthetics. Filled final voids will progressively be cladded by stockpiled soils. Haul roads will be ripped, shaped and re-vegetated. Vegetation cover on rehabilitated land will reduce fugitive dust generated. Visual impact of final voids will be reduced due to vegetative cover (approved EMPr, 2012).	Long-term	5	2	M	Yes	No	Mitigated
	• Continuation of the disposal of mine residue within the existing footprint on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	The visual quality (and 'sense of place') of the environment associated with the existing Klippan Co-disposal site has already been altered due to continued deposition activities on	Permanent	5	2	M	No[61]	Yes	Mitigated; Managed

[61] It is anticipated that the Klippan Co-Disposal Facility will be rehabilitated in-situ and will thus remain after Closure

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		the mentioned facilities as per Kleinkopje Colliery's approved EMPr, 2012. The continuation of the deposition of mine residue on the co-disposal facility during the activities undertaken at the Pit 2A Extension will result in the continued visual impact posed by the establishment and development of the facility.							
	• Site clearance • Construction and use of pollution control dam	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the visual impact it may pose in terms of visual aesthetics, depending on sensitive receptors, distance and viewing lines from roads etc. Therefore, the visual impact associated with the six site alternatives have been rated separately below. It should however be noted that, in general, the visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area and Kleinkopje Colliery as a whole, has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area.							
		Pollution Control Dam: Alternative Site 5 (preferred alternative)	Long-term	3	1	L	Yes	No	Mitigated; Managed
		Pollution Control Dam: Alternative Site 1		5	2	M			
		Pollution Control Dam: Alternative Site 2		5	2	M			
		Pollution Control Dam: Alternative Site 3		3	1	L			
		Pollution Control Dam: Alternative Site 4		5	2	M			
		Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam)		3	1	L			
Protected areas and conservation planning	• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation.	The Kleinkopje Colliery mining area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area, as portrayed in the Mpumalanga Biodiversity Conservation Plan 2013 (MBSP 2013) terrestrial biodiversity assessment which classifies large parts of the study area as having no natural habitat remaining (Wetland Consulting Services, 2016) (Annexure E3). An area classified as a Critical Biodiversity Area (CBA) Optimal (Critical Biodiversity Area Optimal) is however indicated as occurring within the northern corner of the proposed opencast pit extension area (refer Figure 26).	Long-term to permanent[62]	4	2	M	No[63]	Yes	Mitigated; Managed

[62] The impact is rated as medium (before mitigation) due to the study area already having been modified and impacted on (as per description above).

[63] Based on a small section of open pit area to be located within CBA Optimal. However, refer to discussions above regarding the positive opportunity relating to the re-instatement of the watercourse to the Olifants River.

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		A number of impacts on the study area were observed on site by the wetland specialist: • Mining activities in and downstream from the direct catchment of the area, • Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area); • Contaminated seepage with elevated salinities from the adjacent discard dump; • Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area; • Numerous trenches cross the study area, diverting and intercepting flows; • A number of old excavations occur within the study area; • Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area; • Numerous roads and tracks cross the study areas; and • Impoundment of flow in dams and upstream of road crossings. It is also important to note that the remainder of the CBA area (to the north-east of the proposed extension application area) has been earmarked for mining activities of the current authorised Pit 2A as per the mine plans contained in Kleinkopje Colliery's approved EMPr, 2012. Refer to Figure 3 showing the authorised Pit 2A currently being mined, including the proposed Pit 2A Extension.							
	• Site clearance • Dewatering activity: Pumping of water collecting in the open pit extension area	It is not anticipated that the dewatering pipeline will cross over the identified CBA area(s) within and in close proximity to the study area (refer to Figure 26). Therefore, no impact in terms of protected areas and conservation planning is envisaged from the placement of the dewatering pipeline.	Long-term	1	1	L	Yes	No	Mitigated; Managed
	• Site clearance • Construction and use of pollution control dam	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the impact it may pose in terms of protected areas and conservation planning, depending on the location of such PCD sites in relation to critical biodiversity areas or ecological support areas. Therefore, the impact associated with the six site alternatives have been rated separately below.							
		Pollution Control Dam: Alternative Site 5 (preferred alternative) – Not located in CBA / ESA	Long-term	1	1	L	Yes	No	Avoided

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		Pollution Control Dam: Alternative Site 1 - Not located in CBA / ESA.	Long-term	1	1	L	Yes	No	
		Pollution Control Dam: Alternative Site 2 – Located close to CBA Optimal	Long-term	5	2	M	Yes	No	
		Pollution Control Dam: Alternative Site 3 - Not located in CBA / ESA.	Long-term	1	1	L	Yes	No	
		Pollution Control Dam: Alternative Site 4 – Located in ESA Protected Area buffer	Permanent	5	3	H	No	Yes	
		Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam) – Not located in CBA / ESA	Long-term	1	1	L	Yes	No	
Archaeology (Heritage resources)	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and use of pollution control dam	The Phase I HIA study for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area(s), namely (Figure 26): • One graveyard in the Pit 2A Extension mining (application) area (GY01). • Two graveyards directly outside the Pit 2A Extension mining (application) area (GY02, GY03). GY01 will be affected by the Pit 2A Extension Project. GY02 and GY03 fall outside the footprint of the Pit 2A Extension Project and will not be affected by the proposed Pit 2A Extension Project. All graveyards and graves can be considered to be of high significance and are protected by various laws. According to the specialist, all the graveyards hold graves which are older than sixty years. The identified archaeological sites are rated separately, below. No sites of archaeological importance were identified within the proposed pollution control dam study area (refer to Figure 26).							
		GY01 Footprint of the proposed extension of Pit 2A will destroy GY01 with at least five graves.	Permanent (if not mitigated)	5	3	H	Yes	No	Avoided
	Refer above.	**GY02 and GY03** GY02 and GY03 are located outside the Pit 2A Extension Project area and no impact due to the proposed activities are anticipated on these sites.	If any impact – Long-term (during Life of Mine)	1	1	L	Yes	No	Avoided; Managed
Palaeontology	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water	The potential negative impacts of the proposed project on the palaeontological heritage of the area are: • Damage or destruction of fossil materials during the construction of project infrastructural elements to a maximum depth of those excavations. Many fossil taxa (particularly vertebrate taxa) are known from only a single fossil and, thus, any fossil material is potentially highly significant. Accordingly, the loss or damage to any single fossil can be potentially significant to the understanding of the fossil heritage of South Africa and to the understanding of the evolution of life on earth in general. • Where fossil material is present and will be directly affected by the building or construction of the projects infrastructural elements the result will potentially be the irreversible damage or destruction of the fossil(s). • Movement of fossil materials during the construction phase, such that they are no longer *in situ* when discovered. The fact that the fossils are not *in situ* would either significantly reduce or completely destroy their scientific significance. • The loss of access for scientific study to any fossil materials present beneath infrastructural elements for the life span of the existence of those constructions and facilities.							

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
	management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and use of pollution control dam	The sediments of the Vryheid Formation are noted for containing an important palaeontological heritage particularly in respect of plant macrofossils of the Glossopteris flora. In general, the occurrence of fossils within the geological record is erratic in general and the chance of impacting upon most macrofossil types at any particular point within the Vryheid Formation is low. However, the presence of plant macrofossils being present within the Vryheid Formation strata being mines in Kleinkopje Colliery was confirmed in Section 7.1.2 of the Palaeontological Report in Annexure E2 of the EIAR / EMPr. Each of the three project infrastructure elements will affect the Vryheid Formation to differing degrees and, as such the probability of them negatively affecting the palaeontological heritage of the Vryheid Formation were assessed separately (below).							
		<u>Pit 2A Extension area:</u> The entire remaining thickness of the Vryheid Formation will be impacted by the mining activities. The entire vertical and aerial extent of the rocks of the Vryheid Formation within the planned mine void will be permanently and irredeemably impacted by the mining activities.	Long-term to Permanent	5	4[64]	H	No	Yes	Managed
		<u>Pollution Control Dam:</u> The PCD will be constructed upon land that has previously been subjected to mining activities and the void subsequently in-filled with mine waste rock and rehabilitated. As a direct result, the construction of the PCD will not impact directly upon any *in situ* Vryheid Formation rocks		1	2	L	No impact	No impact	Avoided; Managed
		<u>Haul road[65]:</u> The direct effect of the construction of the road will be restricted to the upper-most >1 m of the land surface. In all portions of the haul road route the site investigation the land surface bore a well-developed, apparently thick regolith cover. It is unlikely that the construction of the haul road would directly impact upon the Vryheid Formation.		1	2	L	No impact	No impact	Avoided; Managed
Socio-economic aspects	Continuation of mining and related activities at Kleinkopje Colliery (through the mining of the Pit 2A Extension area)	**Mining / Development Option: Positive Impact** The continuation of operations at Kleinkopje Colliery (i.e. the mining of the Pit 2A Extension area) will ensure continued job security for the mine's current employees and contractors, along with the continued and benefits for the local community arising from the Social and Labour Plan (SLP).	Long-term	Positive			N/A	N/A	NA (Positive)
		No-go Option: Negative Impact Should the Environmental Authorisation not be granted for the proposed Pit 2A Extension, the Life of Mine associated with Pit 2A will not be extended and several jobs may be lost. Skills development may cease and the ore body will remain *in situ* and unutilised	Long-term	4	3	H	Yes	No	Managed

[64] Rating for magnitude provided by specialist rounded off to "4"

[65] And dewatering pipeline that will be located within haul road footprint

Environmental component	Activity	Impact description	Duration	Pre-mitigation[49]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		The impacts on other environmental features as identified in sections above (e.g. dust generation; noise; blasting and vibration; visual aspects etc.) may also pose an impact on surrounding communities and I&APs. However, mining is already undertaken at the existing Pit 2A, as well as the remainder of Kleinkopje Colliery and at other mines within the surrounding area. The existing mining activities at Kleinkopje Colliery and the large number of opencast coal mines in the region, together with the historical nature of the mining in the Emalahleni region (over 100 years of mining history) will most likely have desensitised local residents and frequent travellers through the area.	Short-term to Long-term	3	2	M	Yes	No	Avoided; Mitigated; Managed
	Cessation of mining activities at Pit 2A (including the Pit 2A Extension)	During and subsequent to the cessation of mining activities at Pit 2A (and its extension) a loss of jobs may occur which may not only impact on the employees but on the socio-economic status of the local community and economy.	Long-term Post-Closure	4	3	H	Yes[66]	No	Mitigated; Managed

[66] If the implementation of the various training and economic projects contained in the SLP are effective

7.6 Methodology used in determining and ranking potential environmental impacts and risks

7.6.1 Methodology applied

The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Impact assessments should be conducted based on a methodology that includes the following:

- Clear processes for impact identification, predication and evaluation;
- Specification of the impact identification techniques;
- Criteria to evaluate the significance of impacts;
- Design of mitigation measures to lessen impacts;
- Definition of the different types of impacts (indirect, direct or cumulative); and
- Specification of uncertainties.

After all impacts have been identified, the nature and scale of each impact can be predicted. The impact prediction will take into account physical, biological, socio-economic and cultural information and will then estimate the likely parameters and characteristics of the impacts. The impact prediction will aim to provide a basis from which the significance of each impact can be determined and appropriate mitigation measures can be developed.

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway and the target that experiences the risk (receptor). Refer to Figure 85 below for a model representing the above principle (as contained in the DWA's Best Practice Guideline: G4 – Impact Prediction.

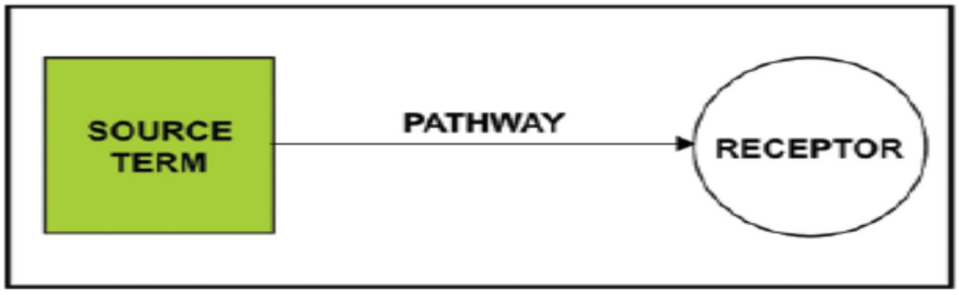

Figure 85: Impact prediction model

Table 66 and Table 67 below indicate the methodology to be used in order to assess the Probability and Magnitude of the impact, respectively, and Table 68 provides the Risk Matrix that will be used to plot the Probability against the Magnitude in order to determine the Severity of the impact.

Table 66: Determination of Probability of impact

SCORE	FREQUENCY OF ASPECT / UNWANTED EVENT	AVAILABILITY OF PATHWAY FROM THE SOURCE TO THE RECEPTOR	AVAILABILITY OF RECEPTOR
1	Never known to have happened, but may happen	A pathway to allow for the impact to occur is never available	The receptor is never available
2	Known to happen in industry	A pathway to allow for the impact to occur is almost never available	The receptor is almost never available
3	< once a year	A pathway to allow for the impact to occur is sometimes available	The receptor is sometimes available
4	Once per year to up to once per month	A pathway to allow for the impact to occur is almost always available	The receptor is almost always available
5	Once a month - Continuous	A pathway to allow for the impact to occur is always available	The receptor is always available

***Step 1**: Determine the **PROBABILITY** of the impact by calculating the average between the Frequency of the Aspect, the Availability of a pathway to the receptor and the availability of the receptor.*

Table 67: Determination of Magnitude of impact

Score	SOURCE				RECEPTOR	
	Duration of impact	Extent	Volume / Quantity / Intensity	Toxicity / Destruction Effect	Reversibility	Sensitivity of environmental component
1	Lasting days to a month	Effect limited to the site. (metres);	Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha)	Non-toxic (e.g. water) / Very low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes will remain unaltered.	Current environmental component(s) are largely disturbed from the natural state. Receptor of low significance / sensitivity
2	Lasting 1 month to 1 year	Effect limited to the activity and its immediate surroundings. (tens of metres)	Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha)	Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible	Current environmental component(s) are moderately disturbed from the natural state. No environmentally sensitive components.
3	Lasting 1 – 5 years	Impacts on extended area beyond site boundary (hundreds of metres)	Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha)	Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible	Current environmental component(s) are a mix of disturbed and undisturbed areas. Area with some environmental sensitivity (scarce / valuable environment etc.).
4	Lasting 5 years to Life of Organisation	Impact on local scale / adjacent sites (km's)	Very large quantities / volumes / intensity (e.g. 5000 L – 10 000L or 8Ha– 12Ha)	Toxic (e.g. diesel & Sodium Hydroxide)	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced / potentially irreversible	Current environmental component(s) are in a natural state. Environmentally sensitive environment / receptor (endangered species / habitats etc.).
5	Beyond life of Organisation / Permanent impacts	Extends widely (nationally or globally)	Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha)	Highly toxic (e.g. arsenic or TCE)	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible	Current environmental component(s) are in a pristine natural state. Highly Sensitive area (endangered species, protected habitats etc.)

***Step 2**: Determine the **MAGNITUDE** of the impact by calculating the average of the factors above.*

Table 68: Determination of Severity of impact

ENVIRONMENTAL IMPACT RATING / PRIORITY					
	MAGNITUDE				
PROBABILITY	**1 Minor**	**2 Low**	**3 Medium**	**4 High**	**5 Major**
5 Almost Certain	Low	Medium	High	High	High
4 Likely	Low	Medium	High	High	High
3 Possible	Low	Medium	Medium	High	High
2 Unlikely	Low	Low	Medium	Medium	High
1 Rare	Low	Low	Low	Medium	Medium

***Step 3**: Determine the **SEVERITY** of the impact by plotting the averages that were obtained above for Probability and Magnitude.*

7.6.2 The need to review the initial site layout

Previously, during the Scoping Phase, the dewatering pipeline (to be placed within or as close as possible to the haul road footprint) was not indicated on the site layout (contained in the Scoping Report). The mentioned pipeline has been included in the site layout plan, with coordinates of the linear structure provided in Figure 19 as well. Further to this, no other changes have occurred resulting in a need for the change / review of the initial site layout.

The final site layout plan is provided in Figure 5.

7.7 Positive and negatives that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and community affected.

A full description on the positive and negative implications of both the proposed activities and the alternatives has been provided as part of the Alternative Assessment Report attached hereto as Annexure D. The positive and negative implication of the proposed activity and the alternatives identified have however also been provided below.

Table 69: Advantage and disadvantages of the proposed activities and alternatives

Alternative		Advantages	Disadvantages
Activity alternatives (mining method alternatives)	**Alternative MM1:** Dragline (as is currently applied) (current preferred option)	• Cost effective in moving bulk waste material. • High production rates and increased coal exposure. • Small carbon footprint. • Suitable for multi-seam operations at increased depth.	• Cannot function optimally in short pit lengths. • Not easily replaceable in the event of catastrophic failure. • Specialized operators and maintenance crews required.
	Alternative MM2: Truck and Shovel	• Fleet sizes can be sized and matched to meet the need of the mining output. • Flexible and easy to relocate if required (campaign mining). • Able to perform multi-purpose duties (relieve bottlenecks). • Reduction of spoil peaks in rehabilitated area.	• Highly costly to operate a large fleet (when comparing to a dragline). • Do not perform well on long pit lengths (carbon footprint increase). • Dependent on consumables like tires and fuel (scarcity and fluctuating price). • Labor intensive. • High risk: fatigue, vehicle interaction, inclement weather conditions.
	Alternative MM3: Production dozing	• Campaign dozing is effective in single seam operations. • Superior profiling ability. • Highly suitable for shallow areas.	• High cost in diesel usage dependent on ancillary equipment at larger depths. • Large carbon footprint. • Slower production rate (when comparing to a dragline). • Optimal performance over short push distances only.

Alternative		Advantages	Disadvantages
Scheduling alternatives	**Alternative SCH1:** Dual dragline schedule (Preferred option)	• Scheduled for simultaneous end of dual dragline work. • High coal exposure rate.	• Proximity (distance) of equipment towards the end of life.
	Alternative SCH2: Single dragline schedule	• Scheduled for single dragline operation long pit length.	• Long running schedule at low coal recovery.
	Alternative SCH3: Underground schedule	• Minimal surface disturbance (only need shaft and overland conveyor, silo, fans). • No blasting concerns. • Less impact on environmental concerns.	• 1 seam too thin to mine underground (1.5m thick, with a 1m parting below 2 seam). • 2 seam is previously mined from underground and subject to spontaneous combustion. • 4 seam underground option compromised by inter-burden stability (previously mines 2 seam and spontaneous combustion). • 5 seam too thin, previously mined and shallow.
Design / layout alternatives	**Alternative DL1:** (Dual dragline layout) (current preferred option)	• Allows for dual dragline production (increased coal recovery). • Balance of pit depletion (mining of both high and low margin areas). • Adequate pit length for optimal performance. • Suited for multi-seam operations (5, 4, 2, 1).	• Increased blasting requirements (blasting on two fronts). • Increased pre-stripping requirements (fleet size).
	Alternative DL2: Single Dragline layout	• Life of Pit is extended. • Overall has a smaller area to manage. • Less complex to schedule.	• Low coal exposure (when compared to the duel dragline option). • In the case of Kleinkopje this is economically unviable.

Alternative		Advantages	Disadvantages
			• Possible pit closure due to low margin.
	Alternative DL3: Underground layout	• Minimal surface disturbance (only need shaft and overland conveyor, silo, fans). • No blasting concerns. • Less impact on environmental concerns.	• 1 seam too thin to mine from underground (1.5m thick, with a 1m parting below 2 seam). • 3 seam is previously mined from underground and subject to spontaneous combustion. • 4 seam underground option compromised by inter-burden stability (previously mines 2 seam and spontaneous combustion). • 5 seam too thin, previously mined and shallow.
Location alternatives (proposed PCD)	**Alternative L1: Site 1** Alternate Site 1 is located north of the Tweefontein Road, approximately 1.5 km northwest of the existing 2A Dam.	• Site 1 is located in close proximity to existing reticulation system (thus an advantage in terms of financial cost as well as ease of infrastructure extension / upgrades). • The site is not located within ecological sensitive areas.	• This location is unsuitable due to the fact that the area overlays the proposed Greenside planned 4 Seam Underground Workings.
	Alternative L2: Site 2 The proposed alternative Site 2 is located approximately 500 m north of the 2A Dam.	• Site 2 is located in close proximity to the existing reticulation system (thus an advantage in terms of financial cost as well as ease of infrastructure extension / upgrades).	• Site 2 is located within close proximity to the CBA Optimal area. • Located within the hillslope seepage wetland system. • Heritage assessments indicated some heritage sites within the area. • No space available for the placement of the dam in amongst other existing and proposed infrastructure.

Alternative		Advantages	Disadvantages
	Alternative L3: Site 3 Alternative Site 3 is located within a 200m ambit of the 2A Dam.	• The site alternative is located close to the EWTP and can be easily connected to existing pipelines. • Not located within ecological sensitive areas.	• This dam was included in the WSP Environmental Environmental Impact Assessment Report (EIAR) for the dam relocation, dated October 2012 as one of the preferred dam locations (along with alternative L5 below – to serve as a smaller buffer dam). • However, since future mining will take place witin the location associated with the L3 site, this option is no longer viable (the site is thus only considered part of the No-go Option). • Located within the hillslope seepage wetland system.
	Alternative L4: Site 4 Alternative Site 4 is located within the eastern section of the mine boundary area, approximately 3.8 km southwest of the 2A PCD.	• No future mining is planned in the area associated with the location of the alternative for Site 4 (disturbed / rehabilitated land).	• The position associated with Site 4 is located too far-off from the Kleinkopje Colliery Main Complex. Furthermore, the installation of new pipes to the proposed dam will not be economically viable. • The site is also located within an area characterised as Ecological Support Area (ESA) Protected area buffer.
	Alternative L5: Site 5 (preferred option) Alternative Site 5 is located approximately 250m east of the	• The site is ideally located in close proximity to the Kleinkopje Colliery Main Complex and subsequently, in close proximity to the return water dam situated within the complex area. Furthermore, the preferred dam will be close	• None

Alternative		Advantages	Disadvantages
	Kleinkopje Colliery Main Complex and 1.5km south of the 2A PCD.	to the 5 West Pit and the Klippan Co-disposal facility. • The site is not situated on future reserves (the area has been mined previously). • The site is not located in a wetland. • The site is not located inan ecological sensitive area.	
	Alternative L6: Site 6 Alternative Site 6 is associated with the upgrading of the current Plant Return Water Dam located at the Kleinkopje Colliery main complex.	• The site is located in close proximity to the mine's current water reticulation system. • The site is not located on future reserves. • The site is not located in an ecological sensitive area.	• The dam is unlined. • Different flood scenarios and a water balance model determined that the plant return water dams will not have sufficient buffer capacity to contain runoff generated from flood events (1:100 year). • As per the scenarios presented in the water balance, for both the wet and dry season scenarios, a significant seepage from 2A Dam occurs that is reflected in the high dewatering volume and subsequently also the excess water. All seepage is contained in the underground affected water system and pumped back to surface for safe continuation of mining activities.
Wetland mitigation alternatives	**Alternative WT1:** 2A Dam wetland re-establishment	• Benefits accrue to the same drainage system impacted by the proposed mining activity.	• Unlikely to meet the functional hectare equivalent target. • Rehabilitation cost may be higher than protection-based offset.

Alternative		Advantages	Disadvantages
		• Opportunities of designing wetland to assist in water quality improvement. • Clean conduit will be created ensuring water will be transported to the Olifants River. • Can be undertaken on land already owned by Anglo. • No risk of future mining (after re-establishment of the wetland). • Increased habitat diversity within the rehabilitated area. • Enhance post mining land use with the attenuation of water over a longer period in the system	• Could lead to increased ingress of water into mined out pits, resulting in higher water treatment costs. • Considered as a last alternative in the Wetland Offset Guidelines (SANBI & DWS 2014). • Considered high risk approach, resulting in reduced wetland credits (SANBI & DWS 2014), therefore requiring a larger offset. • Re-established systems are unlikely to approach the same complexity of ecological processes and biodiversity as natural wetland systems. • Subsidence my impact on this option and might require detailed geotechnical investigation.
	Alternative WT2: Wetland off-set (wetland protection/rehabilitation/averted loss)	• Lower risk activity as it is generally easier to rehabilitate an existing system than create a new system • Allows for the selection of wetlands to meet the like-for-like requirement. • Allows for the selection of wetlands of Moderate to High importance and sensitivity • More wetland credits awarded for rehabilitation when compared to wetland creation/re-establishment.	• Offsite wetland rehabilitation areas could potentially be mined in future by a third party. • Difficult to obtain suitable candidate sites. • Only a number of wetland areas remain within the Kleinkopje mining rights area.

Alternative		Advantages	Disadvantages
	Alternative WT3: Combination of wetland re-establishment and wetland off-set	• As per advantages detailed above.	• Unlikely to meet the functional hectare equivalent target, but will achieve more gains than re-establishment alone. • Multiple offset sites can provide challenges in terms of management and monitoring. • As per other disadvantages detailed above
Wetland offset location	**Alternative OS 1:** Wetland offset on Kleinkopje Colliery site	• Anglo is the land owner. • Future mining is unlikely to be a risk as Anglo is the holder of the Mining Rights for the area. • Easy to manage due to proximity to Kleinkopje Colliery offices. • Enhance post mining land use and contribute water back to the same system.	• Ongoing mining activities and impacts could place the wetland offset at risk. • Only a number of wetland areas remain within the Kleinkopje mining rights area.
	Alternative OS2: Wetland offset in another area (outside mine boundary area)	• Could allow for the selection of wetlands to meet the like-for-like requirement. • Allows for tie-in with existing wetland rehabilitation projects in other areas. • Allows for the selection of wetlands of Moderate to High importance and sensitivity. • Candidate sites will be more readily available. • Sites already within protected areas could be used, securing the offset	• Anglo is not the land owner. • Future mining of offsite areas presents a risk if mining rights are owned by another entity. • Distance to travel in order manage and monitor the implementation and improvement.

Alternative		Advantages	Disadvantages
	Alternative OS3: Combination of wetland offset on-site and on another area (outside mine boundary area)	• Supplementing remaining wetlands on-site with additional wetlands elsewhere might allow for target to be achieved.	• Multiple offset sites can provide challenges in terms of management and monitoring. • Single, larger offset preferred due to improved ecological connectivity. • As per disadvantages detailed above.
No-go versus pit extension	**Alternative NQMining1:** Pit Extension	• Mining of the available reserves can continue. • Job security of the mine's current employees will continue, along with other benefits arising from the Social and Labour Plan. • This alternative is associated with the removal of the current Pit 2A Dam (thus, the potential mitigation off current impacts associated with the existence of the dam). • Opportunity for watercourse re-instatement resulting in catchment draining back into the Olifants River.	• A number of environmental impacts will be associated with the proposed pit extension.
	Alternative NQMining2: No-go option	• No additional impacts on the bio-physical environment (however refer to advantages of mining and re-instating the entire wetland system, above).	• The Life of Mine will not be extended and job security for mine employees and contractors will not continue beyond the current Life of Mine. • 2A Dam is a dirty water fam with no current link to the Olifants River. • The existing wetland drains into 2A Dam

Alternative		Advantages	Disadvantages
No-go versus PCD construction	**Alternative NQPCD1:** PCD construction	• The construction of the PCD will provide for the necessary storage capacity in the water reticulation system, since the existing 2A Dam (PCD) will be mined through as part of the Pit 2A Extension project. • Opportunity for a new PCD in line with best-practice and legislation to be constructed outside delineated wetland areas.	• A number of environmental impacts may be associated with the proposed PCD construction and operation (if not managed appropriately). • Permits / WUL required.
	Alternative NQPCD2: No-go option	• Prevention / minimisation of environmental impacts that would have occurred if PCD was to be constructed.	• Some current impacts may continue (i.e. as per the scenarios presented in the water balance, for both the wet and dry season scenarios, a significant seepage from 2A Dam occurs that is reflected in the high dewatering volume and subsequently also the excess water).

7.8 Possible mitigation measures that could be applied and the level of risk

Table 70 below provides a summary of the issues and concerns as raised by affected parties and an assessment of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered.

Table 70: Summary of issues and concerns raised by I&APs

Concerns / Comments	Mitigation measures or site alternative
First meeting with DWS: 11 July 2016	
Betty Mnguni (DWS) requested clarity on the need for a potential new Pollution Control Dam to be constructed or the potential upgrading of the Plant Return Water Dam to replace the 2A Dam water containing waste storage activity.	Alternatives assessed: PCD Locations Site 1 – 6 (6 being the Plant RWD upgrade option and Sites 1 – 5 being proposed new PCD options). Refer to Sections 4.2.2.7.3 and 4.2.2.7.4 (Part A) for the results obtained from the storm water management plan and water balance. Refer also to the alternatives assessment report in Annexure D and the impacts and mitigation measures in Annexure I.
Betty Mnguni (DWS) enquired as to how many alternatives are considered for the PCD location, in relation to Section 21(c) and (i) water use/s.	Refer above.
Second meeting with DWS: 13 September 2016	
Pieter Ackerman (DWS) enquired as to the location of the decant point(s) at the mine and indicated that there may be a need for passive treatment at the decant point(s).	N/A. No alternatives can be assessed for decant points. Refer to Annexure E6 for more information on decant points.
Subsequent to Wetland Consulting Services presenting proposed Wetland Mitigation Strategy to DWS, Pieter Ackerman (DWS) pointed out that he was in favour of such an approach as it would assist in reinstating some flow from the Pit 2A area back into the Olifants River.	Alternatives assessed: • Wetland re-establishment; • Wetland off-set; • Combination of both. Refer to the alternatives assessment report in Annexures D and E3 as well as to the impacts and mitigation measures in Annexure I.
Wietsche Roets (DWS) enquired as to whether the functional hectare equivalent requirement would be met by implementing the strategy.	

Concerns / Comments	Mitigation measures or site alternative
Betty Mnguni (DWS) enquired as to Slide 18 of Part 2 and asked how removing the alien trees at the pan areas would assist in terms of the strategy.	Refer above as well as Annexure E3.
Public Meeting (as part of Farmers Day): 20 September 2016	
J. Viljoen mentioned that it seems that "Anglo/Shangoni" is concerned about wetlands and pollution to the Olifants river and that problems are buried underground but then his water comes from underground. He stated that when Kleinkopje Colliery do blasting, veins that lead to his house are cut off and that groundwater is his survival means.	
J. Viljoen asked what the mine will do, should groundwater be impacted on. He also mentioned that his one borehole packed up 3 weeks ago, and said that it is dry now. He indicated that he put in a new pump with electronic monitors and that 22 minutes later the borehole was dry. He stated that he cannot live and carry on with business with 20 minutes' supply of water. He also added that if he puts water in a glass for two days, black silt settles at the bottom of the glass. He stated that according to him, the black silt is coal	Refer to the impacts and mitigation measures in Annexure I.
Arthur Lloyd asked for the location of the aquifer that was mentioned during the presentation. Arthur Lloyd expressed their concern that the groundwater specialist is not present at the meeting since he / she would be the person with the specialist field knowledge. He said that his concern is knowing how the water will be affected when the mine does the blasting. He said that he is not concerned about the rivers and wetlands, but the groundwater. He further explained that he does doubts that there is communication to the mine and said that the mine just blasts anywhere. He said he understands that it is a public participation meeting and has to be held as required by the law but	No alternatives relevant. Comment relates to existing mining activities and not Pit 2A Extension specifically.

Concerns / Comments	Mitigation measures or site alternative
after the process, nobody controls what the mine is doing.	
Arthur Lloyd asked how do they establish that the impact on groundwater. He asked if the specialists drill boreholes etc.	Alternatives and mitigation not applicable as this was only a question on methodology used. Answer was provided to I&AP during meeting (refer to Table 23).
Willem du Plessis proposed that the mine and the farmers have a meeting regarding the ongoing groundwater aspects and discuss what the mine is prepared to do, should the farmers' boreholes be impacted on. He then asked that if the dam is moved to another location and the dam cracks resulting in seepage from the dam - how this will affect the groundwater	No alternatives relevant specific to project. Comment relates to existing mining activities and not Pit 2A Extension specifically.

7.9 Motivation where no alternative sites were considered

Kleinkopje Colliery is an existing mining operation and the Pit 2A Extension will be a continuation of already authorised open-pit area. Therefore, no alternative site locations could be considered due to the locality of the mineral deposit. Alternative sites were considered for the location of the proposed PCD. These are described in Sections above and in Annexure D.

7.10 Statement motivating the alternative development location within overall site

Evaluating the alternatives, through evaluating the risks pertaining to the various options, and the concerns as raised by the affected parties and the mitigation measures or site alternatives, the preferred options are:

Current preferred alternative	Motivation
Preferred (only) site for mining activity (Pit 2A Extension area)	
The proposed activity entails the mining of coal in the proposed Pit 2A Extension area.	• Kleinkopje Colliery is an existing mining operation and the Pit 2A Extension will be a continuation of already authorised mining rights open-pit area. Therefore, no alternative site locations could be considered due to the locality of the mineral deposit.
Preferred site for the location of the PCD	
The preferred alternative for the location of the PCD is Alternative L5 (Site 5) which is located approximately 250m east of the Kleinkopje Colliery Main Complex and 1.5km south of the 2A Dam.	• The site is ideally located in close proximity to the Kleinkopje Colliery Main Complex and subsequently, in close proximity to the return water dam situated within the complex area. Furthermore, the preferred dam will be close to the 5 West Pit and the Klippan Co-disposal facility. • The site is not situated on future reserves (the area has been mined previously). • The site is not located in a wetland. • The site is not located inan ecological sensitive area.

8. Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

All impacts and risks as identified are contained within Section 7.5 (Impacts and risks identified). As further provided is an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures. The potential impacts and risks of the proposed activity were identified through consultation with the applicant regarding the proposed activities to be undertaken. Site visits were also conducted by specialists to understand the nature of the proposed activities off-set against the baseline environment of the area. Internal workshops were held in order to determine the risks associated with the proposed project and to identify the knowledge gaps, information insufficiency as well as to identify the specialist studies that would be required to investigate these knowledge gaps and information insufficiencies.

The following specialist studies were conducted for the Pit 2A Extension project:

- Wetland Baseline and Mitigation Assessment with the aim of proposing a conceptual Wetland Mitigation Strategy for development and implementation;
- Soil, land use and land capability Assessment
- Geohydrological Risk Assessment;
- Hydrological Assessment (Storm Water Management Plan and Water Balance); and
- Archaeological- and Palaeontological Impact Assessments.

These specialist studies were initiated to assess the respective biophysical aspects, provide a baseline description of the environment as well as identify any risks and impacts on the biophysical aspects associated with the proposed project. Refer also to Section 7.6 (Methodology used in determining and ranking potential environmental impacts and risks) for the methodology applied in assessing and ranking the impacts and risks on the preferred site and associated preferred alternatives.

The results of the assessments are provided below, with the detailed Risk Assessment Report attached hereto as Annexure I.

9. Assessment of each identified potentially significant[67] impact and risk

Table 71: Assessment of each identified potentially significant impact and risk

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
Geology	Mining of the ore reserve	A permanent impact on the localised geology of the areas associated with the proposed extension area will result from the mining and removal of coal.	Operational	High	Control	High
Soil	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Susceptibility to erosion will be largely increased once the vegetation is cleared and the soils become exposed to wind and storm water.	Commissioning and Operational	High	Stop; Remedy	Medium
		Heavy equipment traffic is anticipated to cause significant soil compaction during construction activities. The severity of this impact is anticipated to be particularly highest in the vicinity of the proposed hauling road and during stripping within the application area.	Commissioning; Operational; Decommissioning / Closure	High	Stop; Control	Medium
		The soil contamination impact is largely dependent on the nature, volume and/or concentration of the contaminant of concern, and all of the identified soils are considered to be equally predisposed to contamination, as contamination sources are unpredictable and typically occur as incidental spills or leaks, and or decant of contaminated mine water in such mining projects.	Commissioning; Operational; Decommissioning / Closure	High	Stop; Remedy	Medium
		The incorrect handling and disposal of general waste, scrap metal and industrial waste (e.g. waste tyres) will have a long-term impact on the local area. Impact will not only effect soil but could also impact on the habitat of fauna and impact of fauna, surface water and groundwater. In addition, the visual character of the area will be impacted on. The incorrect handling and disposal of hazardous waste can also have a permanent negative impact on the local area. Soil, water sources and fauna habitats can be adversely affected and human health can be impacted on.	Commissioning; Operational; Decommissioning / Closure	High	Stop; Remedy; Control	Low
Land Use and Land Capability	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden.	The main impact from a land capability perspective at Kleinkopje Mine is land degradation and loss of land capability from the proposed mining pit extension area. The soils that will be impacted by the proposed mining activities include the following: • Clovelly/Hutton; • Longlands/Fernwood; • Westleigh; • Katspruit; and • Dresden soil forms.	Commissioning; Operational; Decommissioning / Closure; Post-Closure	High	Control	Medium

[67] Impacts with a high rating (pre-mitigation) included in this table

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)					
Flora	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	During the clearance, construction and operational phase activities and following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems (Wetland Consulting Services, 2016).	Commissioning; Operational; Decommissioning / Closure; Post-Closure	High	Remedy; Control	Medium
Surface water	Operation of channels, trenches and return water dams	Silt accumulation within the conveyance channels is a continual problem at coal mining operations and thereby, as a result, reducing channel capacities, blocking silt traps and compromising the capacities containment facilities such as the plant return water dams. <u>Surface water quantity:</u> Process water spillages within the plant area will result in a reduced amount of water recycled within the process resulting in additional water that has to be sourced for usage. Ponding of surface water runoff at the plant also have a negative effect on plant operations.	Operational	High	Stop; Remedy	Medium
	Operation of Ramp 7 trench	The current Ramp 7 trench and Ramp 7 sump should be used as an additional measure to contain any possible spillages or overflows from the current plant return water dams or the proposed pollution control dam. Ineffective maintenance of the trench and the sump might cause overflow towards the Olifants River located approximately 700 meters downstream. <u>Surface water quality:</u>	Operational	High	Stop	Medium

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		Contaminated process water will alter the ecological function and water quality within the Olifants River.				
Surface water	Removal of 2A dam	The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit resulting in a reduced storage capacity for excess process water at Kleinkopje Colliery. <u>Surface water quantity:</u> The removal of the current 2A Dam from the Kleinkopje water management circuit will require that all sources that are currently connected to 2A Dam be rerouted to the plant return water dams. Surface water flood modelling and the average dry and wet season water balance indicated that the current plant return water dams do not have sufficient buffer capacity and storage capacity to contain excess mine process water. Significant overflow of the plant return water dams will occur resulting the mine process water discharge towards the Olifants River.	Operational	High	Remedy / Modify; Control	Low
Groundwater	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Blasting activities may impact negatively on the groundwater quality if significant amounts of explosives are spilled or incompletely detonated. The chemical residues in the form of NH_4 and NO_3 may potentially leach to the groundwater table. Any nitrogen contamination that may occur will be localised within the pit area during the operational phase, due to the dewatering activities within the pit acting as a sink preventing plume migration.	Commissioning; Operational	High	Stop; Control	Medium
	Construction and operation of pollution control dam / upgrading of Plant Return Water Dam	Poor quality seepage from unlined return water/dirty water dams is inevitable and could have the following consequences on the local groundwater regime: • Groundwater mounding directly underneath the dam/s. • Downstream movement of a pollution plume within the weathered zone aquifer. It should be noted that the preferred option is the construction and operation of a new pollution control dam (refer Annexures D and E4). The new pollution control dam will be lined facility. The alternative option considered during the process relates to the upgrading and use of the existing Plant Return Water Dam. The Plant Return Water Dam (RWD) is an unlined facility. This high rating is thus relevant to the unlined Plant RWD.	Operational	High	Stop; Modify	Medium

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
Sensitive Landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	All wetland habitats falling directly within the mining footprint will be permanently destroyed by the proposed opencast mining activities. This amounts to the direct loss of roughly 145 hectares of wetland habitat (and a further 22.7 ha of dam habitat), consisting mostly of hillslope seepage wetland habitat that has been largely modified (PES D) and which is considered of Moderate importance and sensitivity. A haul road will also be constructed around the northern and western edge of the proposed opencast pit and will cross the hillslope seepage wetland remaining upslope of the opencast pit. This will further contribute to the loss and degradation of wetland habitat.68 A positive impact is expected from the recreation of a watercourse with wetland habitat across the 2A Pit area as well as the rehabilitation and protection of two representative pans of the area. The mentioned pans as well as the re-instatement of flow to the Olifants River from the 2A Dam sub-catchment are considered important from a biodiversity support perspective. This sub-catchment is currently an isolated dirty water catchment which, following rehabilitation, will again be a clean water catchment linked to the Olifants River and downstream water resources. Although the re-created watercourse will not resemble the wetland habitat being lost to mining, the re-created water course can be design to re-instate specific desired functions to the landscape, including biodiversity support, flood attenuation and sediment trapping.	Commissioning; Operational	High	Remedy; Control	High[69] Positive
	Rehabilitation of opencast pit	Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to	Decommissioning / Closure	High	Remedy; Control	Medium

[68] It is however probable that construction activities will result in further disturbances to wetland habitat outside the direct development footprints through activities such as temporary stockpiles, construction camps, vehicle turning circles, unauthorised hunting/poaching activities etc. extending beyond the development footprint. This could lead to disturbances and resultant degradation of the adjacent wetland habitat. Given the distance between the proposed activities and the wetland boundaries, this impact is considered to be of low probability.

[69] Refer also to positive impact (opportunity) related to the re-instatement of the watercourse towards the Olifants River

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality.				
		Following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A Pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems.	Decommissioning / Closure	High	Remedy; Control	Medium
		Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality.	Post-Closure	High	Remedy; Control	Medium
		Post-mining, the backfilled opencast pit is likely to fill with water as groundwater levels rebound. Opencast mining permanently destroys the aquitard and strata supporting the perched water table, resulting in increased infiltration of surface water, with infiltration values of 14-20% of rainfall being recorded for rehabilitated opencast mines compared to only 1-3% under natural conditions. Water in the pits is expected to become acidic and sulphate rich due to the oxidation of pyrites in the backfilled spoils. Decanting water could potentially be acidic and is likely to be metal and sulphate rich. Decant will eventually enter the Olifants River and downstream Witbank Dam, which are already water quality stressed systems. Acidic, sulphate rich water is likely to lead to a loss of sensitive species (including sensitive aquatic fauna as well as sensitive flora such as orchids) within the affected water courses and result in changes in species composition, with salinity tolerant species likely to become dominant.	Post-Closure	High	Remedy; Control	Medium

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
Protected Areas and Conservation Planning	Construction and use of pollution control dam	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the impact it may pose in terms of protected areas and conservation planning, depending on the location of such PCD sites in relation to critical biodiversity areas or ecological support areas. Only Site 4 was identified as being located within an ESA Protected Area buffer. Refer to impact tables above for more detail. **It Should be noted that Site 4 is not the preferred alternative.**	Commissioning; Operational; Decommissioning / Closure	High	Stop / Modify	High
Archaeology (Heritage Resources)	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Dewatering activity: Pumping of water collecting in the open pit extension area	The Phase I HIA study for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area(s), namely (Figure 26): • One graveyard in the Pit 2A Extension mining (application) area (GY01). • Two graveyards directly outside the Pit 2A Extension mining (application) area (GY02, GY03). GY01 will be affected by the Pit 2A Extension Project	Commissioning; Operational; Decommissioning / Closure	High	Stop	Low
Palaeontology	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden.	The potential negative impacts of the proposed project on the palaeontological heritage of the area are: • Damage or destruction of fossil materials during the construction of project infrastructural elements to a maximum depth of those excavations. Many fossil taxa (particularly vertebrate taxa) are known from only a single fossil and, thus, any fossil material is potentially highly significant. Accordingly, the loss or damage to any single fossil can be potentially significant to the understanding of the fossil heritage of South Africa and to the understanding of the evolution of life on earth in general. • Where fossil material is present and will be directly affected by the building or construction of the projects infrastructural elements the result will potentially be the irreversible damage or destruction of the fossil(s). • Movement of fossil materials during the construction phase, such that they are no longer *in situ* when discovered. The fact that the fossils are not *in situ* would either significantly reduce or completely destroy their scientific significance. • The loss of access for scientific study to any fossil materials present beneath infrastructural elements for the life span of the existence of those constructions and facilities.	Commissioning- to Closure	High	Manage	High

Environmental component	Activity	Impact description	Phase (Commissioning/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		Pit 2A Extension area: The entire remaining thickness of the Vryheid Formation will be impacted by the mining activities. The entire vertical and aerial extent of the rocks of the Vryheid Formation within the planned mine void will be permanently and irredeemably impacted by the mining activities.				
Socio-economic Aspects	Continuation of mining and related activities at Kleinkopje Colliery (through the mining of the Pit 2A Extension area)	**No-go Option: Negative Impact** Should the Environmental Authorisation not be granted for the proposed Pit 2A Extension, the Life of Mine associated with Pit 2A will not be extended and several jobs may be lost. Skills development may cease and the ore body will remain *in situ* and unutilised	Operational; Decommissioning / Closure	High	Control	Medium
	Cessation of mining activities at Pit 2A (including the Pit 2A Extension)	During and subsequent to the cessation of mining activities at Pit 2A (and its extension) a loss of jobs may occur which may not only impact on the employees but on the socio-economic status of the local community and economy.	Decommissioning / Closure	High	Control; Remedy	Medium

10. Summary of specialist reports

Table 72: Recommendations made by specialists

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
Geohydrological study and risk assessment for Anglo Operations (Pty) Ltd: Kleinkopje Colliery Pit 2A Extension, dated August 2016 and compiled by Shangoni AquiScience.[70] **Annexure E6**	**Construction activities** • No construction of any water management measures, such as the new PCD or the haul roads should be undertaken with carbonaceous material without the necessary exemptions applied for. • All proposed dams should be lined where practically possible, in an effort to minimise the seepage of poor quality leachate. • Clean surface water should not come into contact with dirty water or coal bearing material. • Implement traffic rules and training to employees. • Implement vehicle maintenance. • Install oil collection pans in or under vehicles	X	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

[70] Please note that the recommendations contained in the geohydrological study and risk assessment for the Pit 2A Extension also relates to groundwater recommendations for the entire Kleinkopje Colliery, since groundwater conditions and impacts related to the Pit 2A Extension cannot be assessed in isolation from the rest of the Kleinkopje Colliery mining site.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• Handle and store blasting material according to manufacturing requirements. • Train staff and implement correct procedures for the handling of blasting material. • Only qualified staff should handle hazardous materials.		
	Operational Phase activities • Handle and store blasting material according to manufacturing requirements. • Train staff and implement correct procedures for the handling of blasting material. • Only qualified staff should handle hazardous materials. • Hazardous material should be stored in the correct designated and bunded areas that are specially designed and constructed for that purpose. • Staff should be trained to implement correct procedures for the handling of hazardous material. • Wastage of coal-bearing material outside the allocated dirty water management area during the operational phase should be prevented.	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• Dirty water should be contained in fit-for-purpose and lined designed facilities, which will limit infiltration of contaminated water to groundwater. • Water retention in the in-pit sump areas should be as minimal as possible to limit the quality related impacts. • Clean surface water should not come into contact with dirty water or coal bearing material. • Dirty water dams[71] should be lined as far as is practical to contain all affected water. • Integrity of liners should be regularly inspected. • Oil contaminated water should be diverted from the bunded area during rain events to an interception or oil water separation facility. • Ensure that the water management measures at the mining operations are adequately sized according to the specifications in GN704.		

[71] Proposed dirty water dam(s)

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• Continuous monitoring of groundwater quality through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts. • Update groundwater (flow and transport) when new data becomes available. • Implement and maintain proper storm water management infrastructure. • Concurrent rehabilitation should follow the pre-mining in-situ profile with coal spoils and carbonaceous material placed in the bottom beneath the water followed by neutralising rock (sandstone/tillite) and finally a clay and topsoil layer. • Limit infiltration of precipitation into backfilled areas by capping with clay layer and vegetating. • Continuous monitoring of groundwater quality through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts. • Update groundwater (flow and transport) when new data becomes available.		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• Drains and cut-off trenches (storm water management system) around the proposed opencast pits should be implemented before commencing with pit development to prevent clean run-off water from entering the pit, reducing inflow of clean water into the pit and volumes to be dewatered. • Interception drainage around the pit – minimize surface area where operations could contaminate water (smaller disturbed areas mean smaller manageable volumes). • Implement and maintain proper storm water management infrastructure. • Continuous monitoring of groundwater quantity/ groundwater levels through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts. • Update groundwater (flow and transport) when new data becomes available.		
	Decommissioning, Closure and Post-Closure Phase • The final cut or pit should be filled to resemble the pre-mining in-situ profiles with the coal spoils and carbonaceous materials (mudstones) in the bottom followed by the higher neutralising potential rocks such	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	as the sandstones and tillites (if present) and finally by a compacted clay and topsoil layer. • Rate and volume of water infiltration should be minimised by compaction and capping. • Coal spoils and carbonaceous material should as far as possible be placed beneath the water table to limit the ingress of oxidation. • Seeding of landscaped areas (depending on specialist recommendations) to further limit infiltration. • Continuous monitoring of groundwater quality conditions through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts. • Present the results to Government on an annual basis to determine compliance with the closure objectives set during the Decommissioning Phase.		
	General • The monitoring programme should be reviewed so that all sources are covered in terms of monitoring. This monitoring programme should also cover all underground mining compartments where water levels need to be measured to get to an as close as possible volume of water in all mining areas.	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• It is recommended that the water quality sampling and analysis occurs on as close as possible to a quarterly basis. Groundwater level monitoring occurs on a monthly interval. • The most important aspect for groundwater monitoring and management at Kleinkopje is to know the volumes and qualities of mine water in the mined-out areas. Stage curves for all the mined-out areas need to be completed and refined and the water volumes in all areas need to be completed and refined and the water volumes in all areas need to be monitored to ensure that management actions (treatment) can be rolled out in time to cater for all contaminated water. The monitoring programme must also take note of water levels in all compartments, especially in the region where decant is expected to eventually occur. Water abstraction should be planned such that the water level in the mine remains well below the decant surface elevation. • Source or impact monitoring programme is designed to determine the effect of the operation / source on the ambient (unaffected pre-mining) groundwater quality. The up-gradient (incoming) groundwater quality should thus be measures at a few positions to		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	compare with qualities downgradient of the suspected pollution sources. • Similarly, static water levels of the region must be compared to water levels around the mine to determine the extent of the dewatering impact. • Al of these elements are monitored for in the Kleinkopje monitoring programme, but it does not cover all the sources and additional boreholes need to be drilled. Conceptual positions for additional boreholes are indicated in Figure 18 of the Shangoni AquiScience report in Annexure E6. The mentioned report also contains a motivation for the new boreholes. The water levels at these borehole localities should be measures on at least a quarterly basis for inclusion into the groundwater database with the objective of groundwater model calibration at a later stage. • The groundwater qualities should be analysed on a quarterly basis for inorganic content. The parameters recommended for analysis are listed in Table 18 of Annexure E6. This monitoring schedule should be re-assessed by a qualified person on a biennial frequency. In terms of flow, all water uses and discharges should be measured on an ongoing basis. The flows include:		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	➢ Make-up water; ➢ Volumes of groundwater seepage into the mine and pumped from the mine; ➢ Volumes of contaminated water used for dust suppression and other uses. • As far as possible, the same monitoring boreholes should be used to develop a long-term data record and enable trend analysis and recognition of progressive impacts (or improvement) with time. • A geophysical survey needs to be performed to aid in the siting of these new proposed monitoring boreholes. Geophysical investigations are usually conducted as a non-intrusive method with the aim of inferring sub-surface geological structures like joints or faults or delineating formation contacts, weathering depths or the presence of igneous intrusive rocks like dolerite or syenite dykes or sills. The results will present best position or drilling the monitoring boreholes. • After monitoring boreholes have been drilled, they need to be pump tested as this will give an estimation of the site specific aquifer parameters that is currently not available for Kleinkopje. These aquifer parameters will aid in the update of the numerical		

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	groundwater model. The numerical groundwater model gives estimations on the extent of impacts of the mining operation in terms of groundwater quality and will be a useful tool for estimating future impacts. • Acid-base accounting (ABA) was not conducted in the Kleinkopje area during the studies. It is proposed that ABA be done if information is not already available for the Kleinkopje area. From experience in mining areas in the vicinity of Kleinkopje, the generation of acid mine drainage is highly probable. • The monitoring results should be captured in a suitable database and should be interpreted regularly to gain knowledge from the information. • Stage curves for all the mined-out areas need to be completed and refined and the water volumes in all areas need to be monitored to ensure that management actions (treatment) can be rolled out in time to cater for all contaminated water. The monitoring programme must also take note of water levels in all compartments, especially in the region where decant is expected to eventually occur. Water abstraction should be planned such that the water level in the mine remains well below the decant surface elevation.		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• A source of impact monitoring program is designed to determine the effect of the operation / source on the ambient (unaffected pre-mining) groundwater quality. The up-gradient (incoming) groundwater quality should thus be measured at a few positions to compare with qualities downgradient of the suspected pollution sources. • Similarly, static water levels of the region must be compared to water levels around the mine to determine the extent of the dewatering impact. • Water levels measured from the new strategically placed monitoring boreholes will also aid in the determination of water volumes in the mining voids. In many of the areas no water level information is available and therefore water management cannot be performed on an effective basis. Water levels are essential for the effective planning of water storage space and dewatering requirements for future mining. • The knowledge obtained from all the additional proposed work should be used to act / to implement management actions if impacts are confirmed, to expand the monitoring network or increase the		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	frequency if necessary and to correlate with related environmental information to use for closure planning.		
"*Anglo Coal Kleinkopje Colliery - Annual Water Quality Assessment Report*", dated December 2015 (for the period January – November 2015), compiled by Aquatico Scientific, dated December 2015. **Annexure E4**	• Additional source monitoring boreholes are required for complete coverage of the Kleinkopje mining area. Conceptual positions of additional monitoring boreholes are presented in Figure 11 of the Aquatico, December 2015 report in Annexure E4, and were also proposed in the geohydrological assessment.	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.
"Anglo Operations (Pty) Ltd., Kleinkopje Colliery: Pit 2A Extension. Storm Water Management Plan and Water Balance; compiled by Shangoni and dated September 2016 **Annexure E4**	• Develop and implement a maintenance schedule on the proposed haul road to ensure effective drainage and controlled conveyance towards the adjacent clean water areas. • Investigations should be conducted to install silt traps along the discharge areas of the haul road where needed. • Haul roads should have berms alongside to channel runoff towards controlled discharge areas. • Investigations should take place to install collection drains at concentration points in order to re-use water in the circuit. These collection drains will be suited in low laying areas of the haul roads.	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• Implement wetland rehabilitation strategy on completion of mining activities and once haul road has been removed • It is recommended to implement a maintenance schedule to ensure regular servicing takes place on the affected water channels, trenches and containment facilities to ensure design capacity. • Regular servicing of the silt traps should take place to limit the amount of silt entering the plant return water dams. • The plant return water dams should be maintained to ensure sufficient freeboard in order to limit any possible overflow or spillages. • Implement a maintenance schedule to ensure the integrity of the Ramp 7 trench and the Ramp 7 sump. • A level control system should be investigated to eliminate any possible overflow towards the Olifants River located downstream of the sump. • Ensure that the haul road berm downstream of the sump is maintained at all time as the structure functions as an additional measure to prevent any overflow from reaching the Olifants River. • Surface water will be diverted away from mining operations within the 2A mining area as far as practicable in an attempt to lower dewatering requirements from the voids. Unfortunately, there are areas were the		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	diversion of surface water runoff will be difficult to achieve, especially within the ramps leading towards the voids were mining takes place. Surface runoff that accumulates in these areas as a result of rainfall, and groundwater ingress will then need to be dewatered from the voids to ensure the safe continuation of mining activities. • The proposed construction of a new haul road along the western and northern perimeter of the 2A extension area will act as a barrier to prevent any ingress of clean surface runoff into the mine workings. • It is important to conduct regular inspections on the haul road's berms to ensure the integrity of the berms. • It is recommended to replace the current 2A Dam with a pollution control dam with sufficient capacity to contain all excess mine affected water, designed to accommodate at least a 1:100-year flood scenario. • Adequate lining measures are proposed, to limit seepage (as also affecting the mine dewatering volumes and associated costs to dewater from underground). • All mine process water contained in the proposed pollution control dam should be re-used in the system, or provided to Emalahleni Water Reclamation Plant for treatment.		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• It is recommended to construct an additional pollution control dam with sufficient capacity to contain all excess mine affected water, designed to accommodate at least a 1:100 year flood scenario. • Adequate lining measures are proposed, to limit seepage (as also affecting the mine dewatering volumes). • All mine process water contained in the proposed pollution control dam should be re-used in the system, or provided to Emalahleni Water Reclamation Plant for treatment.		
"Soil, land use and land capability assessment for the proposed Kleinkopje Pit 2A Expansion and development of a new pollution control dam, near Emalahleni in the Mpumalanga Province", dated September 2016 and compiled by Scientifc Aquatic Services A**nnexure E9**	• Schedule vegetation clearance and soils stripping to coincide with the dry (low rainfall) season; • Strictly limit vegetation clearance and earthworks to the pre-determined development areas as proposed; • Implement progressive soil stripping according to the mining schedule to minimise exposure duration; • Stockpiles should be re-vegetated as soon as possible; • Install erosion control measures to divert storm water away from stockpiles e.g. berms, soil traps, hessian curtains. • Soil stripping and stockpiling should be carried out according to the land capability map as illustrated in Figures 9 and 10 of Annexure E9; and in accordance with the respective diagnostic horizon sequence,	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	as illustrated in Tables 6 to 11 of Annexure E9, in order to ease of re-instating the soils during rehabilitation. • A total of at least seven (7) stockpiles is therefore anticipated for the proposed development, as illustrated in Table 17 of Annexure E9 for the various land capability classes. Stripping is however not deemed necessary for the already extensively disturbed Class VIII Witbank soils. • Soils with closely similar attributes such as the Clovelly/Hutton and Glencoe soil forms, and Westleigh and Katspruit soil forms can be co-stockpiled. • Soil erosion from stockpiles should be minimised by providing suitable storm water and cut off measures and/or establishing a temporary vegetation cover on the stockpiles. • Lightly rip stockpiles to at least 25 cm beneath the surface prior to revegetation, and re-vegetate stockpiles with indigenous grass species as soon as practically possible areas as an erosion control mechanism such that the interval between clearing and revegetation is kept to an absolute minimum in order to limit run-off and to mitigate dust emission.		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• Re-vegetation may be carried out by manual hand seeding or hydro-seeding according to the Environmental Management Plan (EMP) protocols for the proposed development • It is recommended that soil stripping and stockpiling be guided by an independent Environmental Control Officer (ECO) with a sound Soil Science expertise, particularly within the Application Area and haul road. • The open pit extension area should preferably be demarcated into subsections within which vegetation clearance and soil stripping can be permitted for the current year according to the mining schedule, as opposed to clearing vegetation and stripping all the soils at once, in order to minimise the exposure duration to various impacts (as discussed in the above sections) during stockpiling, and the cumulative effects thereof. Additional areas can then be cleared and stripped progressively in the following mining year when required. • Vehicular movement should be strictly prohibited over the stockpiles to avoid potentially irreversible compaction. • Soils should be tilled to at least 1350 kg/m^3 to improve infiltration as well as crop water and nutrients uptake following rehabilitation where		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	significant compaction of more than 1600 kg/m3 bulk density is encountered in the topsoil. • The spill prevention and handling procedure should be implemented in the event of the relevant spillages at the project areas. • The mine's incident reporting procedure will be implemented in terms of reporting the relevant incidents internally and externally (if required). • An annual soil contamination assessment should be carried out to monitor soil quality down-gradient of the potentially contaminating facilities e.g. the proposed PCD relative to baseline soil quality prior to the construction of such facilities. This will enable detection of latent soil contamination and facilitate emergency response for remedial action where necessary. • Strip soils according to soil type as illustrated in the land capability map (Figures 9 & 10 and Table 15 in Annexure E9); • The upper 0-20 cm topsoil should be stockpiled separately; • Stockpiles should be re-vegetated as soon as possible; and • Interburden material should be stockpiled separately to the classifiable soil material.		

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	• Sequentially replace soils in a reversed order such that the diagnostic horizon sequence corresponds to pre-mining conditions during the rehabilitation phase **Post-mining rehabilitation requirements for open pit extension area**: During the rehabilitation phase, the identified soils within the open pit extension area should be sequentially replaced to mimic the current (pre-mining) conditions, as illustrated on the soil map in Figure 7 and 8 in Annexure E9. This will enable re-establishment of the conditions, as illustrated in the land capability map in Figure 9 and 10 (Annexure E9), which is relatively consistent with the recommendations of the post-mining land capability as included in approved EMPr for the greater mining operation. **Post-mining rehabilitation requirements for the PCD area:** The proposed PCD area can be maintained as a wilderness land use, as > 80% of this area comprises of very shallow Mispah/Glenrosa/Dresden soils, observed to have very limited effective soil depth/volume (growth medium) under prevailing conditions. Alternatively, clean soil material of at least 250 mm on average can be imported to rehabilitate these soils to		

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	favourable conditions potentially suitable for Grazing land use, as proposed in the existing EMPr and rehabilitation plan for the MRA. **Post-mining rehabilitation requirements for the haul road:** Similar to the open pit extension area, the identified soils within the proposed haul road should be rehabilitated to mimic the current conditions.		
"Wetland baseline and mitigation report for the proposed Kleinkopje Colliery opencast extension project", dated August 2016 and compiled by Wetland Consulting Services **Annexure E3**	• **Minimisation:** ➢ The placement of associated surface infrastructures must be carefully planned to minimise impact on delineated wetlands. No stockpiles should be placed within the delineated wetland habitat. The following measures should be implemented: o The proposed mining and development footprint must be fenced off and all activities must be limited to the fenced off area. o Locate all temporary stockpiles, constructor's camps, laydown areas, and ablution facilities etc. outside delineated wetland areas and a minimum of 50m from any delineated wetland area.	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	○ Develop and implement a construction storm water management plan prior to the commencement of site clearing activities. Such a plan should aim to minimise sediment movement off the construction site and limit increases in turbidity of adjacent wetlands. ○ All disturbed areas outside the direct development footprints should be rehabilitated and re-vegetated as soon as possible. ○ All construction staff should be educated on the sensitivity of wetland areas and should be made aware of all wetland areas in close proximity to the mining sites. ○ If land adjacent to the mining area is leased, the leasee must be made aware of the presence and importance of wetland systems on the leased land, as well as the management measures adopted by the mine for these areas. ○ Regular cleaning up of the wetland areas should be undertaken to remove litter. ○ An alien vegetation management plan should be drawn up by the Environmental Control Officer (ECO) and implemented. Regular removal of invasive alien species		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	should be undertaken. This should extend right through to the decommissioning and closure phase of the project. • **Mitigation:** ➢ A detailed wetland mitigation strategy should be compiled to address the impact of the proposed wetland loss. Such a strategy should quantify the expected wetland loss in terms of hectare equivalents (using the SANBI & DWS 2014 methodology) and should propose measures to compensate for the loss of wetland habitat. Measures should include the rehabilitation and protection of suitable remaining wetlands within the Kleinkopje mining rights area and the reinstatement of a wetland/watercourse across the mined out area to ensure that the rehabilitated mining area, as well as the remaining intact catchment upslope of the mining area, are again connected to downstream water resources, in this case the Olifants River. More detail on such a wetland mitigation strategy is provided in Section 8 of the Wetland Baseline and Mitigation Report (Annexure E3).		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• A construction storm water management plan must be developed and implemented prior to the commencement of large scale vegetation clearing activities or construction activities and be maintained until the end of the construction phase. Such a plan should aim to minimise the transport of sediment off site as well as prevent the discharge of high velocity flows into downslope wetlands. Sediment traps and sediment barriers should be installed where necessary, and discharge points should be protected against erosion and incorporate energy dissipaters. • Erosion within the construction site must be minimised through the following: ➢ Limiting the area of disturbance and vegetation clearing to as small an area as possible; ➢ Where possible, undertaking construction during the dry season; ➢ Phasing vegetation clearing activities and limiting the time that any one area of bare soil is exposed to erosion; ➢ Control of storm water flowing onto and through the site. Where required, storm water from upslope should be diverted around the construction site;		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	➢ Prompt stabilisation and re-vegetation of soils after disturbance and construction activities in an area are complete; and ➢ Protection of slopes. Where steeper slopes occur, these should be stabilised using geotextiles or any other suitable product designed for the purpose. • Sediment transport off the site must be minimised through the following: ➢ Establishing perimeter sediment controls. This can be achieved through the installation of sediment fences along downslope verges of the construction site. Where channelled or concentrated flow occurs, reinforced sediment fences or other sediment barriers such as sediment basins should be used (refer to US EPA guidelines on Storm Water Pollution Prevention); ➢ Discharge storm water from the construction site (dirty water) into adjacent grassland rather than directly into wetland habitat. Discharged flows must be slow and diffuse; and ➢ Regular inspection and maintenance of sediment controls ➢ In addition, ensure that no equipment is washed in/near the streams and wetlands, and if washing facilities are provided, that these are placed no closer than 50m from a wetland or water course.		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	➢ No abstraction of water from the wetlands is allowed unless expressly authorised by the DWS. ➢ In order to reduce the potential impacts associated with the introduction of contaminants dissolved or suspended in the runoff from construction sites, where practically possible, no runoff should be introduced into wetlands. Introduction into dryland areas is preferred as the vegetation and soils provide an opportunity to limit the movement of contaminants and the environment is conducive for natural degradation. • Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks. Sufficient spill clean-up material must be kept on site at all times to deal with minor spills. Larger spills should be reported to the Environmental Officer and the relevant authorities (DWS) immediately, with specialists appointed to oversee the clean-up operations. • The partial exclusion of the wetland catchments as dirty water areas is inevitable. However, to minimise loss of water inputs to the wetlands, the following measures should be implemented:		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	➢ Isolate dirty water areas and prevent discharge of dirty water into the environment. ➢ Minimise the extent of the dirty water exclusion areas while ensuring the effective separation of clean and dirty water. ➢ Ensure concurrent rehabilitation measures keep pace with mining activities so that the rehabilitated areas can be reinstated as clean water areas draining towards downslope wetlands. ➢ During rehabilitation the opencast pit should be shaped to drain back into the Olifants River via Ramp 7. The remaining intact catchment upslope of the opencast pit should also be incorporated into the design to ensure flows from these areas can also enter the Olifants River. ➢ No discharge of dirty water should take place on site. • The overburden stockpiles will contain carbonaceous material and should be considered a dirty water area. No run-off from the overburden stockpile should be discharged to the environment without treatment. • The topsoil stockpiles should be located within a clean water area and no contaminated water should come into contact with the topsoil stockpiles.		

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	• Side slopes of the topsoil stockpiles should be kept as low as possible and should be vegetated to minimise sediment loss. • Sediment fences should be installed around the stockpile to prevent transport of sediment and topsoil away from the stockpile. All concentrated runoff from the topsoil stockpile should be conveyed through a sediment trap or similar facility which is regularly cleaned and maintained. • Clean storm water should ideally be conveyed in grassed swales rather than cement lined channels or excavated trenches. • Discharge points into the environment should be protected against erosion and be subjected to regular maintenance. • Random water quality test should be done to ensure that the water entering the water systems are clean and does not contaminate the top soil stockpiles. • Clean and dirty storm water needs to be separated. • No contaminated water should be allowed to enter the clean storm water system. • No dirty mine or dirty storm water may be released into the wetlands and should be contained and treated on site, or used for dust suppression. Should contaminated water enter the wetlands due to		

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	spillages or other unforeseen circumstances a wetland/water quality expert should be consulted regarding implementation of suitable mitigation and/or rehabilitation measures. • The required PCD should be designed to be in compliance with the applicable legislation requirements as well as accepted best management practices. • To prevent seepage and leakage out of the PCD, this facility should be lined with a suitable engineered liner. • A water quality and biomonitoring plan should be compiled and implemented (if not already in place) to monitor for any deterioration in water quality in the adjacent wetland systems. • Regular maintenance and inspections of the PCD should be undertaken to ensure operation of the dam as per design specifications. A log book of inspections and maintenance activities must be kept • It is recommended that rehabilitation of the opencast pit includes the reinstatement of a water course across the opencast pit to drain into the Olifants River via Ramp 7. The entire rehabilitated area should be appropriately shaped to ensure the upslope catchment and the rehabilitated area can drain via the reinstated water course to the		

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	Olifants River. Soil cover should be maximised in the rehabilitated area, while slopes should be kept as low as possible while ensuring free-drainage and bearing in mind that ingress into the mined out pits is minimised. • The reinstated watercourse should be designed to support wetland habitat with a variety of micro-habitats. This will require a clay liner to prevent ingress of water into the mined out pits as well as various interventions to control flow and prevent erosion and scour. Further recommendations are provided in Section 8 of Annexure E3 (Wetland Baseline and Mitigation Report). • Further recommendations include: ➢ All disturbed and transformed areas should be landscaped to approximate the natural landscape profile, but should avoid steep slopes and concentrated run-off; ➢ Compacted soils should be ripped and scarified; ➢ The rehabilitated areas should be re-vegetated as soon as possible following completion of the earthworks to minimise erosion; ➢ Regular long-term follow up of rehabilitated areas will be required to ensure the successful establishment of vegetation and to		

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	survey for any erosion damage on site. Erosion damage should be repaired immediately; ➢ The recommendations contained within the specialist vegetation and soils reports should be fully implemented to ensure successful rehabilitation; and • Sediment traps should be placed in rehabilitated areas to avoid sedimentation. • An alien vegetation management plan should be compiled by the ECO already during the construction/operational phase of the project and should be kept in place for several years following rehabilitation (minimum of ten years). All species of alien invasive vegetation should be controlled and removed from site. No spread of alien vegetation into any wetlands or adjacent properties should be allowed. Removal of alien species should not be considered a once-off activity, but should include follow-up treatments until successful control/eradication has been achieved. • The likelihood of decant, as well as its expected quality, volume, location and timing, should be determined and measures put in place to ensure that no decant or discharge of contaminated water occurs, unless it meets the required water quality standards as set by the		

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	DWS. Where these standards are exceeded, contaminated water will need to be treated. In this regard it is recommended that a water treatment plant be established, or to make use of the existing eMalahleni Water Reclamation Plant, and a water management plan put in place, to keep the water levels within the mined out areas actively managed post-mining to ensure decant is prevented and no contaminated water is discharged into the environment untreated. • No contaminated water must be allowed to enter the reinstated watercourse across the rehabilitated opencast pit.		
"*Air quality monitoring report for Anglo American Coal SA, Kleinkopje Colliery*", dated July 2016 and compiled by WSP **Annexure E7**	• None	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

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"*Report: Ground Vibration and Air Blast Monitoring prepared for Kleinkopje Collier, Anglo American, Thermal Coal*", dated September 2016, and compiled by Blast Management and Consulting **Annexure E8**	• All attempts must be made to ensure all levels are within the limits, as to avoid complaints from the public.	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.
"*A Phase 1 Heritage Impact Assessment (HIA) Study for Anglo Operations (Pty) Ltd (Kleinkopje Colliery) proposed Pit 2A Extension Project near Emalahleni in the Mpumalanga Province*", dated August 2016 and compiled by Dr Julius Pistorius **Annexure E2**	**Mitigating the graveyard impacts for GY01:** • The impacts to the graveyard (GY01) can be mitigated by means of exhumation and relocation. The exhumation of human remains and the relocation of graveyards are regulated by various laws, regulations and administrative procedures. This task is undertaken by forensic archaeologists or by reputed undertakers who are acquainted with all the administrative procedures and relevant legislation that have to be adhered to whenever human remains are exhumed and relocated. This process also includes social consultation with a 60 days statutory notice period for graves older than sixty years. Permission for the exhumation and relocation of human remains have to be obtained from the descendants of the	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

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	deceased (if known), the National Department of Health, the Provincial Department of Health, the Premier of the Province and the local police. **Managing graveyards that remain unaffected (GY02 and GY03):** • Graveyards that remain unaffected should be managed (by Anglo Operations) to ensure their future unaffected existence during the construction, operation and decommissioning phases of its mining operations. The following mitigation measures are recommended: • Graveyards must be demarcated with fences or with walls and should be fitted with access gates. • Regulated visitor hours should be implemented that is compatible with mine safety rules. This will not be necessary when graveyards are located next to national roads. • Corridors of at least 20m should be maintained between graveyard's fences and any developmental components such as roads or other infrastructure that may be developed in the future. • Graveyard should be inspected every three months. Inspections should be noted in an inspection register. The register should outline the state of the graveyards during each inspection. Reports on		

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	damages to any of the graves or to the graveyards (fences, walls, gates) should be followed with the necessary maintenance work. Maintenance work should be recorded in in the inspection register. • Graveyards should be kept tidy from any invader weeds and any other refuse. **General:** • If any heritage resources of significance are exposed during the Pit 2A Extension Project the SAHRA should be notified immediately, all development activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologists (ASAPA) should be notified in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from the SAHRA to conduct the mitigation measures.		
"Phase 1 Palaeontological heritage impact assessment report on the site of the construction of a proposed haul road, proposed extension of mining activities beneath 2A Pollution Control Dam and the site of the new Pollution	**Pit 2A extension mining area**: • It is recommended that a member of staff (e.g., the Environment Officer) of the Kleinkopje Colliery be trained to recognise the types of fossils that may be exposed via the mining operations and how to excavate and curate them. This officer should:	**X**	Refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I, as well as Part B of this EIAR / EMPr.

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Control Dam on Kleinkopje Colliery", dated September 2016", compiled by Professor Barry Millsteed **Annexure E2**	➢ Make regular inspections of newly exposed rock material following blasting to identify if scientifically significant fossils have been exposed. ➢ An experience Karoo palaeobotanist must be mandated by the colliery to inspect the fossils, ascertain their significance and to make any necessary recommendations concerning their preservation. ➢ Should scientifically significant macrofossil materials be unearthed during the excavations associated with the project the excavations in that area should be halted in that location and SAHRA informed of the discovery and a palaeontologist contracted to evaluate their importance. ➢ A significant potential benefit of the examination of the excavations associated with the construction of the project is that currently unobservable fossils may be uncovered and that potentially significant fossil material may be made available for scientific study. • It is further recommended that:		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	➢ Six monthly examinations of the colliery pit by an experience Karoo palaeobotaist should be undertaken once mining has commenced. ➢ The six monthly periodicity of these inspections should be subject to later review, based on the results of those inspections. ➢ Should scientifically significant macrofossil materials be unearthed during the excavations associated with the project the excavations in that area should be halted in that location and SAHRA informed of the discovery and a palaeontologist contracted to evaluate their importance. ➢ Should scientifically or culturally significant fossil material exist within the project area any negative impact upon it could be mitigated by its excavation (under permit from SAHRA) by a palaeontologist and the resultant material being lodged with an appropriately permitted institution. In the event that an excavation is impossible or inappropriate the fossil or fossil locality should be protected and the fossil site excluded from any further construction activities.		

The above mentioned specialist reports are attached hereto in Annexure E.

11. Environmental Impact Statement

11.1 Summary of the key findings of the environmental impact assessment

A detailed description of the methodology utilised to determining the environmental impacts and their respective probability, magnitude and severity is provided in Section 7.6 above. As part of the EIA process, a number of alternatives applicable to the proposed project were identified (refer to Annexure D for the detailed quantitative Alternatives Assessment Report) and therefore (as per the requirements of the EIA Regulations GN. R982, dated 04 December 2014) the risks associated with the proposed activity, as well as the identified alternatives, were assessed (refer also to the Part 5 of the Risk Assessment Report attached hereto as Annexure I).

Significant environmental impacts

During the risk assessment process (refer to Annexure I) it was found that the proposed project would result in a number of impacts with a "High" significance rating, and these impacts include impacts on geology, sensitive landscapes, heritage sites (GY01), soil, land use and land capability, surface and groundwater and impacts on socio-economic aspects relating to mine closure and interested and affected parties.

Several other impacts on the bio-physical and socio-economic environment have been identified and assessed (refer to Part 5 of the Risk Assessment Report attached hereto as Annexure I), and include impacts on the following:

- Topography.
- Flora and fauna
- Air quality.
- Noise, air blast and ground vibration.
- Visual aspects.
- Protected areas and conservation planning.

Refer also to Section 11.3 below for a summary of the negative and positive environmental impacts, after mitigation.

Concerns raised by IAP's

Because of the fact that Shangoni has no interest in this activity other than the fair remuneration for the work done by it and the fact that payment for the work done by Shangoni is not subject to a positive outcome of the application, no circumstances exist that may compromise the objectivity of the EAP (as required per the definition of "independence"). Due attention and consideration have been placed to consider the inputs from I&AP's within this EIAR / EMPr, and the comments/concerns received from

I&AP's are highly regarded for the value and merit in compiling of this EIAR / EMPr. The public participation process conducted for the project has been described in detail in the Public Participation Report attached hereto as Annexure GI and the comments received from all I&APs and stakeholders have also been included in Part 7.3 above.

11.2 Final Site Map

The final site layout plan is presented in Figure 5 and the final site layout plan in relation to sensitive environmental features in presented in Figure 84. Refer also to Annexure A.

11.3 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Table 73: Summary of negative and positive environmental impacts, after mitigation.

Geology	
A permanent impact on the localised geology of the areas associated with the proposed extension area will result from the mining and removal of coal.	High
Topography	
Changes in topography as a result of opencast mining activities The existing and continued mining activities at Pit 2A has altered the topography. The construction and progressive development of the open pit (as part of the Pit 2A Extension activities) and the establishment of various associated stockpiles will continue to temporarily alter the topography until such time as rehabilitation activities have been undertaken.	Low
Changes in topography as a result of the construction of the haul road, pollution control dam and continued disposal of mine residue on existing co-disposal facility • The continuation of disposal of residue within the existing footprint of the Klippan Co-Disposal Facility will continue to influence the nature of the topography that is typical of the surrounding area[72] • The construction of the haul road and pollution control dam will lead to an alteration of the topography and subsequently the alteration of drainage patterns on-site.	Low
Soil	
Soil erosion Susceptibility to erosion will be largely increased once the vegetation is cleared and the soils become exposed to wind and storm water.	Medium
Soil compaction	Medium

[72] Not a listed activity applied for as part of this EIAR / EMPr. The mentioned existing facility was included in the approved EMPR dated 2012 which EMPR is deemed to be approved in terms of the National Environmental Management: Waste Act (NEMWA), 2008. Therefore, this activity is not applied for as a waste management activity. However the continued impact on the topography as a result of the Pit 2A Extension activities has been included in this Risk Assessment Report.

Heavy equipment traffic is anticipated to cause significant soil compaction during construction activities. The severity of this impact is anticipated to be particularly highest in the vicinity of the proposed hauling road and during stripping within the application area.	
Soil contamination The soil contamination impact is largely dependent on the nature, volume and/or concentration of the contaminant of concern, and all of the identified soils are considered to be equally predisposed to contamination, as contamination sources are unpredictable and typically occur as incidental spills or leaks, and or decant of contaminated mine water in such mining projects.	Medium
Waste management The incorrect handling and disposal of general waste, scrap metal and industrial waste (e.g. waste tyres) will have a long-term impact on the local area. Impact will not only effect soil but could also impact on the habitat of fauna and impact of fauna, surface water and groundwater. In addition, the visual character of the area will be impacted on. The incorrect handling and disposal of hazardous waste can also have a permanent negative impact on the local area. Soil, water sources and fauna habitats can be adversely affected and human health can be impacted on.	Low
Land use and land capability	
The main impact from a land capability perspective at Klein Kopje Mine is land degradation and loss of land capability from the proposed mining pit extension area. The soils that will be impacted by the proposed mining activities include the following: • Clovelly/Hutton; • Longlands/Fernwood; • Westleigh; • Katspruit; and • Dresden soil forms.	Medium
Flora	
Impacts associated with clearance and site establishment The Kleinkopje Colliery mining area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area (Wetland Consulting Services, 2016). The project area is situated within an area vegetated by the Moist Sandy Highveld Grassland vegetation type according to Low & Rebelo (1998) with the most recent vegetation classification, classifying it as Eastern Highveld Grassland (Mucina & Rutherford 2006). The vegetation type is considered to be Endangered nationally with none conserved and 55% altered, primarily by cultivation. The conservation status of this vegetation type is very poor, with large parts that are either currently cultivated or have been previously ploughed, and the remaining untransformed vegetation that occurs as patchy remnants that are often heavily grazed. The Kleinkopje Colliery mine lease area is situated in an endangered ecosystem. This means that the ecosystem has	Low

undergone degradation of ecological structure, function or composition as a result of human intervention, although it is not critically endangered (Digby Wells, 2014).

A number of impacts on the study area were observed on site by the wetland specialist (Wetland Consulting Services, 2016) (Annexure E3):

- Mining activities in and downstream from the direct catchment of the area,
- Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area);
- Contaminated seepage with elevated salinities from the adjacent discard dump;
- Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area;
- Numerous trenches cross the study area, diverting and intercepting flows;
- A number of old excavations occur within the study area;
- Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area;
- Numerous roads and tracks cross the study areas; and
- Impoundment of flow in dams and upstream of road crossings.

As per the Biodversity Action Plan (BAP) for Kleinkopje Colliery (Digby Wells, 2014), the areas associated with the proposed location of the Pit 2A Extension and related activities fall within an area with low biodiversity value (Annexure E1).

Only one species *Gladiolus macneilii*, which is included in the BAP even though it does not occur on the National Herbarium of Pretoria (PRE) Computerised Information system (PRECIS) list for the area, is endangered, and may require special measures to protect any populations that are positively identified. The remainder of the threatened species are in the vulnerable and near threatened categories indicating that conservation efforts aimed at the level of habitat conservation are adequate in the surface rights area (Digby Wells, 2014).

However, the BAP also indicates that the wetland systems within Kleinkopje Colliery's mine boundary area (and thus also the hillslope seepage wetland associated with the proposed Pit 2A Extension area and associated haul road and dewatering pipeline) provides unique habitat for various flora species, especially potential Red Data *Nerine gracillis, Callilepis leptophyll, Crinum bulbispermum, Crinum macowanii ,* and *Aspidoglossum validum.*

The possibility thus exist that potentially occurring conservation important species may be impacted upon, if not mitigated appropriately.

Establishment / increase of alien invasive vegetation During the clearance, construction and operational phase activities and following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems (Wetland Consulting Services, 2016).	Medium
Fauna	
Habitat transformation Loss and degradation of untransformed faunal habitat as a direct result of clearing of vegetation and habitat to allow for mining and farming activities as well as related infrastructure establishment. This in turn may affect the biodiversity regionally, as present ecological systems may be altered and replaced by another less sensitive system. Refer however also to discussions under Section 5.5 above (Flora) regarding the biodiversity value of the mining area and project area specifically. Habitat fragmentation may occur as a result of the degradation and seclusion of possible natural corridors and habitat types. This results in the disruption of ecological connectivity and migration routes of larger animals as well as territorial infringement. Surface and groundwater related impacts may result in an impact on fauna including loss of species, loss of habitat and overall loss of ecological integrity. Furthermore, noise and lighting disturb animal migration, occupation patterns and natural foraging activities.	Low
Potential loss of faunal species This impact includes the potential loss of natural animal individuals through increase of traffic through natural areas resulting in potential collisions with animals on roads. Direct mortality is highly likely of ground-living animals as a result of blasting operations and operation of heavy mining machinery. Animals may also become trapped or drown in the pollution control dam.	Low
Surface water	
The surface area of the new proposed haul road will be compacted to ensure that the road will be able to carry heavy vehicle activity. As a result, increased volumes of surface runoff will be generated during storm events that might lead to erosion of the road itself. Increased sediment load as a result of potential erosion of the haul road at surface runoff concentration areas will result in surface water quality deterioration to adjacent clean water areas including wetland areas.	Low
Silt accumulation within the conveyance channels is a continual problem at coal mining operations and thereby, as a result, reducing channel capacities, blocking silt traps and compromising the capacities containment facilities such as the plant return water dams. <u>Surface water quantity:</u>	Medium

Process water spillages within the plant area will result in a reduced amount of water recycled within the process resulting in additional water that has to be sourced for usage. Ponding of surface water runoff at the plant also have a negative effect on plant operations.	
The current Ramp 7 trench and Ramp 7 sump should be used as an additional measure to contain any possible spillages or overflows from the current plant return water dams or the proposed pollution control dam. Ineffective maintenance of the trench and the sump might cause overflow towards the Olifants River located approximately 700 meters downstream.	Medium
Surface runoff and rainfall directly into the ramps, voids and areas in the vicinity of the mining operations are inevitable. <u>Surface water quantity:</u> Rainfall and surface runoff into the respective ramps will cause a reduction in catchment yield towards the adjacent clean water areas.	Low
Currently there is a small catchment area in the upper north-western section of the 2A extension area which generates clean runoff towards 2A Dam. The proposed 2A extension area will encroach the small catchment area and therefore it is important to divert and prevent the ingress of any clean surface runoff that will be generated from the remaining catchment into the mine workings. Due to the topographical characteristics and proposed structures that will prevent surface runoff ingress into the workings, the impact is considered as low. Rainfall and surface runoff into the respective ramps will cause a reduction in catchment yield towards the adjacent clean water areas.	Low
The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit resulting in a reduced storage capacity for excess process water at Kleinkopje Colliery. <u>Surface water quantity:</u> The removal of the current 2A Dam from the Kleinkopje water management circuit will require that all sources that are currently connected to 2A Dam be rerouted to the plant return water dams. Surface water flood modelling and the average dry and wet season water balance indicated that the current plant return water dams do not have sufficient buffer capacity and storage capacity to contain excess mine process water. Significant overflow of the plant return water dams will occur resulting the mine process water discharge towards the Olifants River.	Low
As per the scenarios presented in the water balances in Section 5 of the Hydrology report (Storm water management plan) (Annexure E4), for both wet and dry season scenario, a significant volume of excess water has been calculated to report to 2A Dam. It is however believed that significant seepage from 2A Dam occurs that is reflected in the high dewatering volume and subsequently also in the excess water. All seepage is contained in the underground affected water system and pumped back to surface for safe continuation of mining activities. <u>Surface water quantity:</u>	Positive

The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit. Should 2A Dam in future be replaced with a facility designed to minimise seepage (e.g. membrane or clay of high plasticity), the dewatering requirements could substantially reduce. The management requirements for dewatering operations would also be simplified and the associated costs associated with dewatering will substantially reduce.	
Groundwater	
Impacts associated with the clearance of vegetation, construction and use of haul roads, construction of a new pollution control dam Site clearing and removal of topsoil, may lead to ponding of surface water in the cleared areas during the wet season and could potentially lead to increased infiltration to aquifers. Groundwater quality impacts during the construction phase are expected to be insignificant if the proposed management measures are implemented. The stripping and stockpiling of topsoil and subsoil from the pit and infrastructure surface areas is considered negligible since no chemical interaction is envisaged that could have an adverse impact on groundwater quality. The stripping of topsoil before the advancing pit may result in a very slight increase in groundwater recharge, which is a slight positive effect on the groundwater environment. The duration of the activity is however so limited that the effect will not be measurable. The construction of the above mentioned infrastructure will cause a very small reduction in recharge to the aquifer due to the compaction of the surface area. This impact is countered by the fact that vegetation clearing may result in ponding and slight increases in recharge. Runoff water will contribute to the catchment yield. Carbonaceous material found within the mine lease area has the potential to generate acidic leachate, which means that any construction undertaken with carbonaceous material may be a potential source of poor quality leachate.	Low
Impacts associated with the progressive development of the pit including blasting Blasting activities may impact negatively on the groundwater quality if significant amounts of explosives are spilled or incompletely detonated. The chemical residues in the form of NH_4 and NO_3 may potentially leach to the groundwater table. The aquifer structure will be destroyed wherever the pit intersects the aquifer. Any nitrogen contamination that may occur will be localised within the pit area during the operational phase, due to the dewatering activities within the pit acting as a sink preventing plume migration.	Medium
Impacts associated with the utilisation of water management measures Poor quality seepage from unlined return water/dirty water dams is inevitable and could have the following consequences on the local groundwater regime: • Groundwater mounding directly underneath the dam/s. • Downstream movement of a pollution plume within the weathered zone aquifer. It should be noted that the preferred option is the construction and operation of a new pollution control dam (refer Annexures D and E4). The new pollution control dam will be lined facility. The alternative option considered during	

the process relates to the upgrading and use of the existing Plant Return Water Dam. The Plant Return Water Dam is an unlined facility. Therefore, the two options have been rated separately (below).	
New pollution control dam at sites 1; 2; 3; 4 or 5 (lined)	Low
Upgrading and use of existing Plant Return Water Dam (unlined)	Medium
Impacts associated with the disposal of mine residue and concurrent backfilling of overburden – Operational Phase Acid base accounting showed that a likely possibility exists for AMD development from the overburden and coal seams. During the operational phase of mining, the impact on pit and PCD quality is believed to be moderate given the short residence time and contact with carbonaceous material of water in the pit. If the PCD is unlined contamination of the upper weathered or perched aquifer may occur but migration thereof will be limited during the LoM given the hydraulic conductivities of the Karoo type aquifer. Due to the pit acting as a sink during the operational phase, no seepage from the pit towards adjacent aquifers (plume migration) is likely to occur. Overburden of stockpiles and backfilling have the potential to pollute aquifers.	Low
Impacts associated with the removal of groundwater inflow into pit During the operational phase the open pit mining will be active which will cause the dewatering of the surrounding aquifer(s), the degree of which will depend upon the depth and extent of the open pit. The aquifers affected by the cone of depression will depend on the final depth of the pit. It is expected that the pit will not exceed a depth of 60 m. No privately owned boreholes are situated within the modelled cone of depression.	Low
A pollution plume will start to migrate during the decommissioning and closure phases when mining and dewatering has ceased. The following impacts may be expected: • Deterioration of groundwater quality within the backfilled opencast mine workings due to AMD reactions. • Downstream movement of a groundwater pollution plume. • Decant may occur at the lowest topographical point. • Risks towards receptors are deemed to be low due to absence of privately owned boreholes or natural rivers/streams in the near vicinity.	Low
Sensitive landscapes (Wetlands)	
Loss and disturbance of wetland habitat – Construction All wetland habitats falling directly within the mining footprint will be permanently destroyed by the proposed opencast mining activities. This amounts to the direct loss of roughly 145 hectares of wetland habitat (and a further 22.7 ha of dam habitat), consisting mostly of hillslope seepage wetland habitat that has been largely modified (PES D) and which is considered of Moderate importance and sensitivity. A haul road will also be constructed around the northern and western edge of the proposed opencast pit and will cross the hillslope seepage wetland remaining upslope of the opencast pit. This will further contribute to the loss and degradation of wetland habitat.	High[73]

[73] Refer also to positive impact (opportunity) below related to the re-instatement of the watercourse towards the Olifants River

Although a wetland system can be recreated over the mined out area, this wetland will differ in terms of hydrological drivers, seasonality and species composition from the natural system.	
Increased sedimentation in adjacent wetlands – Construction Construction activities associated with the opencast pit and associated activities (including the haul road, stockpiles and required PCD) will involve the clearing of large areas of soil, as well as the movement of soil and overburden with subsequent stockpiling. This will expose large areas and large volumes of soil to erosion by wind and water, which will likely be aggravated by an increase in surface runoff from bare soil areas and concentration of flows. Sediment could be transported downslope via surface runoff to the adjacent wetland areas, leading to: • Increased turbidity with resultant impacts on aquatic habitats, including loss of sensitive species; and • Increased sediment deposition in wetlands, leading to habitat degradation as these areas become colonised by alien and pioneer species. Severe sedimentation could also impact flow distribution within the wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Low
Increased turbidity and water quality deterioration – Construction During the construction phase, as activities are taking place adjacent to wetlands, there is a possibility that water quantity and quality can be impaired through contaminated surface runoff entering the wetlands. Typically, impairment will occur as a consequence of sediment disturbance resulting in an increase in turbidity. Water quality may also be impaired as a consequence of accidental spillages and the intentional washing and rinsing of equipment within the wetlands. It is possible that hydrocarbons will be temporarily stored and used on site, as well as cement and other potential pollutants. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Low
Decreased flows within adjacent wetlands – Construction The opencast pit and associated surface infrastructures will be designated a dirty water area and as such will be isolated from the surrounding catchment. In addition, the opencast pit will intercept any shallow subsurface seepage from upslope. Water inputs to downslope wetlands could thus decrease, resulting in partial desiccation of these systems. However, in the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. The 2A Dam is already classed as a dirty water systems and is isolated from downstream water resources. There will therefore be no further reduction in flow to downstream wetlands and water resources.	Low
Increased sedimentation in adjacent wetlands – Operation	Low

Various stockpiles will be required as part of the proposed mining activities, including overburden and topsoil stockpiles. Such stockpiles will be characterised by bare soil, steep side slopes that generate significant surface run-off. Run-off from these stockpiles is likely to be sediment rich. Where run-off from these stockpiles enters adjacent wetlands, sediment will be deposited and changes in vegetation are likely to occur, with pioneer species such as *Typha capensis* and *Phragmites australis* or other weedy species likely to become dominant. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project	
Water quality deterioration – Operation Ongoing mining activities could lead to water quality deterioration in adjacent water resources via a number of pathways: • Ineffective clean and dirty water separation • Storm water typically contains various pollutants that could contribute to deteriorating the water quality in the wetlands where storm water is released into such as the valley bottoms • Discharge of contaminated water • Decant points from the mine workings • Leakage/seepage/overflow out of pollution control dams • Overflow of dams from water treatment plant directly into the seepage wetlands In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Low
Altered hydrology – Decommissioning and Closure Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality	Medium
Increased sediment transport into wetlands – Decommissioning and Closure The rehabilitated mine impacted areas will be susceptible to erosion following rehabilitation, especially in areas that are sparsely vegetated and/or steep sloped areas. This will result in increased sediment loads in the downslope wetlands, leading to deteriorating water quality (increased turbidity and TSS) and changes in the aquatic fauna and flora. Changes in wetland vegetation can also occur as sediment thriving plants (e.g. *Phragmites australis*) become dominant. As a watercourse across the rehabilitated area will be reinstated, sediment rich flows derived from the rehabilitated area would be discharged into the Olifants River.	Low

Increased in alien vegetation – Decommissioning and Closure Following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A Pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems.	Medium
Altered hydrology – Post-Closure Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality	Medium
Water quality deterioration – Post-Closure Post-mining, the backfilled opencast pit is likely to fill with water as groundwater levels rebound. Opencast mining permanently destroys the aquitard and strata supporting the perched water table, resulting in increased infiltration of surface water, with infiltration values of 14-20% of rainfall being recorded for rehabilitated opencast mines compared to only 1-3% under natural conditions. Water in the pits is expected to become acidic and sulphate rich due to the oxidation of pyrites in the backfilled spoils. Decanting water could potentially be acidic and is likely to be metal and sulphate rich. Decant will eventually enter the Olifants River and downstream Witbank Dam, which are already water quality stressed systems. Acidic, sulphate rich water is likely to lead to a loss of sensitive species (including sensitive aquatic fauna as well as sensitive flora such as orchids) within the affected water courses and result in changes in species composition, with salinity tolerant species likely to become dominant.	Medium
A positive impact is expected from the recreation of a watercourse with wetland habitat across the 2A Pit area as well as the rehabilitation and protection of two representative pans of the area. The mentioned pans as well as the re-instatement of flow to the Olifants River from the 2A Dam sub-catchment are considered important from a biodiversity support perspective. This sub-catchment is currently an isolated dirty water catchment which, following rehabilitation, will again be a clean water catchment linked to the Olifants River and downstream water resources. Although the re-created watercourse will not resemble the wetland habitat being lost to mining, the re-created water course can be design to re-instate specific desired functions to the landscape, including biodiversity support, flood attenuation and sediment trapping.	Positive
Air quality	
Impacts during site establishment	Low

Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment.	
Impacts during mine operation (extension) Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Kleinkopje Colliery is an opencast mine, contributing significantly to surface dust fallout. The inherent air quality of the area is considered poor and is impacted on by the activities of adjacent collieries, industry, and vehicle use and veld fires. Furthermore, dust generation occurs from the existing opencast operations on-site. The operational phase would result in continued air quality related impacts due to the progressive development of the opencast pit. The following activities may pose a fire risk on-site, if not management appropriately: • Maintenance activities. • Storage, off-loading and refuelling of hazardous substances (e.g. hydrocarbons (diesel and oil), chemicals etc.). • Operation and handling of explosives • Waste management activities.	Medium
Impacts during site rehabilitation Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Impacts during the Decommissioning- and Closure Phase are anticipated to be short-term in nature.	Low
Noise	
The study area is characterised by the presence of existing noise sources. There are major coal mining activities within the surrounding area (including Greenside Colliery and Landau Colliery). The proposed project is not expected to worsen the noise levels of the study area as it would be a continuation of the current Pit 2A mining activities. The current ambient noise levels are characterised by the presence of mining and related activities, and road traffic related noises. Noise levels at the proposed site are expected to be the same as that of the current Pit 2A.	Low
Vibration and Blast	
Ground vibration and air blast from the existing Kleinkopje Colliery operations (including Pit 2A) are monitored on a monthly basis. The results from the latest (August 2016) report (Annexure E8) indicated that levels of ground vibration recorded at privately owned structures or houses were within the limits and within the safe blast criteria, the levels recorded at the Dam Wall were within the ground vibration limit and acceleration limits, except for one event which just exceeded the vibration limit. Air blast levels recorded were within the accepted levels currently applied in South	Low

Africa of 134 dB at the structures monitored, except for eleven events that were greater than the limit. The possibility of damage is unlikely due to ground vibration and / or air blast at the surrounding structures / buildings. No damage was observed or reported after the blast. Since the Pit 2A Extension will be a continuation of the current Pit 2A operation, the possibility of blasting impacting on structures within and surrounding the mine, still remains.	
Visual aspects	
Pit 2A Extension mining area and associated haul road and dewatering pipeline The visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area. During the decommissioning phase, final voids and ramps will be profiled and vegetated thus reducing the impact on visual aesthetics. Filled final voids will progressively be cladded by stockpiled soils. Haul roads will be ripped, shaped and re-vegetated. Vegetation cover on rehabilitated land will reduce fugitive dust generated. Visual impact of final voids will be reduced due to vegetative cover (approved EMPr, 2012).	Low
Continuation of the disposal of mine residue within the existing footprint of the current Klippan Co-disposal site, located at Kleinkopje Colliery The visual quality (and 'sense of place') of the environment associated with the existing Klippan Co-disposal site has already been altered due to continued deposition activities on the mentioned facilities as per Kleinkopje Colliery's approved EMPr, 2012. The continuation of the deposition of mine residue on the co-disposal facility during the activities undertaken at the Pit 2A Extension will result in the continued visual impact posed by the establishment and development of the facility.	Medium
Pollution Control Dam Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the visual impact it may pose in terms of visual aesthetics, depending on sensitive receptors, distance and viewing lines from roads etc. Therefore, the visual impact associated with the six site alternatives have been rated separately below. It should however be noted that, in general, the visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area and Kleinkopje Colliery as a whole, has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area.	
Pollution Control Dam: Alternative Site 5 (preferred alternative)	Low
Pollution Control Dam: Alternative Site 1	Medium
Pollution Control Dam: Alternative Site 2	Medium
Pollution Control Dam: Alternative Site 3	Low
Pollution Control Dam: Alternative Site 4	Medium
Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam)	Low
Protected areas and conservation planning	

Pit 2A Extension area, including stockpiles and haul road and associated structures The Kleinkopje Colliery mining area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area, as portrayed in the Mpumalanga Biodiversity Conservation Plan 2013 (MBSP 2013) terrestrial biodiversity assessment which classifies large parts of the study area as having no natural habitat remaining (Wetland Consulting Services, 2016) (Annexure E3). An area classified as a Critical Biodiversity Area (CBA) Optimal (Critical Biodiversity Area Optimal) is however indicated as occurring within the northern corner of the proposed opencast pit extension area (refer Figure 26). A number of impacts on the study area were observed on site by the wetland specialist: • Mining activities in and downstream from the direct catchment of the area, • Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area); • Contaminated seepage with elevated salinities from the adjacent discard dump; • Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area; • Numerous trenches cross the study area, diverting and intercepting flows; • A number of old excavations occur within the study area; • Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area; • Numerous roads and tracks cross the study areas; and • Impoundment of flow in dams and upstream of road crossings. It is also important to note that the remainder of the CBA area (to the north-east of the proposed extension application area) has been earmarked for mining activities of the current authorised Pit 2A as per the mine plans contained in Kleinkopje Colliery's approved EMPr, 2012. Refer to Figure 3 showing the approved Pit 2A area as per the approved EMPr (including the proposed Pit 2A Extension).	Medium
Dewatering pipeline It is not anticipated that the dewatering pipeline will cross over the identified CBA area(s) within and in close proximity to the study area (refer to Figure 26). Therefore, no impact in terms of protected areas and conservation planning is envisaged from the placement of the dewatering pipeline.	Low
Pollution control dam Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the impact it may pose in terms of protected areas and conservation planning, depending on the location of such PCD sites in relation to critical biodiversity areas or ecological support areas. Therefore, the impact associated with the six site alternatives have been rated separately below.	
Pollution Control Dam: Alternative Site 5 (preferred alternative) – Not located in CBA / ESA	Low

Pollution Control Dam: Alternative Site 1 - Not located in CBA / ESA.	Low
Pollution Control Dam: Alternative Site 2 – Located close to CBA Optimal	Medium
Pollution Control Dam: Alternative Site 3 - Not located in CBA / ESA.	Low
Pollution Control Dam: Alternative Site 4 – Located in ESA Protected Area buffer	High
Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam) – Not located in CBA / ESA	Low
Site of archaeological and cultural importance	
The Phase I HIA study for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area(s), namely (Figure 26): • One graveyard in the Pit 2A Extension mining (application) area (GY01). • Two graveyards directly outside the Pit 2A Extension mining (application) area (GY02, GY03). GY01 will be affected by the Pit 2A Extension Project. GY02 and GY03 fall outside the footprint of the Pit 2A Extension Project and will not be affected by the proposed Pit 2A Extension Project. All graveyards and graves can be considered to be of high significance and are protected by various laws. According to the specialist, all the graveyards hold graves which are older than sixty years. The identified archaeological sites are rated separately, below. No sites of archaeological importance were identified within the proposed pollution control dam study area (refer to Figure 26).	
GY01 Footprint of the proposed extension of Pit 2A will destroy GY01 with at least five graves, if not relocated.	Low
GY02 and GY03 GY02 and GY03 are located outside the Pit 2A Extension Project area and no impact due to the proposed activities are anticipated on these sites.	Low
Palaeontology	
The potential negative impacts of the proposed project on the palaeontological heritage of the area are: • Damage or destruction of fossil materials during the construction of project infrastructural elements to a maximum depth of those excavations. Many fossil taxa (particularly vertebrate taxa) are known from only a single fossil and, thus, any fossil material is potentially highly significant. Accordingly, the loss or damage to any single fossil can be potentially significant to the understanding of the fossil heritage of South Africa and to the understanding of the evolution of life on earth in general. • Where fossil material is present and will be directly affected by the building or construction of the projects infrastructural elements the result will potentially be the irreversible damage or destruction of the fossil(s). • Movement of fossil materials during the construction phase, such that they are no longer *in situ* when discovered. The fact that the fossils are not *in situ* would either significantly reduce or completely destroy their scientific significance. • The loss of access for scientific study to any fossil materials present beneath infrastructural elements for the life span of the existence of those constructions and facilities.	

The sediments of the Vryheid Formation are noted for containing an important palaeontological heritage particularly in respect of plant macrofossils of the Glossopteris flora. In general, the occurrence of fossils within the geological record is erratic in general and the chance of impacting upon most macrofossil types at any particular point within the Vryheid Formation is low. However, the presence of plant macrofossils being present within the Vryheid Formation strata being mines in Kleinkopje Colliery was confirmed in Section 7.1.2 of the Palaeontological Report in Annexure E2 of the EIAR / EMPr. Each of the three project infrastructure elements will affect the Vryheid Formation to differing degrees and, as such the probability of them negatively affecting the palaeontological heritage of the Vryheid Formation were assessed separately (below).	
Pit 2A Extension area The entire remaining thickness of the Vryheid Formation will be impacted by the mining activities. The entire vertical and aerial extent of the rocks of the Vryheid Formation within the planned mine void will be permanently and irredeemably impacted by the mining activities.	High
Pollution Control Dam The PCD will be constructed upon land that has previously been subjected to mining activities and the void subsequently in-filled with mine waste rock and rehabilitated. As a direct result, the construction of the PCD will not impact directly upon any *in situ* Vryheid Formation rocks.	Low
Haul road[74] The direct effect of the construction of the road will be restricted to the upper-most >1 m of the land surface. In all portions of the haul road route the site investigation the land surface bore a well-developed, apparently thick regolith cover. It is unlikely that the construction of the haul road would directly impact upon the Vryheid Formation.	Low
Socio-economic aspects	
Employment and economic benefit: Mining / Development Option: Positive Impact The continuation of operations at Kleinkopje Colliery (i.e. the mining of the Pit 2A Extension area) will ensure continued job security for the mine's current employees and contractors, along with the continued and benefits for the local community arising from the Social and Labour Plan (SLP).	Positive
Employment and economic benefit: No-go Option: Negative Impact Should the Environmental Authorisation not be granted for the proposed Pit 2A Extension, the Life of Mine associated with Pit 2A will not be extended and several jobs may be lost. Skills development may cease and the ore body will remain *in situ* and unutilised	Medium
Impacts on Interested and Affected Parties (I&APs) and surrounding community The impacts on other environmental features as identified in tables above (e.g. dust generation; noise; blasting and vibration; visual aspects etc.) may also pose an impact on surrounding communities and I&APs. However, mining is already undertaken at the existing Pit 2A, as well as the remainder of Kleinkopje Colliery and at other mines within the surrounding area. The existing mining activities at Kleinkopje Colliery and the large number of opencast coal mines in the region, together with the historical nature of the mining in the eMalahleni region (over 100 years of mining history) will most likely have desensitised local residents and frequent travellers through the area.	Medium
Cessation of mining activities	Medium

[74] And dewatering pipeline that will be located within haul road footprint

During and subsequent to the cessation of mining activities at Pit 2A (and its extension) a loss of jobs may occur which may not only impact on the employees but on the socio-economic status of the local community and economy.	

12. Proposed impact management objectives and the impact management outcomes for inclusion into the EMPr

Based on the assessment and where applicable the recommendations form specialist reports, the table below summarises the impact management objectives and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.

Table 74: Impact management objectives and the impact management outcomes

Environmental aspect	Objective	Summary of impact management outcome
Geology	To minimise the destruction of the geological strata and to prevent the unnecessary loss of geology	Monitoring of Mineral Resources and Reserves.
Topography	To limit the impact on topography.	Site rehabilitation and monitoring
Soil	Prevent soil erosion	Site inspections, rehabilitation and monitoring programmes; Erosion management, rehabilitation and monitoring programmes.
	Maintain functional soil structure to sustain post-mining land capability	
	Preserve healthy (non-toxic) growth medium for future land use	
	To conserve soil and land capability	
Land use and capability	Preserve sufficient soil volumes to enable pre-mining land capability post-rehabilitation. Maintain natural soil morphology (horizon sequence) and structural characteristics	Soil (and topsoil) management, rehabilitation and monitoring programmes
Flora	Prevent the destruction of vegetation and subsequent impacts species of conservation concern and protected species.	Implementation of a declared weed and invader plant species management programme. Site inspections and monitoring programmes. Implementation of and training programmes. Implementation of specialist recommendations.
Fauna	Prevent the destruction of habitats and subsequent impacts on faunal species..	
	Prevent the potential impacts on faunal species	

Environmental aspect	Objective	Summary of impact management outcome
Surface water	To prevent surface water quality deterioration towards the remaining clean water area adjacent to the proposed haul road	Storm water management plan; monitoring programmes; site inspections; spill management; incident reporting; management of water balance; preventive maintenance plan(s); rehabilitation.
	To promote the re-use of affected water within the plant operation	
	Contain spillages	
	Re-use rainfall ingress into the 2A Dam Extension Area.	
	Maintain proposed structures to prevent any surface runoff ingress into the workings during rainfall events.	
	Contain excess mine process water and prevent any discharge to the receiving environment.	
	To limit seepage to underground compartments with the 2A Dam Extension Area.	
Groundwater	To minimise the extent of disturbance of the aquifer. To limit degeneration of groundwater quality	Monitoring programmes, site inspections; spill management; incident reporting system; preventive maintenance plan(s); rehabilitation; groundwater model
	Minimise seepage, prevent contact between clean and dirty areas, and recycle contaminated water.	
	To limit aquifer depletion and quality deterioration	
Sensitive Landscapes	Minimise sediment movement off the site	Offsetting recommendations; monitoring programmes; rehabilitation.
	Minimise impact to water quality leaving the site	
	Minimise flow reduction in adjacent wetlands	
	Limit impact to water quality of downstream water resources (Olifants River)	
	Improve flow to Olifants River & re-instate some wetland functionality	
	Prevent the establishment and spread of invasive alien species	

Environmental aspect	Objective	Summary of impact management outcome
	Prevent decant of contaminated water into the environment	
Air quality	Prevent the deterioration of air quality and indirect effects on floral, faunal and human health	Monitoring programmes; dust suppression activities; maintenance activities; emergency preparedness and response; incident reporting system.
Noise; vibration and air blast	Prevent and mitigate against the effects of noise and blasting on sensitive receptors (including employees and surrounding communities and towns	Monitoring programmes; maintenance activities.
Visual aspects	Prevent / minimise visual intrusions on sensitive receptors	Monitoring programmes and rehabilitation; implementation
Protected areas and conservation planning	Prevent and / or manage impacts on ecological habitats, Conservation Important species and ecological processes in order to preserve Protected areas.	Monitoring programmes; rehabilitation.
Sites of archaeological and cultural importance	Prevent the destruction of and loss of sites of cultural and archaeological importance.	Obtaining of appropriate authorisations and permits for relocation of graves; site inspections; protection of heritage resources; training programmes.
Palaeontology	Prevent the destruction of and loss of sites of palaeontological importance.	Site inspections
Socio-economic aspects	Enhance the positive impact on the socio-economic aspects.	Implementation of SLP.
	To prevent and / or limit impacts on I&APs and the surrounding community	Implementation of measures for all other environmental aspects (above).
	To prevent or minimise the impacts on the local community and economy as a result of the cessation of mining activities during Closure	Implementation of measures to train employees to ensure future employment opportunities. Implementation of SLP.

13. Final proposed alternatives

Refer to Annexure D for the alternatives assessment. In addition, refer to Section 7.1 above.

14. Aspects for inclusion as conditions of Authorisation

Section 26 of the EIA Regulations GNR. 982, dated 04 December 2014 specifies the requirements and content of an environmental authorisation. The content requirements of the environmental authorisation is described in Table 75 below, and where applicable, a reference to the section as to where the requirement has been addressed as part of the EIR/ EMPr has been included.

Table 75: Content of environmental authorisation as per Section 26 of the EIA Regulation GNR.982, dated 04 December 2015.

Ref. No.	Requirement as per Section 26	Reference to EIR/EMPr (where applicable)
a	the name, address and contact details of the person to whom the environmental authorisation is issued	Refer to Section 1 of Part A for details.
b	a description of the activity that is authorised;	Section 4 of Part A for details.
c	a description of the location of the activity, including	
(i)	the 21 digit Surveyor General code of each cadastral land parcel,	Section 2 of Part A for details.
(ii)	where available, the physical address or farm name,	Section 2 of Part A for details.
(iii)	where the required information in sub-regulation (i) and (ii) is not available, the coordinates of the boundary of the property or properties,	-
(iv)	a plan which locates the proposed activity or activities authorised at an appropriate scale, or, if it is-	Refer to Figure 5for the plan.
(aa)	a linear activity, a description and coordinates of the approved corridor of the activity or activities; or	Refer to Figure 17 and Figure 19.
(bb)	on land where the property has not been defined, the coordinates of the area within which the activity is to be undertaken;	-
d	the conditions subject to which the activity may be undertaken, including conditions determining-	-
(i)	the period within which commencement must occur, which period may not exceed 10 years and may not be extended beyond such 10 year period, unless the process to amend the environmental authorisation contemplated in regulation 32 is followed;	As determined by the competent authority.
(ii)	the period for which the environmental authorisation is granted and the date on which the activity is deemed to have been	As determined by the competent authority.

Ref. No.		Requirement as per Section 26	Reference to EIR/EMPr (where applicable)
		concluded, where the environmental authorisation does not include operational aspects;	
	(iii)	a distinction between the portions of the environmental authorisation that deal with operational and non- operational aspects respectively and the respective periods for which the distinct portions of the environmental authorisation is granted, where the environmental authorisation contains operational and non- operational aspects;	As determined by the competent authority.
	(iv)	requirements for the avoidance, management, mitigation, monitoring and reporting of the impacts of the activity on the environment throughout the life of the activity. additional to those contained in the approved EMPr, and where applicable the closure plan; and	As determined by the competent authority.
e		the frequency of auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr, and where applicable the closure plan, in order to determine whether such EMPr and closure plan continuously meet mitigation requirements and addresses environmental impacts, taking into account processes for such auditing prescribed in terms of these Regulations: provided that the frequency of the auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr may not exceed intervals of five years;	Refer to Section 1.8 and Section 1.11 of Part B for details and / or as determined by the competent authority.
f		the frequency of submission of an environmental audit report to the competent authority, including the timeframe within which a final environmental audit report must be submitted to the competent authority;	Refer to Section 1.11 of Part B details and / or as determined by the competent authority.
g		the frequency of updating the EMPr, and where applicable the closure plan, and the manner in which the updated EMPr and closure plan will be approved, taking into account processes for such amendments prescribed in terms of these Regulations;	As determined by the competent authority.
h		a requirement that the environmental authorisation, EMPr, any independent assessments of financial provision for rehabilitation and environmental liability, closure plans, where applicable, audit reports including the environmental audit report contemplated by regulation 34, and all compliance monitoring reports be made available for inspection and copying-	-
	(i)	at the site of the authorised activity;	-
	(ii)	to anyone on request; and	-

Ref. No.		Requirement as per Section 26	Reference to EIR/EMPr (where applicable)
	(iii)	where the holder of the environmental authorisation has a website, on such publicly accessible website; and	-
i		any relevant conditions which the competent authority deems appropriate.	As determined by the competent authority.

Furthermore, should the Environmental authorisation be granted, the following condition should be included and / or taken into account:

- The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements.
- A detailed wetland mitigation strategy, including costing, should be developed and implemented in order to re-instate the watercourse towards the Olifants River as well as to rehabilitate other identified wetlands on-site.
- The EMPr should be implemented by qualified environmental personnel who have the competency and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Anglo Operations (Pty) Ltd. to provide guidance and instructions to employees and contractors.
- Stakeholder engagement must be maintained during the Construction, Operational and Closure / Rehabilitation Phases of the project, with the emphasis on the continuing provision of information.

15. Description of any assumptions, uncertainties and gaps in knowledge

In terms of Section 3(p) of Appendix 3 to the EIA Regulations GN 982, the Environmental Impact Assessment Practitioner (EAP) must provide a description of any assumptions, uncertainties and gaps in knowledge upon which the impact assessment has been based. The table below provides the assumptions and limitations applicable to the various specialist assessments.

Table 76: Specialist assumptions and limitations

Specialist	Assumptions and limitations
Geohydrological study and risk assessment for Anglo Operations (Pty) Ltd: Kleinkopje Colliery Pit 2A Extension, dated August. **Annexure E6**	• Groundwater monitoring from a comprehensive borehole network on a regular basis is required to continuously know what the impact of the activity is. The monitoring boreholes at Kleinkopje Colliery do not cover all potential source areas at present. The monitoring programme should be reviewed so that all sources are covered in terms of monitoring. Refer to Part B of his EIAR / EMPr for mitigation and management measures. A geophysical survey needs to be performed to aid in the sitting of these new proposed monitoring boreholes. After the monitoring boreholes have been drilled, they

Specialist	Assumptions and limitations
	need to be pump tested as this will give an estimation of the site specific aquifer parameters that is currently not available for Kleinkopje. • No site specific data is available for Kleinkopje in terms of acid base accounting (ABA). • Acid-base accounting (ABA) was not conducted in the Kleinkopje area during this study. It is proposed that ABA be done if information is not already for the Kleinkopje area. From experience in mining areas in the vicinity of Kleinkopje, the generation of acid mine drainage is highly probable.
"*Anglo Coal Kleinkopje Colliery - Annual Water Quality Assessment Report*", dated December 2015 (for the period January – November 2015), compiled by Aquatico Scientific, dated December 2015. **Annexure E4**	• None
Relevant recommendations from: "*Biomonitoring and toxicity assessment of the Tweefonteinspruit, Naauwpoortspruit and Olifants River*", dated December 2015 and compiled by Nepid Consultants. **Annexure E5**	• The composition and abundance of macroinvertebrates in marginal and submerged vegetation provides some insight into ecological conditions, but results need to be interpreted with caution. • The Invertebrate Habitat Assessment System (IHAS) was developed specifically for use with the SASS5 index. Instream habitats within the Study Area were unsuitable for the application of SASS5, so IHAS could not be applied. Instead, the quality of each instream habitat where macroinvertebrates were sampled were rated using the standard SASS5 five-point scale. • The Naauwpoortspruit and Tweefonteinspruit are both historically seasonal wetlands, so the natural diversity of fish is likely to have been low. Furthermore, under natural conditions no fish are expected to have occurred in these system during the dry season, so the use of fish as indicators of ecological conditions in these two wetlands is inappropriate. Nevertheless, under present conditions the flow in the Naauwpoortspruit has become permanent because of development in the catchment, and fish have colonised the system. The fish survey for this report therefore included electrofishing of the Naauwpoortspruit. Fish were not sampled from the Tweefonteinspruit because habitats were unsuitable. The use of fish as biological indicators of the Olifants River near Kleinkopje Colliery is considered inappropriate because the river here supports a low diversity of fish, with only six indigenous species expected under current conditions. All of these species are hardy and tolerant, and therefore inappropriate as

Specialist	Assumptions and limitations
	indicators of environmental change. Furthermore, the river here is difficult to sample, partly because backup from gauge B1H005 makes the river deep and difficult to access, and partly because the river channel is deeply incised and fringed with dense marginal vegetation that makes access to the river difficult without a boat. Electrofishing alone is likely to miss larger species in deeper areas, and proper sampling needs the use of nets (gill net and fyke), in addition to electrofishing.
Anglo Operations (Pty) Ltd., Kleinkopje Colliery: Pit 2A Extension. Storm Water Management Plan and Water Balance; compiled by Shangoni and dated September 2016 **Annexure E4**	• Whilst every endeavour has been made by Shangoni to ensure that information provided is correct and relevant, this technical report is, of necessity, based on information that could reasonably have been sourced within the time period allocated to the assessment, and is, furthermore, of necessity, dependent on information provided by management and/or its representatives during the course of the project. • It is assumed that the Client provided all information to Shangoni that is relevant to the scope of work included in this technical report and that no important information has been withheld. • The relevant information received from the Client during the course of this project will be deemed true and correct. If such information reflected in any documentation relevant to this project is discovered to be misleading, Shangoni does not take any responsibility for the implications of such misrepresentations made by the Client. • Any reference to legislation in this technical report should not be perceived as a substitute for the provisions of such legislation. In the event of any inconsistency between this document and such legislation, the latter would prevail. • Shangoni is under no obligation to the Client and others to conduct work not specified in the scope of work as agreed in the relevant proposal. • Flood peak calculations assume rainfall intensity is uniform throughout the duration of the storm. Analysis does not account for runoff retention or artificial acceleration within the catchment. • Calculations are done for complete catchment areas and should be distributed where there is more than one drainage point within the same built up catchment. • Storm water control recommendations are based on industry experience and best practice. Final designs for construction should be authorised by an approved engineer. • Contour and elevation data as provided during the analysis are assumed to be accurate and representative of the site and catchment areas. • Upstream catchment activities are interpreted according to common practices and no detailed insight is available on possible storm water measures beyond the site. The assessment does not guarantee the integrity of downstream infrastructure in the event of release or discharge from site.

Specialist	Assumptions and limitations
	• The measures proposed as part of the storm water management section of the report do not impose preference as this is an operational document to assist in the complete management of clean and dirty surface water in the vicinity of the Mbeya Coal to Power Project. • The measures proposed in the storm water management plan section of the report do not specifically cover considerations relevant to storm water management for the purpose of safety, like mine flooding and loss of life, the primary focus being environmental management and the identification of potential environmental concerns. • Recommendations represented in this report apply to the site conditions and features as they existed at the time of Shangoni's investigations, and those reasonable foreseeable. The recommendations do not necessarily apply to conditions and features that may arise after the date of this hydrological study, for which Shangoni had no prior knowledge nor had the opportunity to evaluate.
"Soil, land use and land capability assessment for the proposed Kleinkopje Pit 2A Expansion and development of a new pollution control dam, near Emalahleni in the Mpumalanga Province", dated September 2016 and compiled by Scientifc Aquatic Services A**nnexure E9**	For the purpose of this assessment, the following assumptions are applicable: • Sampling by definition means that not all areas are assessed, and therefore some aspects of soil and land capability may have been overlooked in this assessment. However, it is the opinion of the professional specialist that this assessment was carried out with sufficient sampling and in sufficient detail to enable the applicant, the Environmental Assessment Practitioner and the regulating authorities to make an informed decision regarding the proposed activities; • Land Capability was classified according to current soil restrictions, with respect to prevailing climatic conditions on site. However, it is virtually impossible to achieve 100% purity in soil mapping. The delineated soil map units could include other soil type(s), as the boundaries between the mapped soils are not absolute, but rather form a continuum and gradually change from one type to another. Therefore, soil mapping and the findings of this assessment were extrapolated from individual observation points; and • Soil fertility status was not considered a limitation, seeing as inherent nutrient deficiencies and/or toxicities would be rectified by appropriate liming and/or fertilization prior to cultivation.
"Wetland baseline and mitigation report for the proposed Kleinkopje Colliery opencast extension project", dated August 2016 and compiled by Wetland Consulting Services **Annexure E3**	• Wetland systems reflect the ecological boundary where there is a close relation and interaction between water content and soil particles in the first 50 centimetres of the soil profile. The soil-water interaction in response influences the plant communities and soil properties, i.e. causing mottling and gleying in the soil. The wetland boundary, based on vegetation species compositions and soil properties, can vary depending on historical rainfall conditions and introduce a degree of variability in the wetland boundary between years as well as sampling period.

Specialist	Assumptions and limitations
	• The scale of the remote imagery used (1:10 000 aerial photographs and Google Earth Imagery), as well as the accuracy of the handheld GPS unit used to delineated wetlands in the field, result in the delineated wetland boundaries being accurate to about 10-20m on the ground. Should greater mapping accuracy be required, the wetlands would need to be pegged in the field and surveyed using conventional survey techniques. • Groundtruthing and field verification of wetland boundaries was limited to the study area (Figure 1). Wetlands falling outside the study area boundary were not delineated in the field as part of the current study, but are based on available information from previous studies (WCS, 2013) and desktop mapping. • Reference conditions are unknown. This limits the confidence with which the present ecological category (PES) is assigned. • The study only provides for conceptual wetland mitigation and rehabilitation measures. No design or costing of proposed interventions was undertaken. • This impact assessment focusses on the impact of the proposed mining expansion only, and does not include the impact of existing mining activities on site. It is assumed that such impacts will have been covered in previous studies and existing authorisations.
"*Air quality monitoring report for Anglo American Coal SA, Kleinkopje Colliery*", dated April 2016 and compiled by WSP **Annexure E7**	• None
"*Report: Ground Vibration and Air Blast Monitoring prepared for Kleinkopje Collier, Anglo American, Thermal Coal*", dated May 2016, and compiled by Blast Management and Consulting **Annexure E8**	• None
"*A Phase 1 Heritage Impact Assessment (HIA) Study for Anglo Operations (Pty) Ltd (Kleinkopje Colliery) proposed Pit 2A Extension Project near Emalahleni in*	• Although due consideration was given to the observing and documenting of all heritage resources in the Project Area, some resources may not have been detected due to various reasons (occurring beneath the surface, unmarked, inconspicuous or eroded nature, covered by vegetation, human failure to recognise, etc.).

Specialist	Assumptions and limitations
the Mpumalanga Province", dated August 2016 and compiled by Dr Julius Pistorius **Annexure E2**	
"Phase 1 Palaeontological heritage impact assessment report on the site of the construction of a proposed haul road, proposed extension of mining activities beneath 2A Pollution Control Dam and the site of the new Pollution Control Dam on Kleinkopje Colliery", dated September 2016", compiled by Professor Barry Millsteed **Annexure E2**	The information provided within this report was derived from a detailed site investigation conducted on foot. No fossil materials were observed during the conduct of that survey. However, it was impossible, within the time constraints possible, to inspect all portions of the three project infrastructure areas. It is possible, but unlikely that fossiliferous outcrops may have not been observed. Additionally, the geological occurrence of fossils within fossiliferous geological units is sporadic and cannot be interpreted with precision or certainty. In order to assess the potential impacts of the project upon the palaeontological heritage of the area assumptions were made concerning both the scope of impact that will result from the construction of the identified infrastructure elements.
"Closure cost assessment: Rehabilitation, Decommissioning and Closure Plan"; dated September 2016, compiled by Shangoni Management Services **Annexure J**	Wetland re-establishment in the Pit 2A extension - the sloping of the backfilled material will be done in line with the proposed slope angle as per mitigation measures proposed by the wetland specialist. Further studies are required into specific vegetation to be planted and additional mitigation regarding soil pollution. In the absence of this information, provisional measures for the rehabilitation of these features in the form of routine area-based rehabilitation have been allowed. These measures and costs will have to be revised once the information from the specialist work becomes available. The final design for the proposed dewatering pipeline was not available during the compilation of this document. The closure cost may change once the design has been finalised.

The impact assessments have assumed that all specialist assessments are essentially correct.

15.1 Further gaps in knowledge

No further gaps (additional to the assumptions and limitations contained in the table above) were identified during the EIA process.

16. Reasoned opinion as to whether the proposed activity should or should not be authorised.

16.1 Reasons why the activity should be authorised or not

In accordance with Section 3(q) of Appendix 3 to the EIA Regulations GN R982, the Environmental Impact Assessment Practitioner (EAP) must provide an opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation must be stated.

An impact assessment has been undertaken using qualified specialists, which has incorporated extensive consultation with and participation of interested and affected parties. Applying the hierarchical approach to impact management, alternatives were firstly considered to avoid negative impacts, but where avoidance was not possible, to better mitigate and manage negative impacts. Where impacts were found to be potentially significant, various mitigation measures to manage and monitor the impacts of the project have been proposed. As a final option, offset strategies were considered.

In terms of collectively considering ecological, social and economic impacts it is important to remember that while there might be some trade-offs between the considerations, in South Africa all development must in terms of Section 24 of the Constitution be ecologically sustainable, while economic and social development must be justifiable. There are therefore specific "trade-off" rules that apply. Environmental integrity may never be compromised and the social and economic development must take a certain form and meet certain specific objectives in order for it to be considered justifiable.[75]

The EAP is of opinion that economic benefit will be derived from the proposed project at both local and national level. This is not only applicable to monetary aspects, as the project will allow for the continued employment and job security of the current employees of the mine. This being said, as described above in Part 11.1, a number of "High" negative impacts will transpire during the life span of the project. Impacts of primary concern relate to geology, sensitive landscapes (wetlands), soil, land use and land capability, sites of cultural and archaeological importance, and some socio-economic aspects as these impacts may be irreversible and could lead to irreplaceable loss. Impacts of notable concern, although not obtaining a severity rating of "High" as a result of the lower probability of occurrence, are impacts that may occur on fauna and flora, air quality, impacts in terms of noise generation, and visual aspects. Although a number of significant impacts may result from the proposed project, a number of these significant impacts are reversible and may not lead to irreplaceable loss, if the recommended mitigation measures are effectively implemented.

[75] Guideline on need and desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 (GN 891 of 20 October 2014);

The following reasoned opinions on whether the project should be authorised or not, were provided by the project specialists:

Table 77: Specialist reasoned opinions

Specialist	Reasoned opinion
Wetland	*'The benefits from the proposed wetland mitigation strategy include the rehabilitation and protection of two representative pans of the area which are considered important from a biodiversity support perspective, as well as the re-instatement of flow to the Olifants River from the 2A Dam sub-catchment. This sub-catchment is currently an isolated dirty water catchment which, following rehabilitation will again be a clean water catchment linked to the Olifants River and downstream water resources. Although the re-created watercourse will not resemble the wetland habitat being lost to mining, the re-created water course can be designed to re-instate specific desired functions to the landscape, including biodiversity support, flood attenuation and sediment trapping.* *Based on the above, it is our reasoned opinion that the proposed mining activities could be authorised under the condition that proposed mitigation measures are implemented, most specifically the proposed wetland mitigation strategy (including re-creation of a water course across the mined out area and the rehabilitation and protection of pans 1 and 2) and the proposed water management strategy.'*
Soil, land use and land capability.	*'Based on the findings of this assessment, the proposed development activities can be considered favourable for the projected economic incentives provided that the recommendations of this assessment report are considered and implemented to the satisfactory of the regulating authorities'*
Geohydrology	*'It is the opinion of the author that the said activity poses no significant negative contribution to the groundwater environment and that the activity can be authorised by the relevant governing body(ies).'*
Archaeology (heritage)	*'There is consequently no reason from a heritage point of view why Anglo's proposed Pit2A Extension Project cannot proceed after the appropriate mitigation measures outlined in this report have been implemented.'*
Palaeontology	*This study has not identified any palaeontological reason to prejudice the redevelopment of the 2A Dam as an open pit mine or the construction of the proposed pollution control dam or haul road at Kleinkopje Colliery subject to the proposed damage mitigation procedures being enacted.*

Based on the above and the results of the impact assessment, the EAP is of the opinion that the proposed project be allowed to commence, with the condition that the management objectives and management measures as presented in the EIAR/EMPr be implemented to effectively manage, prevent, control and / or stop environmental impacts from occurring.

16.2 Conditions that must be included in the authorisation

16.2.1 Specific conditions to be included into the compilation and approval of the EMPr

Should the DMR grant authorisation for this project, it should be subject to the following conditions:

- The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements.
- A detailed wetland mitigation strategy, including costing, should be developed and implemented in order to re-instate the watercourse towards the Olifants River as well as to rehabilitate other identified wetlands on-site.
- The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Anglo Operations (Pty) Ltd. to provide guidance and instructions to employees and contractors.
- Stakeholder engagement must be maintained during the operational and closure/rehabilitation phases of the project, with the emphasis on the continuing provision of information.

17. Period for which the authorisation is required

As per the mining schedule depicted on the site plan (Figure 5), mining at the 2A Pit will continue until 2025 (the next 9 years) (including the mining of the reserves located in the application area). Therefore, the period for which environmental authorisation is required will be for at least the next 9 to 10 years (excluding decommissioning activities).

18. Undertaking (confirmation)

The undertaking by the EAP is provided in Section 2 of Part B (Environmental Management Programme) below. This undertaking confirms: the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&APs, the inclusion of inputs and recommendations from the specialist reports where relevant and the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

19. Financial Provision

The quantum was calculated using the demolition and rehabilitation rates obtained from the CES Group and has been calculated as **R 140,359,319.27 (including P&G, contingency and VAT)** for the closure of the proposed Pit 2A extension. A breakdown of the costing is contained in Table 78. Refer to Appendix C of Annexure J for the complete cost model.

The physical component of closure contributes R 246,406.47 towards the closure liability, consisting of demolition of the proposed dewatering pipeline and removal of the chemical toilets. Biophysical costing, consisting of rehabilitation of the final void and ramp scars, rehabilitation of the haul road and the proposed PCD, contributes R 95,942,820.00 to the closure quantum. Refer to Figure 86 for a comparison of the physical and biophysical closure costs.

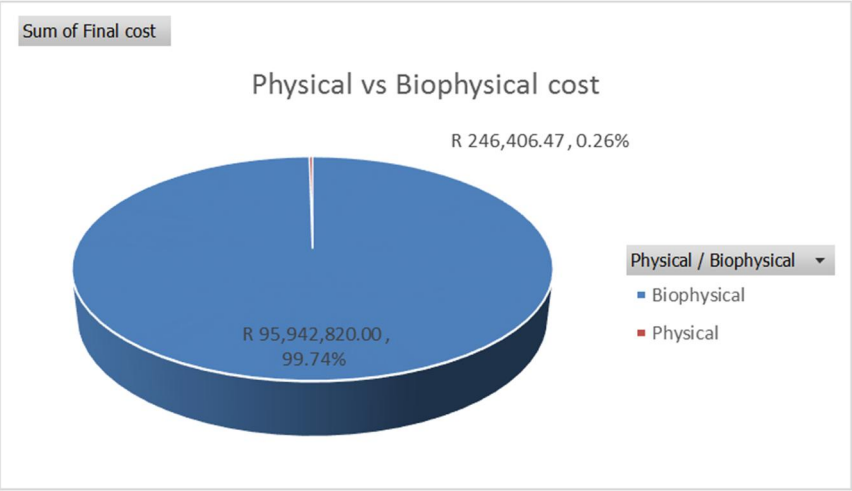

Figure 86: Physical and biophysical cost comparison

Table 78: Summary of the closure cost calculation for the proposed Pit 2A extension

Item	Final cost
Haul road	R 1,022,000.00
Dewatering pipeline	R 239,821.47
Chemical toilets	R 6,585.00
Proposed PCD	R 11,485,720.00
Placing 250 mm topsoil over void area	R 3,393,600.00
Seeding void area	R 76,129,200.00
Final void & ramp scars	R 3,912,300.00
Sub-total 1	**R 96,189,226.47**
Contingency 10%	R 9,618,922.65
P&G (18%)	R 17,314,060.76
Sub-total 2	**R 123,122,209.88**
VAT (14%)	R 17,237,109.38
Grand total	**R 140,359,319.27**

19.1 Explain how the aforesaid amount was derived.

19.1.1 Process followed

An infrastructure list was compiled using information supplied by Kleinkopje Colliery and specialists. The quantum was calculated using the demolition and rehabilitation rates obtained from the CES Group. The following assumptions have been made as part of closure planning:

- No allowances have been made for money received from sale of equipment, recyclable materials, structures, vehicles or the hiring of infrastructure in terms of premature closure costs;
- The length of the dewatering pipeline will be 6 363 m
- It is assumed that the chemical toilets will be removed during the decommissioning phase.
- The width of the haul road is assumed to be 14m, based on the haul road design report supplied by Kleinkopje.

19.1.2 Tariffs

The CES Group was contracted by Shangoni to acquire rates for demolition and rehabilitation of mining activities (Table 79). Procurement of budget pricing approached by identifying reputable demolition companies, various sites of varying sizes at various locations and identifying local companies in the study area with ability to work on similar scale project. A bill of quantities (BoQ) was distributed to the various companies. The table below indicates the number of contractors to which the BoQ was distributed and the number of tenders received afterwards.

Table 79: Results of rate acquisition process

Area	Number of contractors identified	Tenders received
National	6	1
North West	6	3
Free State	5	1
Northern Cape	7	2
Limpopo	5	3 (One joint venture with national based company)
Total	29	10

The prices received from contractors were reviewed by the CES Group, after which average and meridian rates were drawn rates to correctly establish a baseline rate. The following methods to establish the baseline rates were followed:

- Price A - Average if priced – across the board average of rates received per category;
- Price B - Median pricing – “middle” rate of all rates in series per category;
- Price C - Average between Price A & B;

- Price D - Average rate excluding top and bottom rates per category.
- Rates used in the closure cost calculation – the all-round lowest reasonable rates were used, unless otherwise indicated in the closure cost spreadsheet "Rate" sheet.

A model was used to calculate the exact rate to be used based on the information indicated above. Refer to the cost spreadsheet (Appendix C of Annexure J) for the results of the model. The levelling, and replacement of topsoil for the distributed areas will be costed at a rate of R28.43 per cubic meter (excluding P&G allowances).

The tariffs used during this closure quantum calculation are included in the table below.

The closure budget consists of the following sections:

- Physical – Demolition of infrastructure where infrastructure does not form part of end land use.
- Biophysical – Actions to safeguard (making safe and stable) and re-establish the biophysical to ensure a sustainable landform and mitigate identified risks. This includes placing rehabilitation of the final void and seeding.

Preliminary and general (P&G) costs were calculated at 18% of the demolition and rehabilitation sub-total, in line with industry norm.

Table 80: Demolition and rehabilitation rates

Rehabilitation and Demolition	List reference	Unit	Rates	Rate used
Up to 400mm Diameter piping	Infrastructure: Pipelines <400mm	m	R 37.69	Lowest quote (National)
Toilet removal	Toilet removal	no	R 6,585.00	North West
Ripping of dirt road	Ripping	m²	R 14.89	Lowest ave (top and bottom removed)
Traditional seeding	Seeding	m²	R 3.36	National
Backfilling of open pit	Dragline	m³	R 4.90	Kleinkopje 2015 rate increased by 6%
	Dozer	m³	R 7.60	Kleinkopje 2015 rate increased by 6%
Placing topsoil 400mm, max 5km haul distance	Placement of topsoil	m³	R 28.43	QS rate

19.2 Confirm that this amount can be provided for from operating expenditure

Anglo Operations (Pty) Ltd. Kleinkopje Colliery will provide for the closure liability associated with the project through the purchase of a Bank Guarantee.

20. Deviations from the approved scoping report and plan of study

20.1 Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

The methodology applied in determining and ranking potential environmental impacts and the significance of potential impacts is described in detail in Section 7.6 of Part A above. Furthermore, this methodology was described in the Final Scoping Report for this project, which was accepted on 19 September 2016. Therefore, no deviation from the methodology as provided in the Scoping Report, has occurred.

20.2 Motivation for the deviation.

Refer to Section 20.1 of Part A, above. No deviation from the methodology used in determining the significance of potential environmental impacts and risks, as provided in the approved Environmental Scoping Report, has occurred.

21. Other information required by the competent Authority

21.1 Compliance with the provisions of section 24(4)(a) and (b) read with section 24(3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:-

21.1.1 Impact on the socio-economic conditions of any directly affected person.

Table 81: Impacts on socio-economic conditions

Results of investigation, assessment and evaluation of impact on any directly affected person	Reference to where mitigation is reflected
Should the proposed Pit 2A Extension be authorised and the no-go option not be implemented, mining of the available reserves can continue. This will ensure continued job security for the mine's current employees and contractors, along with the continued and long-term benefits for the local community arising from the Social and Labour Plan. This impact will be further discussed in detail, assessed and the significance determined during the EIA and EMP Phase of the project.	Refer to Part 9.9 above and Annexure F.

21.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

Table 82: Impacts on national heritage resources

Results of investigation, assessment and evaluation of impact on any national estate	Reference to where mitigation is reflected
The Phase I HIA study for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area, namely (Figure 84): • One graveyard in the Project Area (GY01). • Two graveyards directly outside the Project Area (GY02, GY03). GY01 will be affected by the Pit 2A Extension Project. GY02 and GY03 fall outside the footprint of the Pit 2A Extension Project and will not be affected by the proposed Pit 2A Extension Project. All graveyards and graves can be considered to be of high significance and are protected by various laws. According to the specialist, all the graveyards hold graves which are older than sixty years.	Refer to Part 9.9 above and Annexure E2.

22. Other matters required in terms of section 24(4)(a) and (b) of the Act.

Section 24(4)(b) of the NEMA (1998) states that the following:

"24(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment -

(b) must include, with respect to every application for an environmental authorisation and where applicable-

(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;"

An Alternative Assessment Report has been compiled and is attached hereto as Annexure D. The Alternative Assessment Report has been compiled to include the following:

- Brief description of the proposed project.
- A description of the proposed activities to be undertaken.
- A description of the proposed alternatives.
- An assessment of the positive and negative implications of each of the alternatives.
- A description of the method to be followed during the EIA and EMPr Phase, in terms of quantitate assessing the alternatives.

Furthermore, a Risk Assessment Report (attached hereto as Annexure I) has been compiled in support of this EIAR / EMPr document and provides information regarding the potential environmental impacts associated with the proposed activities as well as an assessment of the significance of the potential environmental impacts. Information and an assessment of potential environmental impacts associated with the identified alternatives has also been provided in the Risk Assessment Report.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme.

1.1 Details of the EAP.

The requirements for the provision of the detail and expertise of the EAP are included in Part A, Section 1.1.

1.2 Description of the Aspects of the Activity.

The requirement to describe the aspects of the activity that are covered by the draft environmental management programme is included in Part A, Section 7.

1.3 Composite Map.

Refer to Figure 84 above as well as Annexure A for a map that superimposes the proposed activity, its associated structures and infrastructures on the environmental sensitivities of the preferred sites, also indicating any areas that should be avoided, including buffers.

1.4 Description of Impact management objectives including management statements.

1.4.1 Determination of closure objectives

This section presents the closure objectives of Kleinkopje Colliery operation (that are also considered applicable to the Pit 2A Extension Project). Refer to the Section 1.7.1 of Part B below for a description of the closure objectives as compared to the baseline environment as well as the Rehabilitation, Decommissioning and Closure Report attached hereto as Annexure J.

In order to guide identification of key biophysical and socio-economic drivers, and aligned to the mine's current EMPr commitments, the following general closure objectives have been formulated:

- To rehabilitate mining-related disturbed areas to a land capability that will support and sustain a predetermined mix of post closure land uses;
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation;

- To ensure that the plans and actions put in place will meet specific closure-related performance objectives;
- To maximise surface runoff from the rehabilitated mine site to the nearby Tweefonteinspruit and Olifants River;
- To prevent acid mine drainage;
- To limit decant from the open water bodies, as well as the amount of contaminated water seeping from the rehabilitated pits;
- To rehabilitate borrow pits to be free-draining;
- To remove all surface infrastructure that cannot be beneficially re-used and return the associate disturbed land to the planned final land use;
- To in-fill and slope ramps and voids to be free draining;
- To limit adverse effect on local catchment yield; and
- To limit the recharge of rainfall to the rehabilitated pits to reduce the amount of water to be abstracted to maintain the in-pit water levels to prevent surface and/or near surface contaminated excess mine water decant.

1.4.2 The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

The potential impacts that may result from the Pit 2A Extension activities have been presented in the Risk Assessment Report (attached hereto as Annexure I). The impacts were identified through the input from various specialists and their resultant specialist reports (attached hereto in Annexure E). The impacts were identified, described, assessed and their significance ranked. Mitigation measures were then put forward to prevent these impacts from occurring, and where they could not be prevented, mitigation measures were put forward to minimise, remedy and / or avoid the impacts.

1.4.3 Potential risk of Acid Mine Drainage

Coal and many mine wastes contain sulphidic material that may oxidise to produce acid mine drainage (AMD). A number of factors control the generation of AMD, but of primary importance are the relative abundance of acid producing minerals (generally the sulphides) and acid consuming minerals (generally carbonates and silicates), availability of water (moisture) and an oxidising environment (exposure to air). As AMD has the potential to impact significantly on surface and groundwater quality, it is necessary to quantify the potential of waste to generate AMD during geochemical characterisation assays.

Coal deposition is associated with pyrite being formed. Mining activity will expose the pyrite (FeS2) to oxidising agents such as oxygen and ferric iron (Fe3+). A variety of mining wastes, most notably tailings, overburden and slimes containing sulphuric material (mostly FeS2) which may oxidise to produce AMD.

The result is sulphuric acid (H2SO4) generation resulting in acidification of water it comes in contact with (depending on neutralisation potential of host rock or water). Acidification has a number of negative consequences and most notably includes the solubilisation of a variety of trace metals and metalloids. A number of factors control the generation of AMD, but the most important are the relative abundance of acid producing minerals (generally the sulphides) and acid consuming, neutralising minerals (generally carbonates), moisture content / ingress and exposure to air. As AMD has the potential to impact significantly on surface and groundwater quality, it is necessary to quantify the potential that waste rock has to generate AMD during any geochemical characterisation.

AMD is produced when sulphuric minerals are oxidised and hydrated (exposed to oxygen and water) resulting in increased salinity, acidity and metal solubility. Precipitated secondary minerals are common to AMD environments. However, the precipitated salts can re-dissolve following oxidation resulting in mineral dissolution. Secondary salts can be classified as acid producing, non-acid producing and acid buffering. The formation of the soluble salts Al^{3+}, Ca^{2+}, Mg^{2+}, Fe^{2+}, Fe^{3+} and Mn^{2+} sulphate salts influence the pH of a solution because of their capacity to generate or consume protons (Lottermoser, 2003). AMD typically has pH values below 2.3 and ionic concentrations exceeding 10 000 mg/l (Caruccio et. Al., 1981). Pyrite (FeS_2) is recognized as the major source of AMD. Acidic water has been found associated with many mine wastes including underground flows, mine decant wastes and ore stockpiles. During the oxidation process of sulphide ores, the sulphudic components (S^{2-}) in pyrite is oxidised to sulphate (SO_4^{2-}), acidity (H^+) is generated in the process and ferrous iron (Fe^{2+}) ions are released (Stumm and Morgan, 1996). The following reaction steps show the general accepted sequence of pyrite oxidation (Stumm and Morgan, 1996):

1. Acidity (H^+), Fe^{2+} and SO_4 are released into the water when the mineral FeS_2 is exposed to water and oxygen:

$$FeS_2(s)+3.5O_2+H_2O \rightarrow Fe^{2+} + 2SO_4^{-2} + 2H^+$$

2. The highly soluble Fe^{2+} species oxidise to relatively insoluble Fe^{3+} in the presence of oxygen – the reaction is slow but is increased by microbial activity:

$$Fe^{2+}+0.25O_2+H^+ \rightarrow Fe^{3+} + 0.5H_2O$$

3. Fe^{3+} is then hydrolysed by water (at pH >3) to form the insoluble precipitate ferrihydrate $Fe(OH)_3(s)$ (also known as yellow-boy) and more acidity:

$$Fe^{3+}+3H_2O \rightarrow FeOH_3(s) + 3H^+$$

4. In addition to reacting directly with oxygen, FeS_2 may also be oxidised by dissolved Fe^{3+} to produce additional Fe^{2+} and acidity:

$$FeS_2(s)+14Fe^{3+} \rightarrow 15Fe^{2+} + 2SO_4^{2-} +16H^+$$

Reaction 4 uses up all available Fe^{3+} and the reaction may cease unless more Fe^{3+} is made available (Appelo and Postma, 1999). Reaction 2, the re-oxidation of Fe^{2+}, can sustain the pyrite oxidation cycle (Nordstrom and Alpers, 1999). The rate determining step is the oxidation of Fe^{2+} to Fe^{3+} (reaction 2), usually catalysed by autotrophic bacteria.

5. The overall reaction as given by Nordstrom and Alpers (1999) is:

$$FeS_2(s)+3.75O2 + 3.5H2O \rightarrow Fe(OH)_2(s) + 2SO_4^{2-} +4H^+$$

Acidity (H^+), Fe and SO_4^{2-} are the end products of the above reactions. Reaction (1) is an abiotic process occurring at a pH >4.5 due to spontaneous oxidation of the pyrite. Process (2) is the transformation of Fe^{2+} to Fe^{3+}. This is an abiotic process when pH is >4.5, but slows down and becomes biotic at pH <4.5. At a pH below 2.5 the biotic process is most prominent. Reaction (3) produces ferric hydroxide (yellow boy), and further lowers the acidity by releasing protons (H^+). The Fe^{3+} oxidises the pyrite in reaction 4 even when oxygen in absent.

Process (2) is the rate limiting process in this mechanism. This process requires oxygen, therefore, the prevention of oxygen ingress and the creation of reducing conditions within the workings is crucial to slow down the oxidation of pyrite and the resulting low pH conditions. However, if the reaction has proceeded past reaction 2 to where Fe^{3+} is produced oxygen is no longer required for the reaction to continue. Fe^{3+} will continue to oxidise the pyrite releasing Fe, SO_4 and acidity until all the pyrite, or other sulphidic mineral, has been oxidised.

The contaminant generation potential is pronounced where the source minerals of contaminants are in direct contact with water and oxygen underground. The opencast mining operations expose reactive minerals to water and oxygen. Sulphides are the main minerals which react and contribute to the formation of AMD. Mining sections that are not in contact with groundwater flow paths i.e. flooded or stagnant sections are unlikely to contribute to AMD formation. AMD formation may be enhanced and continue at high rates if there are active flow paths through sections. Where water is flowing through moist sections, ideal conditions for sulphide mineral oxidation exist.

Many sulphide ores have a mixture of sulphide minerals such as pyrrhotite (FeS), arsenopyrite (FeAsS), chalcopyrite ($CuFeS_2$), galena (PbS), cobaltite (CoAsS), gersdorffite (NiAsS) and millerite (NiS). If pyrite is dominant it initiates acid formation resulting in leaching of metal sulphides and oxides. The end result of AMD is therefore a mixture of very acidic pH, high SO_4 and soluble and precipitated Fe including toxic heavy or trace metals, metalloids and/or radionuclides in solution (Nordstrom and Alpers, 1999).

From experience in mining areas in the vicinity of Kleinkopje Colliery as well as based on the results as contained in the Geohydrological Study and Risk Assessment (Annexure E6), the generation of acid mine drainage is highly probable (Shangoni AquiScience, 2016).

1.4.4 Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

A Geohydrological Study and Risk Assessment was conducted for the Pit 2A Extension and is attached hereto in Appendix E6. Information contained in Section 1.4.3 above was obtained from the mentioned specialist report. The impact description and significance has been included in Part A; Section 9 of this EIAR / EMPr.

Although no site specific data is available for Kleinkopje Colliery in terms of acid-base accounting (ABA), geochemical analyses were conducted on 4 overburden samples for the adjoining Landau Navigation Section (Groundwater Complete, 2013). The test results are provided in Table 83. According to the results the majority of samples are classified as a Type II rock, which means that they may produce acid when occurring under favourable conditions.

Overburden collected from one location (borehole 07) is however the exception as it was classified as a Type III rock, which poses the highest risk of generating acid in an oxidising and water enriched environment.

Table 83: Results of acid-base accounting (Groundwater Complete, 2013)

Acid – Base Accounting Modified Sobek (EPA-600)	Sample Identification			
	borehole02	borehole4	borehole07	borehole08
Sample Number	14893	14894	14895	14896
Paste pH	5.5	6.1	6.2	5.7
Total Sulphur (%) (LECO)	0.14	0.05	0.01	0.08
Acid Potential (AP) (kg/t)	4.38	1.56	0.313	2.50
Neutralization Potential (NP)	4.46	2.97	-1.48	4.21
Nett Neutralization Potential (NNP)	0.082	1.41	-1.80	1.71
Neutralising Potential Ratio (NPR) (NP : AP)	1.02	1.90	4.74	1.68
Rock Type	**II**	**II**	**III**	**II**

The nett neutralising potential (NNP), as referred to in Table 85, is calculated by subtracting the acid potential of a sample from its base potential. A negative NNP value therefore represents a sample of which the acid potential exceeds the base potential. The majority of samples have slightly higher base potentials compared to acid potentials – hence most samples are classified as a *Type II* intermediate rock. The methodology for the ABA rock classification is displayed in Table 84..

Table 84: Rock Classification

TYPE I	Potentially Acid Forming	Total S(%) > 0.25% and NP:AP ratio 1:1 or less
TYPE II	Intermediate (uncertain)	Total S(%) > 0.25% and NP:AP ratio 1:3 or less
TYPE III	Non-Acid Forming	Total S(%) > 0.25% and NP:AP ratio 1:3 or greater

The samples indicate potential acid forming tendencies and should be handled and managed in such a way as to minimise and prevent pollution towards the receiving surface and groundwater environments.

1.4.5 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

It is recommended that the concurrent rehabilitation of the box cuts and open pits follow its pre-existing in-situ profiles. Coal spoils and carbonaceous materials should be placed in the bottom of the pit beneath the water table to limit the ingress of oxygen to create a reducing environment, thus reducing the generation of AMD. This should be followed by the sandstone layers with high neutralising capacities, and lastly a good cover of clay and topsoil. The low permeable clay layer encapsulates the carbonaceous material placed at the bottom of the mined out cuts. Leaching of the neutralising minerals in the middle or top layers will result in neutralisation of AMD effects, should they occur in the lower carbonaceous material. Although these management measures may reduce contamination, horizontal groundwater seepage and minimal surface water infiltration may result in contamination over the medium and long-term. Effective monitoring of surface and groundwater should serve as early warning systems should AMD occur.

1.4.6 Measures that will be put in place to remedy any residual or cumulative impacts that may result from acid mine drainage

Refer to Section 1.4.5 above and Part B; Section 1.4.9 of this EIAR / EMPr. Refer also to Annexure I for the Risk Assessment Report.

1.4.7 Volumes and rate of water use required for the mining, trenching or bulk sampling operation

Refer to Figures 27 and 28 as well as Annexure E3.

1.4.8 Has a water use licence been applied for

A Water Use Licence Application for water use activities associated with the Pit 2A Extension will be applied for. A notice of intent to submit a Water Use Licence Application was submitted to the Department of Water and Sanitation (DWS) (refer to Annexure C6). Furthermore, two pre-application meetings were held with DWS in July 2016 and September 2016. The minutes of the mentioned meeting are attached in Annexure C6.

1.4.9 Impacts to be mitigated in their respective phases.

Table 85: Measures to rehabilitate the environment affected by the undertaking of any listed activity

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Geology	Mining of the ore reserve	Operational Phase	Pit 2A Extension area: 101 ha.	The mining activities will be limited to the mining rights boundary area and only to what is required in the mine plan (Mining Works Programme and Life of Mine Plan)	• In compliance with the Mining Rights issued in terms of the MPRDA (2002), the approved EMPr (and its associated documentation)	During the Operational Phase (until 2025)
Topography	• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Construction and use of haul roads within and around the open pit extension area(s) • Continuation of the disposal of mine residue within the existing footprint of the current Klippan Co-disposal site, located at Kleinkopje Colliery. • Construction and operation of a new pollution control dam	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015)	Ensure that the Rehabilitation, Decommissioning- and Closure plans that have been compiled in terms of Government Gazette 39425. Government Notice R.1147 dated 2015, is adhered to, kept up to date and submitted to the DMR on an annual basis.	• In terms of Government Gazette 39425. Government Notice R.1147 dated 2015 (Financial Provision Regulations) and any amendments thereto • In compliance with Kleinkopje Colliery's Rehabilitation, Decommissioning and Closure Plans • Storm Water Management Plan (Annexure E4); the NWA, 1998 and GN704, 1999 • Compliance with a detailed Wetland Mitigation Strategy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase Submission on an annual basis
				Comply with the measures contained in the Storm Water Management Plan (Annexure E4)		During the Construction- and Operational Phase
				Final land forms should be free draining with final slopes and elevations blending in with surrounding topography post-closure.		During the Closure / Decommissioning Phase
				Restore land to the agreed land capability by means of appropriate restoration of topography and rehabilitation		During the Closure / Decommissioning Phase
				Implementation of measures indicated in the Free-draining / rehabilitation models and Wetland Mitigation Strategy (once developed).		During the Closure / Decommissioning Phase
				Ripping, shaping, and vegetating of haul roads with no beneficial post-closure use and integrating these into the surrounding surface topography[76]		During the Closure / Decommissioning Phase
				Should the new Pollution Control Dam be decommissioned, removed and rehabilitated during the Closure Phase[77]: • Remove all contaminated sediment and dispose of onto the Klippan Co-disposal facility;		During the Closure / Decommissioning Phase

[76] As per the latest Kleinkopje Colliery Decommissioning and Closure Plan; January to December 2016.

[77] The possibility exists that the new pollution control dam may remain after Closure, depending on the agreed use thereof as part of the final closure plan for the mine

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Remove liner system; • Breach and shape embankments to be free-draining • Rip and shape footprint area; • Establish vegetation by applying suitable seed mix		
				Ensure compliance with the rehabilitation measures and closure objectives for the Klippan Co-Disposal Facility (as per the approved EMPr, 2012 and the Kleinkopje Colliery Rehabilitation, Decommissioning and Closure plans).		During the Operational- and Closure / Decommissioning Phase
Soil	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015) Dewatering line = 6 363m	Schedule vegetation clearance and soils stripping to coincide with the dry (low rainfall) season.	**Soil management:** • In compliance with principles in the MPRDA, 2002, NEMA, 1998, NEM: WA, 2008, Regulations there under and amendments thereto. • In Compliance with the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GNR.331 of 2014), thereunder. • In compliance with the Kleinkopje Colliery Rehabilitation, Decommissioning- and Closure plan and Closure Objectives. • Implementation in compliance with the mine's internal procedures (spill handling, incident reporting, emergency response, training, waste management, topsoil management). • Procedures to be in line with the latest legislation.	During the Construction- and Operational Phase (until 2025)
				Strictly limit vegetation clearance and earthworks to the pre-determined development areas as proposed.		During the Construction- and Operational Phase (until 2025)
				Implement progressive soil stripping according to the mining schedule to minimise exposure duration.		During the Operational Phase (until 2025)
				Stockpiles should be re-vegetated as soon as possible.		During the Operational Phase (until 2025)
				Install erosion control measures to divert storm water away from stockpiles e.g. berms, soil traps, hessian curtains.		During the Construction- and Operational Phase (until 2025)
				Soil stripping and stockpiling should be carried out according to the land capability map as illustrated in Figures 9 and 10 of Annexure E9; and in accordance with the respective diagnostic horizon sequence, as illustrated in Tables 6 to 11 of Annexure E9, in order to ease of re-instating the soils during rehabilitation.		During the Construction- and Operational Phase (until 2025)
				A total of at least seven (7) stockpiles is therefore anticipated for the proposed development, as illustrated in Table 17 of Annexure E9 for the various land capability classes. Stripping is however not deemed necessary for the already extensively disturbed Class VIII Witbank soils.		During the Construction- and Operational Phase (until 2025)
				Soils with closely similar attributes such as the Clovelly/Hutton and Glencoe soil forms, and Westleigh and Katspruit soil forms can be co-stockpiled.		During the Construction- and Operational Phase (until 2025)

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Soil erosion from stockpiles should be minimised by providing suitable storm water and cut off measures and/or establishing a temporary vegetation cover on the stockpiles.		During the Construction- and Operational Phase (until 2025)
Soil	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015) Dewatering line = 6 363m	Lightly rip stockpiles to at least 25 cm beneath the surface prior to revegetation, and re-vegetate stockpiles with indigenous grass species as soon as practically possible areas as an erosion control mechanism such that the interval between clearing and revegetation is kept to an absolute minimum in order to limit run-off and to mitigate dust emission		During the Operational Phase (until 2025)
				Re-vegetation may be carried out by manual hand seeding or hydro-seeding according to the Environmental Management Plan (EMP) protocols for the proposed development		During the Operational Phase (until 2025)
				It is recommended that soil stripping and stockpiling be guided by an independent Environmental Control Officer (ECO) with a sound Soil Science expertise, particularly within the Application Area and haul road.		During the Construction- and Operational Phase (until 2025)
				The open pit extension area should preferably be demarcated into subsections within which vegetation clearance and soil stripping can be permitted for the current year according to the mining schedule, as opposed to clearing vegetation and stripping all the soils at once, in order to minimise the exposure duration to various impacts (as discussed in the above sections) during stockpiling, and the cumulative effects thereof. Additional areas can then be cleared and stripped progressively in the following mining year when required.		During the Construction- and Operational Phase (until 2025)
				Vehicular movement should be strictly prohibited over the stockpiles to avoid potentially irreversible compaction		During the Construction- and Operational Phase (until 2025)
				Soils should be tilled to at least 1350 kg/m^3 to improve infiltration as well as crop water and nutrients uptake following rehabilitation where significant compaction of more than 1600 kg/m3 bulk density is encountered in the topsoil.		During Operational Phase (until 2025)
				The spill prevention and handling procedure should be implemented in the event of the relevant spillages at the project areas.		During the Construction- and Operational Phase (until 2025) and

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						Decommissioning (Closure) Phase
				The mine's incident reporting procedure will be implemented in terms of reporting the relevant incidents internally and externally (if required).		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				An annual soil contamination assessment should be carried out to monitor soil quality down-gradient of the potentially contaminating facilities e.g. the proposed PCD relative to baseline soil quality prior to the construction of such facilities. This will enable detection of latent soil contamination and facilitate emergency response for remedial action where necessary.		Prior to construction to Decommissioning (Closure) Phase
Soil	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Dewatering line = 6 363m	The project site should be kept in an orderly state at all times. Littering is prohibited.	Refer above	During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste. These receptacles will be removed to the central salvage yard before being removed from site and disposed of by a permitted contractor at a licensed site. While being stored on-site, the receptacles should be placed within designated areas on an impermeable surface and must be correctly labelled and/or adequately colour coded.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				Hazardous and general waste will be separated at source, with separate waste bins provided in accordance to the waste management procedure Waste Management.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				Under no circumstances is waste to be burnt or buried on-site.		During the Construction- and Operational Phase (until 2025) and

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						Decommissioning (Closure) Phase
				Records of hazardous waste being taken off-site must be kept as evidence.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				All leakages, spillages and incidents must be cleaned-up and reported as per the mine's spill handling and environmental incidents procedures.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				All general and hazardous waste material will be disposed of at registered waste sites (appropriate to the type of waste as disposed of). Certificates of safe and legal disposal shall be kept on file at the mine.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				Documentation (waste manifest) will be maintained detailing the quantity, nature and fate of any regulated waste.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
				Management and disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.		During the Construction- and Operational Phase (until 2025) and Decommissioning (Closure) Phase
Land Use and Land Capability Flora	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	Strip soils according to soil type as illustrated in the land capability map (Figures 9 & 10 and Table 15 in Annexure E9).	• In terms of Government Gazette 39425. Government Notice R.1147 dated 2015 (Financial Provision Regulations) and any amendments thereto • In compliance with the Kleinkopje Colliery Rehabilitation,	During the Construction- and Operational Phase (until 2025)
				The upper 0-20 cm topsoil should be stockpiled separately.		During the Construction- and Operational Phase (until 2025)
Land Use and Land Capability				Stockpiles should be re-vegetated as soon as possible		During Operational Phase (until 2025)

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Flora	• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s). • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)		Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015) Dewatering line = 6 363m	Interburden material should be stockpiled separately to the classifiable soil material	Decommissioning- and Closure plan and Closure Objectives. • Implementation in compliance with the mine's internal procedures (spill handling, incident reporting, emergency response, training, waste management, topsoil management). • In compliance with principles contained in the MPRDA, 2002, Mine Health and Safety Act, 1996, NEMA, 1998, NEM:WA, 2008, Regulations there under and amendments thereto. • The continued implementation of requirements contained in the NEM:BA (2004) and the regulations thereunder.	During the Construction- and Operational Phase (until 2025)
				Sequentially replace soils in a reversed order such that the diagnostic horizon sequence corresponds to pre-mining conditions during the rehabilitation phase		During the Operational Phase (until 2025)
				Ensure that the Rehabilitation, Decommissioning- and Closure plans that have been compiled in terms of Government Gazette 39425. Government Notice R.1147 dated 2015, is adhered to, kept up to date and submitted to the DMR on an annual basis.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase Submission on an annual basis
				Implementation of measures indicated in the Free-draining / rehabilitation models and Wetland Mitigation Strategy (once developed).		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Post-mining rehabilitation requirements for the haul road: Similar to the open pit extension area, the identified soils within the proposed haul road should be rehabilitated to mimic the current conditions.		During the Closure / Decommissioning Phase
				Post-mining rehabilitation requirements for the PCD area: The proposed PCD area can be maintained as a wilderness land use, as > 80% of this area comprises of very shallow Mispah/Glenrosa/Dresden soils, observed to have very limited effective soil depth/volume (growth medium) under prevailing conditions. Alternatively, clean soil material of at least 250 mm on average can be imported to rehabilitate these soils to favourable conditions potentially suitable for Grazing land use, as proposed in the existing EMPr and rehabilitation plan for the MRA.		During the Closure / Decommissioning Phase
Land Use and Land Capability				**Post-mining rehabilitation requirements for open pit extension area**:		During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Flora				During the rehabilitation phase, the identified soils within the open pit extension area should be sequentially replaced to mimic the current (pre-mining) conditions, as illustrated on the soil map in Figure 7 and 8 in Annexure E9. This will enable re-establishment of the conditions, as illustrated in the land capability map in Figure 9 and 10 (Annexure E9), which is relatively consistent with the recommendations of the post-mining land capability as included in approved EMPr for the greater mining operation.		
				Considering that the proposed Pit 2A extension and related activities forms part of the existing Kleinkopje Colliery, it is recommended that this Final Rehabilitation, Decommissioning and Closure Plan be consolidated with the Mine's closure planning documents. It is recommended that the information gained from monitoring be used to update the closure plan information. Specialist studies and monitoring results will provide additional information in understanding the full extent of the residual and latent impacts		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
Flora	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Dewatering line = 6 363m	Minimise the footprint as far as possible to mitigate impacts associated with the clearance of existing vegetation	**Biodiversity management:** The continued implementation of requirements contained in: • The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998),	During the Operational Phase (until 2025)
				Keep clean and dirty water systems separate and ensure that dirty water is not discharged into the environment to avoid impact occurring to flora species		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Implement the relevant measures contained in the mine wide Biodiversity Action Plan (BAP) (Annexure E1)		
				Implementing adequate erosion control through slope stabilisation and proper vegetation.		

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	• Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)			The mine to conduct regular ecological evaluations of the project sites during Construction (clearance) activities and during the Operational and Decommissioning Phase, to monitor and identify potential impacts on biodiversity.	National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Mpumalanga Parks and Tourism Board Act, Mpumalanga Biodiversity Sector Plan.	
				Ensure that the Rehabilitation, Decommissioning- and Closure plans that have been compiled in terms of Government Gazette 39425. Government Notice R.1147 dated 2015, is adhered to, kept up to date and submitted to the DMR on an annual basis.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase Submission on an annual basis
Flora	Refer above	Construction-; Operational Phase and Closure Phase	Refer above	An alien vegetation management plan should be compiled by an ECO already during the construction/operational phase and should be kept in place for several years following rehabilitation (minimum of ten years). All species of alien invasive vegetation should be controlled and removed from site. No spread of alien vegetation into any wetlands or adjacent properties should be allowed. Removal of alien species should not be considered a once-off activity, but should include follow-up treatments until successful control/eradication has been achieved.	Refer above	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase and Post-Closure Phase
Fauna	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Dewatering line = 6 363m	Minimise the footprint as far as possible to mitigate impacts associated with the clearance of existing vegetation		During the Operational Phase (until 2025)
				Keep clean and dirty water systems separate and ensure that dirty water is not discharged into the environment to avoid impact occurring to fauna specie		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Implement the relevant measures contained in the mine wide Biodiversity Action Plan (BAP) (Annexure E1), including:		
				All linear infrastructure to include “ecological crossing” areas where possible, this is a passage where animals can safely cross such structures (roads, pipelines, conveyors etc.).	Refer above	During the Construction- and Operational Phase (until 2025)
				Restore corridors by removing agricultural land/alien vegetation between natural areas.		During Operational Phase (until 2025) and

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	• Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)					During the Closure / Decommissioning Phase
				Remove mining infrastructure as rehabilitation progresses, so as to not promote fragmentation.		During Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Dust suppression of gravel roads (water tankers) should take place.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
Fauna	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha Dewatering line = 6 363m	Noise generation must be kept to the minimum possible levels.	Refer above	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Blasting should be restricted to daylight hours when nocturnal animals are not foraging.		During the Operational Phase (until 2025)
				Traffic: Toad fences and amphibian underpasses (pipes under road) inlaid at regular intervals will allow safe passage across the roads (especially important for roads in close proximity to wetlands/ponds/streams). The use of large underpasses or culverts will also allow safe passage of large/meso-predators throughout the landscape. Warning signage will have to be erected as well as the speed limit enforced in sensitive. Rumble strips can also be applied for animals such as owls that are active at nights, car headlights will blind them.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Monitoring of small mammals could be implemented to monitor the effects of mine activities on small mammal regimes, which are indicative of environmental health.		
				Ensure that collisions with man-made structures, particularly power lines, telephone lines, fences, light masts and guide wires are minimised		
				The mine to conduct regular ecological evaluations of the project sites during Construction (clearance) activities and		

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				during the Operational and Decommissioning Phase, to monitor and identify potential impacts on biodiversity.		
				Ensure that the Rehabilitation plan and Decommissioning- and Closure Plans that have been compiled in terms of Government Gazette 39425. Government Notice R.1147 dated 2015, is kept up to date and submitted to the DMR on an annual basis.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase Submission on an annual basis
Surface water	Operation of new haul road	Operational Phase	Haul road = 3 968m	Develop and implement a maintenance schedule on the proposed haul road to ensure effective drainage and controlled conveyance towards the adjacent clean water areas.	**Surface water management:** • In line with the DWS Best Practice Guidelines, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas; GN704, dated 1999; the NWA (1998) and Regulations there under and amendments thereto; the storm water management plan and / or amendments thereto; specialist recommendations; and the WUL conditions (once issued). • Implementation also to be in compliance with the mine's internal water management and maintenance procedures. • Procedures to be in line with the latest legislation.	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Investigations should be conducted to install silt traps along the discharge areas of the haul road where needed		During the Construction- and Operational Phase (until 2025)
				Haul roads should have berms alongside to channel runoff towards controlled discharge areas.		
				Investigations should take place to install collection drains at concentration points in order to re-use water in the circuit. These collection drains will be suited in low laying areas of the haul roads.		
				Implement wetland mitigation strategy on completion of mining activities and once haul road has been removed.		During the Closure / Decommissioning Phase
	Operation of channels, trenches and return water dams	Operational Phase	Proposed PCD: 21 ha	It is recommended to implement a maintenance schedule to ensure regular servicing takes place on the affected water channels, trenches and containment facilities to ensure design capacity.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Regular servicing of the silt traps should take place to limit the amount of silt entering the plant return water dams.		
				The plant return water dams should be maintained to ensure sufficient freeboard in order to limit any possible overflow or spillages.		

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Implement the Storm Water Management Plan in Annexure E4.		
	Operation of Ramp 7 trench	Operational Phase	Refer to Figure 17.	Implement a maintenance schedule to ensure the integrity of the Ramp 7 trench and the Ramp 7 sump.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				A level control system should be investigated to eliminate any possible overflow towards the Olifants River located downstream of the sump.		During the Construction Phase
Surface water	Operation of Ramp 7 trench	Operational Phase	Refer to Figure 17.	Ensure that the haul road berm downstream of the sump is maintained at all time as the structure functions as an additional measure to prevent any overflow from reaching the Olifants River	**Surface water management:** • In line with the DWS Best Practice Guidelines, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas; GN704, dated 1999; the NWA (1998) and Regulations there under and amendments thereto; the storm water management plan and / or amendments thereto; specialist recommendations; and the WUL conditions (once issued). • Implementation also to be in compliance with the mine's internal water management and maintenance procedures. • Procedures to be in line with the latest legislation.	During the Construction- and Operational Phase (until 2025)
	Rainfall ingress into the ramps	Operational Phase	Pit 2A Extension area: 101 ha.	Surface water will be diverted away from mining operations within the 2A mining area as far as practicable in an attempt to lower dewatering requirements from the voids. Unfortunately, there are areas were the diversion of surface water runoff will be difficult to achieve, especially within the ramps leading towards the voids were mining takes place. Surface runoff that accumulates in these areas as a result of rainfall, and groundwater ingress will then need to be dewatered from the voids to ensure the safe continuation of mining activities.		During the Operational Phase (until 2025)
				Implement the Storm Water Management Plan in Annexure E4		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
	Surface runoff ingress into mine working from remaining north-west catchment	Operational Phase	Pit 2A Extension area: 101 ha.	The proposed construction of a new haul road along the western and northern perimeter of the 2A extension area will act as a barrier to prevent any ingress of clean surface runoff into the mine workings. It is important to conduct regular inspections on the haul road's berms to ensure the integrity of the berms.		During the Construction- and Operational Phase (until 2025)

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	Removal of 2A dam	Operational Phase	Pit 2A Extension area: 101 ha. Refer also to calculations in Storm Water Management Plan (Annexure E4)	It is recommended to construct an additional pollution control dam with sufficient capacity to contain all excess mine affected water, designed to accommodate at least a 1:100 year flood scenario.		During the Construction-Phase
				Adequate lining measures are proposed, to limit seepage (as also affecting the mine dewatering volumes).		During the Construction-Phase
				All mine process water contained in the proposed pollution control dam should be re-used in the system, or provided to the Emalahleni Water Reclamation Plant for treatment.		During the Operational Phase (until 2025)
Groundwater	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) • Construction and operation of pollution control dam	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	No construction of any water management measures, such as the new PCD or the haul roads should be undertaken with carbonaceous material[78]	**Groundwater management:** • In line with the DWS Best Practice Guidelines; GN704, dated 1999; the NWA (1998) and Regulations there under and amendments thereto; the storm water management plan and / or amendments thereto; specialist recommendations; and the WUL conditions (once issued). • Implementation also to be in compliance with the mine's internal water management and maintenance procedures. • Procedures to be in line with the latest legislation. • Mine residue classification and characterisation in compliance with GNR 635 of August 2013, "National Norms and Standards for the Assessment of waste for landfill disposal" and GNR 636 of August 2013, "National Norms	During the Construction- and Phase
				All dams should be lined where practically possible, in an effort to minimise the seepage of poor quality leachate.		
				Clean surface water should not come into contact with dirty water or coal bearing material		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Implement traffic rules and train.		
				Implement vehicle maintenance.		
				Install oil collections pan in or under vehicles		
				Wastage of coal-bearing material outside the allocated dirty water management area during the operational phase should be prevented.		
				Dirty water should be contained in fit-for-purpose and lined designed facilities, which will limit infiltration of contaminated water to groundwater.		
				Water retention in the in-pit sump areas should be as minimal as possible to limit the quality related impacts.		
				Clean surface water should not come into contact with dirty water or coal bearing material.		
				Dirty water dams should be lined as far as is practical to contain all affected water		During the Construction- and Phase
				Integrity of liners should be regularly inspected.		

[78] Should such construction be undertaken the necessary exemptions in terms of GN704, dated 1999 needs to be obtained

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Oil contaminated water should be diverted from the bunded area during rain events to an interception or oil water separation facility.	and Standards for disposal of waste to landfill", in terms of NEMWA, 2008	
				Ensure that the water management measures at the mining operations are adequately sized according to the specifications in GN704.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Continuous monitoring of groundwater quality through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts.		
				Update groundwater (flow and transport) models when new data becomes available.		
Groundwater	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Operational Phase	Pit 2A Extension area: 101 ha.	Handle and store blasting material according to manufacturing requirements.	Refer above	During the Construction- and Operational Phase (until 2025)
				Train staff and implement correct procedures for the handling of blasting material.		
				Only qualified staff should handle these materials.		
				Hazardous material should be stored in the correct designated and bunded areas that are specially designed and constructed for that purpose.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Staff should be trained to implement correct procedures for the handling of hazardous material.		
	Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	Operational Phase	Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015)	Implement and maintain proper storm water management infrastructure.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Concurrent rehabilitation should follow the pre-mining in-situ profile with coal spoils and carbonaceous material placed in the bottom beneath the water followed by neutralising rock (sandstone/tillite) and finally a clay and topsoil layer.		During Operational Phase (until 2025)
				Limit infiltration of precipitation into backfilled areas by capping with clay layer and vegetating.		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Continuous monitoring of groundwater quality through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Update groundwater (flow and transport) when new data becomes available.		
				Waste classification, characterisation and management of mine residue deposits and stockpiles should be undertaken in accordance with the relevant Regulations (GNR 632, GNR 634; GNR 635 and GNR 636) in terms of NEMWA, 2008		
Groundwater	Dewatering activity: Pumping of water collecting in the open pit extension area	Operational Phase	Dewatering point within Pit 2A Extension area: 101 ha. Dewatering line = 6 363m	Drains and cut-off trenches (storm water management system) around the proposed opencast pits should be implemented before commencing with pit development to prevent clean run-off water from entering the pit, reducing inflow of clean water into the pit and volumes to be dewatered.	Refer above	Prior to commencement of pit development
				Interception drainage around the pit – minimize surface area where operations could contaminate water (smaller disturbed areas mean smaller manageable volumes).		
				Implement and maintain proper storm water management infrastructure.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Continuous monitoring of groundwater quantity/ groundwater levels through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts.		
				Update groundwater (flow and transport) when new data becomes available.		
	Backfilling activity - Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	Operational- and Closure Phase	Pit 2A Extension area: 101 ha.	The final cut or pit should be filled to resemble the pre-mining in-situ profiles with the coal spoils and carbonaceous materials (mudstones) in the bottom followed by the higher neutralising potential rocks such as the sandstones and tillites (if present) and finally by a compacted clay and topsoil layer.		During the Closure / Decommissioning Phase
				Rate and volume of water infiltration should be minimised by compaction and capping.		

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Coal spoils and carbonaceous material should be placed beneath the water table to limit the ingress of oxidation.		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Seeding of landscaped areas to further limit infiltration.		
				Continuous monitoring of groundwater quality conditions through purpose drilled groundwater monitoring boreholes to ensure early detection of negative impacts.		
				Review the current Kleinkopje Colliery groundwater monitoring programme and implement measures as per recommendations contained in the Groundwater Risk Assessment Report (Annexure E6). • Monitoring boreholes at Kleinkopje Colliery do not cover all potential source areas at present. The monitoring programme should be reviewed so that all sources are covered in terms of monitoring. This monitoring programme should also cover all underground mining compartments where water levels need to be measured to get to an as close as possible volume of water in all mining areas.[79] • A geophysical survey needs to be performed to aid in the siting of these new proposed monitoring boreholes. • After the monitoring boreholes have been drilled, they need to be pump tested as this will give an estimation of the site specific aquifer parameters. • It is recommended that Acid Base Accounting be conducted. • The monitoring results should be captured in a suitable database and should be interpreted regularly to gain knowledge from the information.		During the Operational Phase (until 2025)
				Present the results to Government on an annual basis to determine compliance with the closure objectives set during the Decommissioning Phase.	Refer above	During the Operational Phase (until 2025) and

[79] The knowledge obtained from all the additional proposed geohydrological work should be used to act / to implement management actions if impacts are confirmed, to expand the monitoring network or increase the frequency if necessary and to correlate with related environmental information to use for closure planning.

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						During the Closure / Decommissioning Phase Annually
Sensitive Landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	Construction- and Operational Phase	Pit 2A Extension area: 101 ha.	**Avoidance**: The loss of wetland habitat could only be avoided if the layout and/or location of the proposed opencast pit was adjusted. The location of the pit is however limited by the location of the coal resource, i.e. you can only mine where the coal is located. Adjusting the pit to exclude all wetland areas would render the proposed mining non-feasible. The loss of wetland habitat is thus inevitable if the coal resource is to be mined.	Only applicable if No-go Option is implemented	
Sensitive Landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	**Minimisation:** The placement of associated surface infrastructures must be carefully planned to minimise impact on delineated wetlands. No stockpiles should be placed within the delineated wetland habitat. The following measures should be implemented:	**Wetland management and mitigation:** The continued implementation of requirements contained in: • The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA); Mpumalanga Parks	
				The proposed mining and development footprint must be fenced off and all activities must be limited to the fenced off area.		During the Construction-Phase
				Locate all temporary stockpiles, constructor's camps, laydown areas, and ablution facilities etc. outside delineated wetland areas and a minimum of 50m from any delineated wetland area.		
				Develop and implement a construction storm water management plan prior to the commencement of site clearing activities. Such a plan should aim to minimise sediment movement off the construction site and limit increases in turbidity of adjacent wetlands.		
				All disturbed areas outside the direct development footprints should be rehabilitated and re-vegetated as soon as possible.		During the Operational Phase (until 2025)
				All construction staff should be educated on the sensitivity of wetland areas and should be made aware of all wetland areas in close proximity to the mining sites.		During the Construction-Phase
				If land adjacent to the mining area is leased, the leasee must be made aware of the presence and importance of wetland		Prior to the Construction Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				systems on the leased land, as well as the management measures adopted by the mine for these areas.	and Tourism Board Act, NWA, 1998; Mpumalanga Biodiversity Sector Plan. • Compliance with the biodiversity, soil, and wetland specialist recommendations.	
				Regular cleaning up of the wetland areas should be undertaken to remove litter.		During the Operational Phase (until 2025)
				An alien vegetation management plan should be drawn up by the Environmental Control Officer (ECO) and implemented. Regular removal of invasive alien species should be undertaken. This should extend right through to the decommissioning and closure phase of the project.		During the Operational Phase (until 2025)
Sensitive Landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	**Mitigation:**		
				A detailed wetland mitigation strategy should be compiled to address the impact of the proposed wetland loss. Such a strategy should quantify the expected wetland loss in terms of hectare equivalents (using the SANBI & DWS 2014 methodology) and should propose measures to compensate for the loss of wetland habitat. Measures should include the rehabilitation and protection of suitable remaining wetlands within the Kleinkopje mining rights area and the reinstatement of a wetland/watercourse across the mined out area to ensure that the rehabilitated mining area, as well as the remaining intact catchment upslope of the mining area, are again connected to downstream water resources, in this case the Olifants River. More detail on such a wetland mitigation strategy is provided in Section 8 of the Wetland Baseline and Mitigation Report (Annexure E3).	Refer above	During the Operational Phase
				A construction storm water management plan must be developed and implemented prior to the commencement of large scale vegetation clearing activities or construction activities and be maintained until the end of the construction phase. Such a plan should aim to minimise the transport of sediment off site as well as prevent the discharge of high velocity flows into downslope wetlands. Sediment traps and sediment barriers should be installed where necessary, and discharge points should be protected against erosion and incorporate energy dissipaters.		Prior to Construction Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Erosion within the construction site must be minimised through the following: • Limiting the area of disturbance and vegetation clearing to as small an area as possible; • Where possible, undertaking construction during the dry season; • Phasing vegetation clearing activities and limiting the time that any one area of bare soil is exposed to erosion; • Control of storm water flowing onto and through the site. Where required, storm water from upslope should be diverted around the construction site; • Prompt stabilisation and re-vegetation of soils after disturbance and construction activities in an area are complete; and • Protection of slopes. Where steeper slopes occur, these should be stabilised using geotextiles or any other suitable product designed for the purpose. • Sediment transport off the site must be minimised through the following: • Establishing perimeter sediment controls. This can be achieved through the installation of sediment fences along downslope verges of the construction site. Where channelled or concentrated flow occurs, reinforced sediment fences or other sediment barriers such as sediment basins should be used (refer to US EPA guidelines on Storm Water Pollution Prevention); • Discharge storm water from the construction site (dirty water) into adjacent grassland rather than directly into wetland habitat. Discharged flows must be slow and diffuse; and • Regular inspection and maintenance of sediment controls		During the Construction Phase
	Vegetation clearing; earthworks; opencast mining	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m	In addition, ensure that no equipment is washed in/near the streams and wetlands, and if washing facilities are provided, that these are placed no closer than 50m from a wetland or water course.	Refer above	During the Construction- and Operational Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			Proposed PCD: 21 ha	No abstraction of water from the wetlands is allowed unless expressly authorised by the DWS.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				In order to reduce the potential impacts associated with the introduction of contaminants dissolved or suspended in the runoff from construction sites, where practically possible, no runoff should be introduced into wetlands. Introduction into dryland areas is preferred as the vegetation and soils provide an opportunity to limit the movement of contaminants and the environment is conducive for natural degradation		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
	Vegetation clearing; earthworks; opencast mining	Construction- and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks. Sufficient spill clean-up material must be kept on site at all times to deal with minor spills. Larger spills should be reported to the Environmental Officer and the relevant authorities (DWS) immediately, with specialists appointed to oversee the clean-up operations.	Refer above	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				The partial exclusion of the wetland catchments as dirty water areas is inevitable. However, to minimise loss of water inputs to the wetlands, the following measures should be implemented:		
				Isolate dirty water areas and prevent discharge of dirty water into the environment.	Refer above	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Minimise the extent of the dirty water exclusion areas while ensuring the effective separation of clean and dirty water.		
				Ensure concurrent rehabilitation measures keep pace with mining activities so that the rehabilitated areas can be reinstated as clean water areas draining towards downslope wetlands		During the Operational Phase (until 2025)
				During rehabilitation the opencast pit should be shaped to drain back into the Olifants River via Ramp 7. The remaining intact catchment upslope of the opencast pit should also be incorporated into the design to ensure flows from these areas can also enter the Olifants River		During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				No discharge of dirty water should take place on site.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Operational Phase	Pit 2A Extension area: 101 ha.	The overburden stockpiles will contain carbonaceous material and should be considered a dirty water area. No run-off from the overburden stockpile should be discharged to the environment without treatment. Random water quality test should be done to ensure that the water entering the water systems are clean and does not contaminate the top soil stockpiles.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Operational Phase	Pit 2A Extension area: 101 ha.	The topsoil stockpiles should be located within a clean water area and no contaminated water should come into contact with the topsoil stockpiles. Side slopes of the topsoil stockpiles should be kept as low as possible and should be vegetated to minimise sediment loss. Sediment fences should be installed around the stockpile to prevent transport of sediment and topsoil away from the stockpile. All concentrated runoff from the topsoil stockpile should be conveyed through a sediment trap or similar facility which is regularly cleaned and maintained. Clean storm water should ideally be conveyed in grassed swales rather than cement lined channels or excavated trenches. Discharge points into the environment should be protected against erosion and be subjected to regular maintenance Clean and dirty storm water needs to be separated. No contaminated water should be allowed to enter the clean storm water system. No dirty mine or dirty storm water may be released into the wetlands and should be contained and treated on site, or used for dust suppression. Should contaminated water enter the wetlands due to spillages or other unforeseen circumstances a wetland/water quality expert should be	Refer above	During the Construction- and Operational Phase (until 2025) During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				consulted regarding implementation of suitable mitigation and/or rehabilitation measures.		
				The required PCD should be designed to be in compliance with the applicable legislation requirements as well as accepted best management practices.		Prior to Construction Phase
				To prevent seepage and leakage out of the PCD, this facility should be lined with a suitable engineered liner.		
	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Operational Phase	Pit 2A Extension area: 101 ha.	A water quality and biomonitoring plan should be compiled and implemented (if not already in place) to monitor for any deterioration in water quality in the adjacent wetland systems Regular maintenance and inspections of the PCD should be undertaken to ensure operation of the dam as per design specifications. A log book of inspections and maintenance activities must be kept		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
	Rehabilitation of opencast pit	Operational- and Closure Phase	Pit 2A Extension area: 101 ha.	It is recommended that rehabilitation of the opencast pit includes the reinstatement of a water course across the opencast pit to drain into the Olifants River via Ramp 7. The entire rehabilitated area should be appropriately shaped to ensure the upslope catchment and the rehabilitated area can drain via the reinstated water course to the Olifants River. Soil cover should be maximised in the rehabilitated area, while slopes should be kept as low as possible while ensuring free-drainage and bearing in mind that ingress into the mined out pits is minimised. The reinstated watercourse should be designed to support wetland habitat with a variety of micro-habitats. This will require a clay liner to prevent ingress of water into the mined out pits as well as various interventions to control flow and prevent erosion and scour. Further recommendations are provided in Section 8 of Annexure E3 (Wetland Baseline and Mitigation Report).	Refer above	During the Closure / Decommissioning Phase Development of detailed Wetland Mitigation Strategy prior to the extension of the pit
				Wetland re-creation: It is proposed that the pit be rehabilitated to be free-draining, draining towards the Olifants River via Ramp 7 (see Figure 12 in Annexure E3). The biggest risk associated with the		

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				proposed approach is the increased ingress of water into the rehabilitated pit, increasing the volumes of water requiring treatment. In order to minimise this risk, it is vital that the re-created watercourse be clay-lined so as to minimise ingress. Further design considerations proposed include: • The re-created watercourse should be characterised by gentle side-slopes, especially along the watercourse/wetland boundary to allow for vegetation zonation • The proposed watercourse should include various interventions designed to control flow. The re-created system will be surface water driven (due to the free-draining landscape and lack of interflow) and likely characterised by significant flood flow following heavy rainfall events and the absence of baseflow during extended dry periods. This will make the system susceptible to erosion, unless carefully designed. Interventions should include: ➢ Ponds to attenuate flood flows, with gradual release over a number of days; and ➢ Erosion control measures, e.g. gabion weirs. These will also assist with trapping sediments; • It is proposed that re-creation of the watercourse includes focus on the creation of various micro-habitats, including for example: ➢ Unchannelled sections ➢ Deeper water areas ➢ Temporarily saturated areas		
	Rehabilitation of opencast pit	Operational- and Closure Phase	Pit 2A Extension area: 101 ha.	**On-site rehabilitation opportunities:** A site visit conducted by the wetland specialists to identified pans (as per Annexure E3) revealed a number of opportunities for improving the ecological integrity of pans 1 and 2 through rehabilitation interventions: • Removal of alien trees – removal of alien trees from within the hillslope seepage wetlands surrounding the pans and	Refer above	During the Closure / Decommissioning Phase Development of detailed Wetland Mitigation Strategy prior to the extension of the pit

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				their direct catchments will serve to improve water flow to the pans • Withdrawing cultivation from the hillslope seepage wetlands around the pan • Instating a vegetated buffer zone between cultivated fields and the delineated wetland habitat. Such a buffer will serve to mitigate against impacts associated with diffuse agricultural runoff from the cultivated fields • Closing of trenches – a number of trenches were observed within the hillslope seepage wetlands that intercept and potentially divert flows • Grazing management plan – it is recommended that a grazing management plan be developed for the pans to ensure overutilization of the pans is avoided		
	Rehabilitation of opencast pit	Operational- and Closure Phase	Pit 2A Extension area: 101 ha.	Further recommendations include: All disturbed and transformed areas should be landscaped to approximate the natural landscape profile, but should avoid steep slopes and concentrated run-off;	Refer above	During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Compacted soils should be ripped and scarified;		
				The rehabilitated areas should be re-vegetated as soon as possible following completion of the earthworks to minimise erosion		
				Regular long-term follow up of rehabilitated areas will be required to ensure the successful establishment of vegetation and to survey for any erosion damage on site.		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase and Post-Closure
				Erosion damage should be repaired immediately		
				The recommendations contained within the specialist vegetation and soils reports should be fully implemented to ensure successful rehabilitation		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Sediment traps should be placed in rehabilitated areas to avoid sedimentation.		
				An alien vegetation management plan should be compiled by the ECO already during the construction/operational phase of the project and should be kept in place for several years		During the Operational Phase (until 2025) and

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				following rehabilitation (minimum of ten years). All species of alien invasive vegetation should be controlled and removed from site. No spread of alien vegetation into any wetlands or adjacent properties should be allowed. Removal of alien species should not be considered a once-off activity, but should include follow-up treatments until successful control/eradication has been achieved.		During the Closure / Decommissioning Phase
				The likelihood of decant, as well as its expected quality, volume, location and timing, should be determined and measures put in place to ensure that no decant or discharge of contaminated water occurs, unless it meets the required water quality standards as set by the DWS. Where these standards are exceeded, contaminated water will need to be treated. In this regard it is recommended that a water treatment plant be established, or to make use of the existing eMalahleni Water Reclamation Plant, and a water management plan put in place, to keep the water levels within the mined out areas actively managed post-mining to ensure decant is prevented and no contaminated water is discharged into the environment untreated.		During the Operational Phase (until 2025)
	Rehabilitation of opencast pit	Operational- and Closure Phase	Pit 2A Extension area: 101 ha.	No contaminated water must be allowed to enter the reinstated watercourse across the rehabilitated opencast pit.	Refer above.	During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
Air quality	• Clearance of vegetation • Removal and stockpiling of topsoil and overburden • Construction of haul roads • Construction of pollution control dam • Construction of storm / process water management measures	Construction-; Operational- and Closure Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	Phasing of earthmoving activities to reduce source size.	**Air quality management:** • Environmental Management: Air Quality Act (Act No 39 of 2004); Regulations there under and amendments thereto. • Consideration of and compliance with the Highveld Priority Area Air Quality Management Plan; Provincial Air Quality Management Plans and	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Dust suppression in dirty areas in accordance to a dust suppression procedure.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Early vegetation and stabilisation of topsoil stockpile and reduction of the frequency of disturbance.		During Operational Phase (until 2025)

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Speed control will be enforced on all roads.	Municipal Air Quality Management Plans. • Emergency preparedness and response in compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996); MPRDA, 2002; NEMA; 1998 and NWA; 1998 and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), (and regulations there under), and amendments thereto • Compliance with internal emergency procedures. • All procedures to be in compliance with latest legislation,	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Complaints register must be make available for the recording of complaints relating to dust: Environmental Incidents, Non-conformance and Complaints.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				The current dust fallout, PM2.5 and PM10 monitoring plan should continue to be implemented.		
				Greenhouse gas emissions must be managed through effective maintenance of all diesel driven vehicles.		
				The Highveld Priority Area has been declared national air pollution hotspot in terms of Section 18(1) of the NEM:AQA. By declaring a priority area, authorities recognise that air quality within these areas are generally regarded as being poor, and frequently meet or exceed ambient air quality standards. Kleinkopje Colliery is located in the Highveld Priority Area. This implies that authorities may impose measures on the Kleinkopje Colliery and other mines and industries within this area in order to allow for improvements in the air quality of the region. Measures imposed by authorities should thus be compiled with.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Continually assess the efficiency of dust mitigation measures		
				Spontaneous combustion to be managed according to the Management of Spontaneous Combustion Procedure.		
Noise, Air Blast and Ground Vibration	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting) • Construction and use of haul roads within and around the open pit extension area(s) • Construction of pollution control dam and storm water management measures	Construction-; Operational- and Closure Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Proposed PCD: 21 ha	Effective maintenance of the vehicle engines and exhaust systems.	**Noise and vibration / blast monitoring:** • In accordance with relevant sections of the National Environmental Management: Air Quality Act (Act No 39 of 2004);	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				All noise related complaints received will be dealt with through the complaints register process		
				Continue implementing the current Ground Vibration and Air Blast monitoring programme.		During the Operational Phase (until 2025)

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Ensure notification to surrunding landowners and residents regarding blasting events. All attempts must be made to ensure all levels are within the limits, as to avoid complaints from the public. All blasting related complaints received will be dealt with through the complaints register process.	Regulations there under and amendments thereto • SABS Code of Practice 0103 of 2008: The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication. • SABS Code of Practice 0328 of 2008: Environmental Noise Impact Assessments • United States Bureau of Mines (USBM) criteria (blasts).	
Visual aspects	• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) • Construction and use of pollution control dam • Continuation of the disposal of mine residue within the existing footprint on the current Klippan Co-disposal site, located at Kleinkopje Colliery. • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Construction-; Operational-Closure; and Post-Closure Phase	Pit 2A Extension area: 101 ha. Haul road = 4km Proposed PCD: 21 ha Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015) Dewatering line = 6 363m	Keep disturbed areas to a minimum. No clearing of land to take place outside the demarcated footprint. Maintain the site during operation of the mine. Inoperative equipment and poor housekeeping, in general, creates a poor image of the activity in the eyes of the public. Employ dust suppression techniques to reduce the visual impact from dust. Adhere to the commitments made in the Kleinkopje Colliery rehabilitation plan and wetland mitigation strategy (once developed).	• In compliance with the Rehabilitation, Decommissioning- and Closure plans and Closure Objectives. • In compliance with principles contained in the MPRDA, 2002, Mine Health and Safety Act, 1996, NEMA, 1998, NEM:WA, 2008, Regulations there under and amendments thereto. • Implementation also to be in compliance with the mine's internal procedures. • Procedures to be in line with the latest legislation.	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
Protected Areas and Conservation Planning	• Clearance of vegetation	Construction-; Operational-Closure; and Post-Closure Phase	Pit 2A Extension area: 101 ha.	Implement the Wetland Mitigation Strategy (as proposed in Annexure E3).	• The continued implementation of requirements contained in:	During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area		Haul road = 3 968m Klippan Co-disposal facility = 133 ha (as per IWWMP, dated 2015) Dewatering line = 6 363m	Implement and adhere to Kleinkopje Colliery's rehabilitation, decommissioning and closure plan.	• The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA); Mpumalanga Parks and Tourism Board Agency Act, 2005; NWA, 1998; Mpumalanga Biodiversity Sector Plan.	During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				Keep disturbed areas to a minimum.		
				No clearing of land to take place outside the demarcated footprint.		During the Construction- and Operational Phase (until 2025)
				Implement the mitigation and management measures included under the sections above (flora, fauna and Sensitive landscapes).		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
	Construction and use of pollution control dam	Construction-; Operational-Closure; and Post-Closure Phase	Proposed PCD: 21 ha	Proposed PCD be constructed and operated in the location associated with Alternative (Site) 5.		During the Construction-Phase
Archaeology (Heritage Resources)	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Dewatering activity: Pumping of water collecting in the open pit extension area	Construction and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Dewatering line = 6 363m Proposed PCD: 21 ha	**GY01:** The impacts to Graveyard 01 (GY01) can be mitigated by means of exhumation and relocation. The exhumation of human remains and the relocation of graveyards are regulated by various laws, regulations and administrative procedures. This task is undertaken by forensic archaeologists or by reputed undertakers who are acquainted with all the administrative procedures and relevant legislation that have to be adhered to whenever human remains are exhumed and relocated. This process also includes social consultation with a 60 days statutory notice period for graves older than sixty years. Permission for the exhumation and relocation of human remains have to be obtained from the descendants of the deceased (if known), the National	**Management of heritage resources:** In compliance with the National Heritage Resources Act (Act No. 25 of 1999), and amendments thereto.	Prior to the commencement of pit extension

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Department of Health, the Provincial Department of Health, the Premier of the Province and the local police.		
				GY02 and GY03: Graveyards that remain unaffected should be managed by Anglo Operations to ensure their future unaffected existence during the construction, operation and decommissioning phases of its mining operations. The following mitigation measures are recommended: • Graveyards must be demarcated with fences or with walls and should be fitted with access gates. • Regulated visitor hours should be implemented that is compatible with mine safety rules. This will not be necessary when graveyards are located next to national roads. • Corridors of at least 20m should be maintained between graveyard's fences and any developmental components such as roads or other infrastructure that may be developed in the future. • Graveyard should be inspected every three months. Inspections should be noted in an inspection register. The register should outline the state of the graveyards during each inspection. Reports on damages to any of the graves or to the graveyards (fences, walls, gates) should be followed with the necessary maintenance work. Maintenance work should be recorded in in the inspection register. • Graveyards should be kept tidy from any invader weeds and any other refuse.		During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Archaeology (Heritage Resources)	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Dewatering activity: Pumping of water collecting in the open pit extension area	Construction and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 3 968m Dewatering line = 6 363m Proposed PCD: 21 ha	**General:** In the event that any other sites of cultural and archaeological importance are uncovered during the undertaking of mining and mining related activities, that the activity within the vicinity of the discovery is ceased, the relevant authority notified and suitable qualified specialists appointed to assess the discovery.	**Management of heritage resources:** In compliance with the National Heritage Resources Act (Act No. 25 of 1999), and amendments thereto	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
Palaeontology	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and operation of PCD	Construction and Operational Phase	Pit 2A Extension area: 101 ha. Haul road = 4km Dewatering line = 6 363m Proposed PCD: 21 ha	It is recommended that a member of staff (e.g., the Environment Officer) of the Kleinkopje Colliery be trained to recognise the types of fossils that may be exposed via the mining operations and how to excavate and curate them. This officer should: • Make regular inspections of newly exposed rock material following blasting to identify if scientifically significant fossils have been exposed. • An experience Karoo palaeobotanist must be mandated by the colliery to inspect the fossils, ascertain their significance and to make any necessary recommendations concerning their preservation. • Should scientifically significant macrofossil materials be unearthed during the excavations associated with the project the excavations in that area should be halted in that location and SAHRA informed of the discovery and a palaeontologist contracted to evaluate their importance. • A significant potential benefit of the examination of the excavations associated with the construction of the project is that currently unobservable fossils may be uncovered and that potentially significant fossil material may be made available for scientific study.	In compliance with the National Heritage Resources Act (Act No. 25 of 1999), and amendments thereto as well as NEMA, 1998 (as amended)	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase
				It is further recommended that:		During the Construction- and Operational Phase (until 2025)

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Six monthly examinations of the colliery pit by an experience Karoo palaeobotaist should be undertaken once mining has commenced. • The six monthly periodicity of these inspections should be subject to later review, based on the results of those inspections. • Should scientifically significant macrofossil materials be unearthed during the excavations associated with the project the excavations in that area should be halted in that location and SAHRA informed of the discovery and a palaeontologist contracted to evaluate their importance. • Should scientifically or culturally significant fossil material exist within the project area any negative impact upon it could be mitigated by its excavation (under permit from SAHRA) by a palaeontologist and the resultant material being lodged with an appropriately permitted institution. In the event that an excavation is impossible or inappropriate the fossil or fossil locality should be protected and the fossil site excluded from any further construction activities.		
Socio-economic Aspects	Continuation of mining and related activities at Kleinkopje Colliery (through the mining of the Pit 2A Extension area)	Operational; Decommissioning / Closure Phase	Mine wide Refer also to sizes and scale above.	The various plans and programmes as contained in the SLP should continue to be implemented. Stakeholders and affected parties should continue to be kept informed of activities at Kleinkopje's Pit 2A mining area Proactive engagement with local and environmental authorities to should continue to be undertaken. A complaints register will be made available at the mine security offices for I&APs and stakeholders to voice their concerns and raise any complaints. All complaints received will be recorded and kept on record along with: • The manner in which they were received. • Time and date of complaint. • The I&APs details. • All correspondence with the complainant.	• Continued implementation in compliance with the DMR Guideline for Consultation with communities and Interested and Affected Parties. As required in terms of Sections 16(4)(b) or 27(5)(b) of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), and in accordance with the standard directive for the compilation thereof as published on the official website of the DMR.	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase

Environmental component	Activity	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• The manner in which and the date the complaint was dealt with. Strict access control will continue to be implemented at the mine. Warning signs will also be placed around the site to warn the public of the dangers associated with the activities Employees and contractors at the mine will receive environmental training on all relevant aspects of the operation and the environment that is, or could be, affected.	• Continued compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996); MPRDA, 2002; National Road Traffic Act; Regulations there under and amendments thereto. • Implementation also to be in compliance with the mine's internal procedures (communication, incident reporting, etc.). • Procedures to be in line with the latest legislation.	
	Cessation of mining activities at Pit 2A (including the Pit 2A Extension)	Decommissioning / Closure Phase	Refer to sizes and scale above.	As per the SLP Progress Report (2015), where retrenchments or closure of the operation is imminent, the mine would put in place the following process to ameliorate the social and economic impact on individuals, regions and economies: • Assessment/counselling services for affected employees • Comprehensive self-employment training programmes • Comprehensive training (non-mining skills) and re-employment programmes • Creation of jobs for local economies • Regeneration of local economies • Accessing the Social Plan Fund		During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase

1.5 Impact Management Outcomes.

Table 86: Impact management outcomes, identifying the stand of impact management required for the identified aspects

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
Geology	Mining of the ore reserve	A permanent impact on the localised geology of the areas associated with the proposed extension area will result from the mining and removal of coal.	Operational Phase	Control	To minimise the destruction of the geological strata and to prevent the unnecessary loss of geology
Topography	• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	The existing and continued mining activities at Pit 2A has altered the topography. The construction and progressive development of the open pit (as part of the Pit 2A Extension activities) and the establishment of various associated stockpiles will continue to temporarily alter the topography until such time as rehabilitation activities have been undertaken.	Construction- and Operational Phase	Control; Remedy	To limit the impact on topography.
	• Construction and use of haul roads within and around the open pit extension area(s) • Continuation of the disposal of mine residue within the existing footprint of the current Klippan Co-disposal site, located at Kleinkopje Colliery. • Construction and operation of a new pollution control dam	The continuation of disposal of residue within the existing footprint of the Klippan Co-Disposal Facility will continue to influence the nature of the topography that is typical of the surrounding area[80]	Construction- and Operational Phase	Control; Remedy	
		The construction of the haul road and pollution control dam will lead to an alteration of the topography and subsequently the alteration of drainage patterns on-site.	Construction- and Operational Phase	Control; Remedy	
Soil	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	Susceptibility to erosion will be largely increased once the vegetation is cleared and the soils become exposed to wind and storm water.	Construction- and Operational Phase	Stop; Remedy	Prevent soil erosion

[80] Not a listed activity applied for as part of this EIAR / EMPr. The mentioned existing facility was included in the approved EMPR dated 2012 which EMPR is deemed to be approved in terms of the National Environmental Management: Waste Act (NEMWA), 2008. Therefore, this activity is not applied for as a waste management activity. However the continued impact on the topography as a result of the Pit 2A Extension activities has been included in this Risk Assessment Report.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
	• Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)				
Soil	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Heavy equipment traffic is anticipated to cause significant soil compaction during construction activities. The severity of this impact is anticipated to be particularly highest in the vicinity of the proposed hauling road and during stripping within the application area.	Construction- and Operational Phase	Stop; Control	Maintain functional soil structure to sustain post-mining land capability
	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline) • Potential in-pit emergency maintenance on equipment or machinery.	The soil contamination impact is largely dependent on the nature, volume and/or concentration of the contaminant of concern, and all of the identified soils are considered to be equally predisposed to contamination, as contamination sources are unpredictable and typically occur as incidental spills or leaks, and or decant of contaminated mine water in such mining projects.	Construction- and Operational Phase	Stop; Remedy	Preserve healthy (non-toxic) growth medium for future land use
		The incorrect handling and disposal of general waste, scrap metal and industrial waste (e.g. waste tyres) will have a long-term impact on the local area. Impact will not only effect soil but could also impact on the habitat of fauna and impact of fauna, surface water and groundwater. In addition, the visual character of the area will be impacted on. The incorrect handling and disposal of hazardous waste can also have a permanent negative impact on the local area. Soil, water sources and fauna habitats can be adversely affected and human health can be impacted on.	Construction- and Operational Phase	Stop; Remedy; Control	To conserve soil and land capability

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
	• Use and maintenance of chemical / portable toilets at open pit extension area(s).				
Land Use and Land Capability	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	The main impact from a land capability perspective at Klein Kopje Mine is land degradation and loss of land capability from the proposed mining pit extension area. The soils that will be impacted by the proposed mining activities include the following: • Clovelly/Hutton; • Longlands/Fernwood; • Westleigh; • Katspruit; and • Dresden soil forms.	Construction- and Operational Phase	Control	Preserve sufficient soil volumes to enable pre-mining land capability post-rehabilitation. Maintain natural soil morphology (horizon sequence) and structural characteristics
Flora	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	The Kleinkopje Colliery mining area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area (Wetland Consulting Services, 2016). The project area is situated within an area vegetated by the Moist Sandy Highveld Grassland vegetation type according to Low & Rebelo (1998) with the most recent vegetation classification, classifying it as Eastern Highveld Grassland (Mucina & Rutherford 2006). The vegetation type is considered to be Endangered nationally with none conserved and 55% altered, primarily by cultivation. The conservation status of this vegetation type is very poor, with large parts that are either currently cultivated or have been previously ploughed, and the remaining untransformed vegetation that occurs as patchy remnants that are often heavily grazed. The Kleinkopje Colliery mine lease area is situated in an endangered ecosystem. This means that the ecosystem has undergone degradation of ecological structure, function or	Construction- and Operational Phase	Stop; Control	Prevent the destruction of vegetation and subsequent impacts species of conservation concern and protected species.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		composition as a result of human intervention, although it is not critically endangered (Digby Wells, 2014). A number of impacts on the study area were observed on site by the wetland specialist (Wetland Consulting Services, 2016) (Annexure E3): • Mining activities in and downstream from the direct catchment of the area, • Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area); • Contaminated seepage with elevated salinities from the adjacent discard dump; • Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area; • Numerous trenches cross the study area, diverting and intercepting flows; • A number of old excavations occur within the study area; • Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area; • Numerous roads and tracks cross the study areas; and • Impoundment of flow in dams and upstream of road crossings. As per the Biodversity Action Plan (BAP) for Kleinkopje Colliery (Digby Wells, 2014), the areas associated with the proposed location of the Pit 2A Extension and related activities fall within an area with low biodiversity value (Annexure E1). Only one species *Gladiolus macneilii*, which is included in the BAP even though it does not occur on the National Herbarium of Pretoria (PRE) Computerised Information system (PRECIS) list for the area, is endangered, and may require special measures to protect any populations that are positively identified. The remainder of the threatened species are in the vulnerable and near threatened categories indicating that conservation efforts aimed at the level of habitat conservation are adequate in the surface rights area (Digby Wells, 2014).			

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		However, the BAP also indicates that the wetland systems within Kleinkopje Colliery's mine boundary area (and thus also the hillslope seepage wetland associated with the proposed Pit 2A Extension area and associated haul road and dewatering pipeline) provides unique habitat for various flora species, especially potential Red Data *Nerine gracillis, Callilepis leptophyll, Crinum bulbispermum, Crinum macowanii ,* and *Aspidoglossum validum.* The possibility thus exist that potentially occurring conservation important species may be impacted upon, if not mitigated appropriately.			
Flora	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	During the clearance, construction and operational phase activities and following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems (Wetland Consulting Services, 2016).	Construction-; Operational Phase and Closure Phase	Remedy; Control	Prevent the destruction of vegetation and subsequent impacts species of conservation concern and protected species.
Fauna	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden.	Loss and degradation of untransformed faunal habitat as a direct result of clearing of vegetation and habitat to allow for mining and farming activities as well as related infrastructure establishment. This in turn may affect the biodiversity regionally, as present ecological systems may be altered and replaced by another less sensitive system. Refer however also to discussions under Section 5.5 above (Flora) regarding the biodiversity value of the mining area and project area specifically. Habitat fragmentation may occur as a result of the degradation and seclusion of possible natural corridors and habitat types. This results in the disruption of ecological connectivity and migration routes of larger animals as well as territorial infringement.	Construction- and Operational Phase	Stop; Control	Prevent the destruction of habitats and subsequent impacts on faunal species.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Surface and groundwater related impacts may result in an impact on fauna including loss of species, loss of habitat and overall loss of ecological integrity. Furthermore, noise and lighting disturb animal migration, occupation patterns and natural foraging activities.			
		This impact includes the potential loss of natural animal individuals through increase of traffic through natural areas resulting in potential collisions with animals on roads. Direct mortality is highly likely of ground-living animals as a result of blasting operations and operation of heavy mining machinery. Animals may also become trapped or drown in the pollution control dam.	Construction- and Operational Phase	Stop	Prevent the potential impacts on faunal species
Surface water	Construction and use of haul roads	The surface area of the new proposed haul road will be compacted to ensure that the road will be able to carry heavy vehicle activity. As a result, increased volumes of surface runoff will be generated during storm events that might lead to erosion of the road itself.	Construction- and Operational Phase	Stop; Remedy	To prevent surface water quality deterioration towards the remaining clean water area adjacent to the proposed haul road
	Operation of channels, trenches and return water dams	Silt accumulation within the conveyance channels is a continual problem at coal mining operations and thereby, as a result, reducing channel capacities, blocking silt traps and compromising the capacities containment facilities such as the plant return water dams. <u>Surface water quantity:</u> Process water spillages within the plant area will result in a reduced amount of water recycled within the process resulting in additional water that has to be sourced for usage. Ponding of surface water runoff at the plant also have a negative effect on plant operations.	Operational Phase	Stop; Remedy; Modify	To promote the re-use of affected water within the plant operation.
	Operation of Ramp 7 trench	The current Ramp 7 trench and Ramp 7 sump should be used as an additional measure to contain any possible spillages or overflows from the current plant return water dams or the proposed pollution control dam. Ineffective maintenance of the trench and the sump might cause overflow towards the Olifants River located approximately 700 meters downstream. <u>Surface water quality:</u> Contaminated process water will alter the ecological function and water quality within the Olifants River.	Operational Phase	Stop	Contain spillages
	Rainfall ingress into the ramps	Surface runoff and rainfall directly into the ramps, voids and areas in the vicinity of the mining operations are inevitable.	Operational Phase	Control	Re-use rainfall ingress into the 2A Dam Extension Area.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		Surface water quantity: Rainfall and surface runoff into the respective ramps will cause a reduction in catchment yield towards the adjacent clean water areas.			
Surface water	Surface runoff ingress into mine working from remaining north-west catchment	Currently there is a small catchment area in the upper north-western section of the 2A extension area which generates clean runoff towards 2A Dam. The proposed 2A extension area will encroach the small catchment area and therefore it is important to divert and prevent the ingress of any clean surface runoff that will be generated from the remaining catchment into the mine workings. Due to the topographical characteristics and proposed structures that will prevent surface runoff ingress into the workings, the impact is considered as low.	Operational Phase	Control	Maintain proposed structures to prevent any surface runoff ingress into the workings during rainfall events.
	Removal of 2A dam as a result of proposed mining activities	The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit resulting in a reduced storage capacity for excess process water at Kleinkopje Colliery. Surface water quantity: The removal of the current 2A Dam from the Kleinkopje water management circuit will require that all sources that are currently connected to 2A Dam be rerouted to the plant return water dams. Surface water flood modelling and the average dry and wet season water balance indicated that the current plant return water dams do not have sufficient buffer capacity and storage capacity to contain excess mine process water. Significant overflow of the plant return water dams will occur resulting the mine process water discharge towards the Olifants River.	Operational Phase	Remedy / Modify; Control	Contain excess mine process water and prevent any discharge to the receiving environment.
		As per the scenarios presented in the water balances in Section 5 of the Hydrology report (Storm water management plan) (Annexure E4), for both wet and dry season scenario, a significant volume of excess water has been calculated to report to 2A Dam. It is however believed that significant seepage from 2A Dam occurs that is reflected in the high dewatering volume and subsequently also in the excess water. All seepage is contained in the underground affected water system and pumped back to surface for safe continuation of mining activities. Surface water quantity:	Operational Phase	Remedy / Modify; Control	To limit seepage to underground compartments with the 2A Dam Extension Area.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit. Should 2A Dam in future be replaced with a facility designed to minimise seepage (e.g. membrane or clay of high plasticity), the dewatering requirements could substantially reduce. The management requirements for dewatering operations would also be simplified and the associated costs associated with dewatering will substantially reduce.			
Groundwater	• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) • Construction of new pollution control dam	Site clearing and removal of topsoil, may lead to ponding of surface water in the cleared areas during the wet season and could potentially lead to increased infiltration to aquifers. Groundwater quality impacts during the construction phase are expected to be insignificant if the proposed management measures are implemented. The stripping and stockpiling of topsoil and subsoil from the pit and infrastructure surface areas is considered negligible since no chemical interaction is envisaged that could have an adverse impact on groundwater quality. The stripping of topsoil before the advancing pit may result in a very slight increase in groundwater recharge, which is a slight positive effect on the groundwater environment. The duration of the activity is however so limited that the effect will not be measurable. The construction of the above mentioned infrastructure will cause a very small reduction in recharge to the aquifer due to the compaction of the surface area. This impact is countered by the fact that vegetation clearing may result in ponding and slight increases in recharge. Runoff water will contribute to the catchment yield. Carbonaceous material found within the mine lease area has the potential to generate acidic leachate, which means that any construction undertaken with carbonaceous material may be a potential source of poor quality leachate.	Construction- and Operational Phase	Control	To minimise the extent of disturbance of the aquifer. To limit degeneration of groundwater quality.
Groundwater	Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Blasting activities may impact negatively on the groundwater quality if significant amounts of explosives are spilled or incompletely detonated. The chemical residues in the form of NH_4 and NO_3 may potentially leach to the groundwater table.	Operational Phase	Stop; Control	To minimise the extent of disturbance of the aquifer. To limit degeneration of groundwater quality

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		Any nitrogen contamination that may occur will be localised within the pit area during the operational phase, due to the dewatering activities within the pit acting as a sink preventing plume migration.			
		Poor quality seepage from unlined return water/dirty water dams is inevitable and could have the following consequences on the local groundwater regime: Groundwater mounding directly underneath the dam/s. Downstream movement of a pollution plume within the weathered zone aquifer. It should be noted that the preferred option is the construction and operation of a new pollution control dam (refer Annexures D and E4). The new pollution control dam will be lined facility. The alternative option considered during the process relates to the upgrading and use of the existing Plant Return Water Dam. The Plant Return Water Dam is an unlined facility. Therefore, the two options have been rated separately (below). New pollution control dam at sites 1; 2; 3; 4 or 5 (lined) Upgrading and use of existing Plant Return Water Dam (unlined)	Operational Phase	Stop; Modify	Minimise seepage, prevent contact between clean and dirty areas, and recycle contaminated water.
	Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	Acid base accounting data reviewed[81] showed that a likely possibility exists for AMD development from the overburden and coal seams. During the operational phase of mining, the impact on pit and PCD quality is believed to be moderate given the short residence time and contact with carbonaceous material of water in the pit. If the PCD is unlined contamination of the upper weathered or perched aquifer may occur but migration thereof will be limited during the LoM given the hydraulic conductivities of the Karoo type aquifer. Due to the pit acting as a sink during the operational phase, no seepage from the pit towards adjacent aquifers (plume migration) is likely to occur. Overburden of stockpiles and backfilling have the potential to pollute aquifers.	Operational Phase	Stop; Control; Remedy	To minimise the extent of disturbance of the aquifer. To limit degeneration of groundwater quality.
	Dewatering activity: Pumping of water collecting in the open pit extension area	During the operational phase the open pit mining will be active which will cause the dewatering of the surrounding aquifer(s), the degree of which will depend upon the depth and extent of the open pit. The aquifers affected by the cone of depression will depend on the final depth of the pit. It is expected	Operational Phase	Control; Remedy	To minimise the extent of disturbance of the aquifer. To limit aquifer depletion and quality deterioration

[81] Landau Colliery data

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		that the pit will not exceed a depth of 60 m. No privately owned boreholes are situated within the modelled cone of depression.			
Groundwater	Backfilling activity - Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	A pollution plume will start to migrate during the decommissioning and closure phases when mining and dewatering has ceased. The following impacts may be expected: • Deterioration of groundwater quality within the backfilled opencast mine workings due to AMD reactions. • Downstream movement of a groundwater pollution plume. • Decant may occur at the lowest topographical point. • Risks towards receptors are deemed to be low due to absence of privately owned boreholes or natural rivers/streams in the near vicinity. Plume will start to migrate during decommissioning and closure when dewatering has ceased but dilution of the contaminant/s and absence of significant receptors reduces the final impact.	Operational- and Closure Phase	Control; Modify	To minimise the extent of disturbance of the aquifer. To limit aquifer depletion and quality deterioration.
Sensitive landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	**Loss and disturbance of wetland habitat – Construction** All wetland habitats falling directly within the mining footprint will be permanently destroyed by the proposed opencast mining activities. This amounts to the direct loss of roughly 145 hectares of wetland habitat (and a further 22.7 ha of dam habitat), consisting mostly of hillslope seepage wetland habitat that has been largely modified (PES D) and which is considered of Moderate importance and sensitivity. A haul road will also be constructed around the northern and western edge of the proposed opencast pit and will cross the hillslope seepage wetland remaining upslope of the opencast pit. This will further contribute to the loss and degradation of wetland habitat.[82] Although a wetland system can be recreated over the mined out area, this wetland will differ in terms of hydrological drivers, seasonality and species composition from the natural system.	Construction- and Operational Phase	Remedy; Control	Minimise extent of wetland loss and disturbance. Compensate for unavoidable wetland loss.

[82] It is however probable that construction activities will result in further disturbances to wetland habitat outside the direct development footprints through activities such as temporary stockpiles, construction camps, vehicle turning circles, unauthorised hunting/poaching activities etc. extending beyond the development footprint. This could lead to disturbances and resultant degradation of the adjacent wetland habitat. Given the distance between the proposed activities and the wetland boundaries, this impact is considered to be of low probability.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
Sensitive landscapes (Wetlands)	Vegetation clearing; earthworks; opencast mining	**Increased sedimentation in adjacent wetlands – Construction** Construction activities associated with the opencast pit and associated activities (including the haul road, stockpiles and required PCD) will involve the clearing of large areas of soil, as well as the movement of soil and overburden with subsequent stockpiling. This will expose large areas and large volumes of soil to erosion by wind and water, which will likely be aggravated by an increase in surface runoff from bare soil areas and concentration of flows. Sediment could be transported downslope via surface runoff to the adjacent wetland areas, leading to: • Increased turbidity with resultant impacts on aquatic habitats, including loss of sensitive species; and • Increased sediment deposition in wetlands, leading to habitat degradation as these areas become colonised by alien and pioneer species. Severe sedimentation could also impact flow distribution within the wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Construction- and Operational Phase	Stop; Control; Remedy	Minimise sediment movement off the site
		Increased turbidity and water quality deterioration – Construction During the construction phase, as activities are taking place adjacent to wetlands, there is a possibility that water quantity and quality can be impaired through contaminated surface runoff entering the wetlands. Typically, impairment will occur as a consequence of sediment disturbance resulting in an increase in turbidity. Water quality may also be impaired as a consequence of accidental spillages and the intentional washing and rinsing of equipment within the wetlands. It is possible that hydrocarbons will be temporarily stored and used on site, as well as cement and other potential pollutants. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project	Construction- and Operational Phase	Stop; Remedy	Minimise impact to water quality leaving the site
	Vegetation clearing; earthworks; opencast mining (including stockpiling)	**Decreased flows within adjacent wetlands – Construction**	Construction- and Operational Phase	Control	Minimise flow reduction in adjacent wetlands

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
Sensitive landscapes (Wetlands)		The opencast pit and associated surface infrastructures will be designated a dirty water area and as such will be isolated from the surrounding catchment. In addition, the opencast pit will intercept any shallow subsurface seepage from upslope. Water inputs to downslope wetlands could thus decrease, resulting in partial desiccation of these systems. However, in the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. The 2A Dam is already classed as a dirty water systems and is isolated from downstream water resources. There will therefore be no further reduction in flow to downstream wetlands and water resources.			
		Increased sedimentation in adjacent wetlands – Operation Various stockpiles will be required as part of the proposed mining activities, including overburden and topsoil stockpiles. Such stockpiles will be characterised by bare soil, steep side slopes that generate significant surface run-off. Run-off from these stockpiles is likely to be sediment rich. Where run-off from these stockpiles enters adjacent wetlands, sediment will be deposited and changes in vegetation are likely to occur, with pioneer species such as *Typha capensis* and *Phragmites australis* or other weedy species likely to become dominant. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Construction- and Operational Phase	Control	Minimise sediment movement off the site.
Sensitive landscapes (Wetlands	Vegetation clearing; earthworks; opencast mining	**Water quality deterioration – Operation** Mining and related activities that could lead to water quality deterioration in adjacent water resources via a number of pathways: • Ineffective clean and dirty water separation; • Storm water typically contains various pollutants that could contribute to deteriorating the water quality in the wetlands where storm water is released into such as the valley bottoms; • Potential discharge of contaminated water; • Decant points from the mine workings; • Leakage/seepage/overflow out of pollution control dams; and	Construction- and Operational Phase	Stop; Remedy	Limit impact to water quality of downstream water resources (Olifants River)

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		• Overflow of dams from water treatment plant directly into the seepage wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project			
	Rehabilitation of opencast pit	**Altered hydrology – Decommissioning and Closure** Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality.	Operational- and Closure Phase	Remedy; Control	Improve flow to Olifants River & re-instate some wetland functionality
Sensitive landscapes (Wetlands	Rehabilitation of opencast pit	**Increased sediment transport into wetlands – Decommissioning and Closure** The rehabilitated mine impacted areas will be susceptible to erosion following rehabilitation, especially in areas that are sparsely vegetated and/or steep sloped areas. This will result in increased sediment loads in the downslope wetlands, leading to deteriorating water quality (increased turbidity and TSS) and changes in the aquatic fauna and flora. Changes in wetland vegetation can also occur as sediment thriving plants (e.g. *Phragmites australis*) become dominant. As a watercourse across the rehabilitated area will be reinstated, sediment rich flows derived from the rehabilitated area would be discharged into the Olifants River.	Operational- and Closure Phase	Stop; Remedy	Minimise sediment movement off the site.
		Increased in alien vegetation – Decommissioning and Closure Following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated	Operational- and Closure Phase	Remedy; Control	Prevent the establishment and spread of invasive alien species

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A Pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems.			
		Altered hydrology – Post-Closure Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality	Operational- and Closure Phase	Remedy; Control	Improve flow to Olifants River & re-instate some wetland functionality
Sensitive landscapes (Wetlands		**Water quality deterioration – Post-Closure** Post-mining, the backfilled opencast pit is likely to fill with water as groundwater levels rebound. Opencast mining permanently destroys the aquitard and strata supporting the perched water table, resulting in increased infiltration of surface water, with infiltration values of 14-20% of rainfall being recorded for rehabilitated opencast mines compared to only 1-3% under natural conditions. Water in the pits is expected to become acidic and sulphate rich due to the oxidation of pyrites in the backfilled spoils. Decanting water could potentially be acidic and is likely to be metal and sulphate rich. Decant will eventually enter the Olifants River and downstream Witbank Dam, which are already water quality stressed systems. Acidic, sulphate rich water is likely to lead to a loss of sensitive species (including sensitive aquatic fauna as well as sensitive flora such as orchids) within the affected water courses and result in changes in species composition, with salinity tolerant species likely to become dominant.	Operational- and Closure Phase	Stop; Remedy; Control	Prevent decant of contaminated water into the environment

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
	Recreation of a watercourse with wetland habitat across the rehabilitated 2A Pit area as well as rehabilitation and protection of identified pans (as part of mitigation to compensate for the proposed wetland loss)	**Positive effect from the re-creation of a watercourse with wetland habitat across the rehabilitated 2A Pit area as well rehabilitation and protection of identified pans)**[83] A positive impact is expected from the recreation of a watercourse with wetland habitat across the 2A Pit area as well as the rehabilitation and protection of two representative pans of the area. The mentioned pans as well as the re-instatement of flow to the Olifants River from the 2A Dam sub-catchment are considered important from a biodiversity support perspective. This sub-catchment is currently an isolated dirty water catchment which, following rehabilitation, will again be a clean water catchment linked to the Olifants River and downstream water resources. Although the re-created watercourse will not resemble the wetland habitat being lost to mining, the re-created water course can be design to re-instate specific desired functions to the landscape, including biodiversity support, flood attenuation and sediment trapping.	Closure Phase	Modify	Improve flow to Olifants River & re-instate some wetland functionality
Air quality	• Clearance of vegetation • Removal and stockpiling of topsoil and overburden • Construction of haul roads • Construction of pollution control dam • Construction of storm / process water management measures	**Impacts during site establishment:** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment.	Construction Phase	Control	Prevent the deterioration of air quality and indirect effects on floral, faunal and human health
	• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Use of haul roads within and around the open pit extension area(s) • Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	**Impacts during mine operation (extension):** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Kleinkopje Colliery is an opencast mine, contributing significantly to surface dust fallout. The inherent air quality of the area is considered poor and is impacted on by the activities of adjacent collieries, industry, and vehicle use and veld fires. Furthermore, dust generation occurs from the existing opencast operations on-site. The operational phase would result in continued air quality related impacts due to the progressive development of the opencast pit.	Operational Phase	Control	Prevent the deterioration of air quality and indirect effects on floral, faunal and human health

[83] Development and implementation of a detailed Wetland Mitigation Strategy as recommended in Annexure E3 (Wetland Baseline and Mitigation Report) (Wetland Consulting Services, 2016)

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		The following activities may pose a fire risk on-site, if not management appropriately: • Maintenance activities. • Storage, off-loading and refuelling of hazardous substances (e.g. hydrocarbons (diesel and oil), chemicals etc.). • Operation and handling of explosives • Waste management activities. Furthermore, the potential / risk for spontaneous combustion exists.			
	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (Operational Phase) • Rehabilitation activities during Decommisioning Phase – Haul road, Pollution Control Dam, Klippan Co-disposal Facility and Pit 2A Extension (re-shaping of final void, removal of infrastructure, replacement of topsoil and re-vegetation). • This further includes dust generation from vehicle movement along unpaved roads.	**Impacts during site rehabilitation:** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Impacts during the Decommissioning- and Closure Phase are anticipated to be short-term in nature.	Operational- and Closure Phase	Control	Prevent the deterioration of air quality and indirect effects on floral, faunal and human health
Noise, air blast and ground vibration	• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting) • Construction and use of haul roads within and around the open pit extension area(s) • Construction of pollution control dam and storm water management measures	The study area is characterised by the presence of existing noise sources. There are major coal mining activities within the surrounding area (including Greenside Colliery and Landau Colliery). The proposed project is not expected to worsen the noise levels of the study area as it would be a continuation of the current Pit 2A mining activities. The current ambient noise levels are characterised by the presence of mining and related activities, and road traffic related noises. Noise levels at the proposed site are expected to be the same as that of the current Pit 2A.	Construction-; Operational- and Closure Phase	Control	Prevent and mitigate against the effects of noise and blasting on sensitive receptors (including employees and surrounding communities and towns

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		Ground vibration and air blast from the existing Kleinkopje Colliery operations (including Pit 2A) are monitored on a monthly basis. The results from the latest (August 2016) report (Annexure E8) indicated that levels of ground vibration recorded at privately owned structures or houses were within the limits and within the safe blast criteria, the levels recorded at the Dam Wall were within the ground vibration limit and acceleration limits, except for one event which just exceeded the vibration limit. Air blast levels recorded were within the accepted levels currently applied in South Africa of 134 dB at the structures monitored, except for eleven events that were greater than the limit. The possibility of damage is unlikely due to ground vibration and / or air blast at the surrounding structures / buildings. No damage was observed or reported after the blast. Since the Pit 2A Extension will be a continuation of the current Pit 2A operation, the possibility of blasting impacting on structures within and surrounding the mine, still remains.	Construction-; Operational- and Closure Phase	Control; Remedy	
Visual aspects	• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	The visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area. During the decommissioning phase, final voids and ramps will be profiled and vegetated thus reducing the impact on visual aesthetics. Filled final voids will progressively be cladded by stockpiled soils. Haul roads will be ripped, shaped and re-vegetated. Vegetation cover on rehabilitated land will reduce fugitive dust generated. Visual impact of final voids will be reduced due to vegetative cover (approved EMPr, 2012).	Construction-; Operational-Closure; and Post-Closure Phase	Control; Remedy	Prevent / minimise visual intrusions on sensitive receptors
	• Continuation of the disposal of mine residue within the existing footprint on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	The visual quality (and 'sense of place') of the environment associated with the existing Klippan Co-disposal site has already been altered due to continued deposition activities on the mentioned facilities as per Kleinkopje Colliery's approved EMPr, 2012. The continuation of the deposition of mine residue on the co-disposal facility during the activities undertaken at the Pit 2A Extension will result in the	Construction-; Operational-Closure; and Post-Closure Phase	Control; Remedy	Prevent / minimise visual intrusions on sensitive receptors

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		continued visual impact posed by the establishment and development of the facility.			
	• Site clearance • Construction and use of pollution control dam	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the visual impact it may pose in terms of visual aesthetics, depending on sensitive receptors, distance and viewing lines from roads etc. Therefore, the visual impact associated with the six site alternatives have been rated separately below. It should however be noted that, in general, the visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area and Kleinkopje Colliery as a whole, has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area. Pollution Control Dam: Alternative Site 5 (preferred alternative) Pollution Control Dam: Alternative Site 1 Pollution Control Dam: Alternative Site 2 Pollution Control Dam: Alternative Site 3 Pollution Control Dam: Alternative Site 4 Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam)	Construction-; Operational-Closure; and Post-Closure Phase	Control; Remedy	Prevent / minimise visual intrusions on sensitive receptors
Protected areas and conservation planning	• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation.	The Kleinkopje Colliery mining area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area, as portrayed in the Mpumalanga Biodiversity Conservation Plan 2013 (MBSP 2013) terrestrial biodiversity assessment which classifies large parts of the study area as having no natural habitat remaining (Wetland Consulting Services, 2016) (Annexure E3). An area classified as a Critical Biodiversity Area (CBA) Optimal (Critical Biodiversity Area Optimal) is however indicated as occurring within the northern corner of the proposed opencast pit extension area (refer Figure 26).	Construction-; Operational-Closure; and Post-Closure Phase	Control; Remedy	Prevent and / or manage impacts on ecological habitats, Conservation Important species and ecological processes in order to preserve Protected areas.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		A number of impacts on the study area were observed on site by the wetland specialist: • Mining activities in and downstream from the direct catchment of the area, • Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area); • Contaminated seepage with elevated salinities from the adjacent discard dump; • Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area; • Numerous trenches cross the study area, diverting and intercepting flows; • A number of old excavations occur within the study area; • Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area; • Numerous roads and tracks cross the study areas; and • Impoundment of flow in dams and upstream of road crossings. It is also important to note that the remainder of the CBA area (to the north-east of the proposed extension application area) has been earmarked for mining activities of the current authorised Pit 2A as per the mine plans contained in Kleinkopje Colliery's approved EMPr, 2012. Refer to Figure 3 showing the authorised Pit 2A currently being mined, including the proposed Pit 2A Extension.			
	• Site clearance • Dewatering activity: Pumping of water collecting in the open pit extension area	It is not anticipated that the dewatering pipeline will cross over the identified CBA area(s) within and in close proximity to the study area (refer to Figure 26). Therefore, no impact in terms of protected areas and conservation planning is envisaged from the placement of the dewatering pipeline.	Construction-; Operational-Closure; and Post-Closure Phase	Control	Prevent and / or manage impacts on ecological habitats, Conservation Important species and ecological processes in order to preserve Protected areas.
	• Site clearance • Construction and use of pollution control dam	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the impact it may pose in terms of protected areas and conservation planning, depending on the location of such PCD sites in relation to critical biodiversity areas or ecological support areas. Therefore, the impact associated with the six site alternatives have been rated separately below	Construction-; Operational-Closure; and Post-Closure Phase	Stop / Modify	Prevent and / or manage impacts on ecological habitats, Conservation Important species and ecological processes in order to preserve Protected areas.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		Pollution Control Dam: Alternative Site 5 (preferred alternative) – Not located in CBA / ESA			
		Pollution Control Dam: Alternative Site 1 - Not located in CBA / ESA.			
		Pollution Control Dam: Alternative Site 2 – Located close to CBA Optimal			
		Pollution Control Dam: Alternative Site 3 - Not located in CBA / ESA.			
		Pollution Control Dam: Alternative Site 4 – Located in ESA Protected Area buffer			
		Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam) – Not located in CBA / ESA			
Archaeology (Heritage resources)	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and use of pollution control dam	The Phase I HIA study for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area(s), namely (Figure 26): • One graveyard in the Pit 2A Extension mining (application) area (GY01). • Two graveyards directly outside the Pit 2A Extension mining (application) area (GY02, GY03). GY01 will be affected by the Pit 2A Extension Project. GY02 and GY03 fall outside the footprint of the Pit 2A Extension Project and will not be affected by the proposed Pit 2A Extension Project. All graveyards and graves can be considered to be of high significance and are protected by various laws. According to the specialist, all the graveyards hold graves which are older than sixty years. The identified archaeological sites are rated separately, below. No sites of archaeological importance were identified within the proposed pollution control dam study area (refer to Figure 26).	Construction and Operational Phase	Refer below	Prevent the destruction of and loss of sites of cultural and archaeological importance.
		GY01 Footprint of the proposed extension of Pit 2A will destroy GY01 with at least five graves.		Stop	
	Refer above.	**GY02 and GY03** GY02 and GY03 are located outside the Pit 2A Extension Project area and no impact due to the proposed activities are anticipated on these sites.		Control	

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
Palaeontology	• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and use of pollution control dam	The potential negative impacts of the proposed project on the palaeontological heritage of the area are: • Damage or destruction of fossil materials during the construction of project infrastructural elements to a maximum depth of those excavations. Many fossil taxa (particularly vertebrate taxa) are known from only a single fossil and, thus, any fossil material is potentially highly significant. Accordingly, the loss or damage to any single fossil can be potentially significant to the understanding of the fossil heritage of South Africa and to the understanding of the evolution of life on earth in general. • Where fossil material is present and will be directly affected by the building or construction of the projects infrastructural elements the result will potentially be the irreversible damage or destruction of the fossil(s). • Movement of fossil materials during the construction phase, such that they are no longer *in situ* when discovered. The fact that the fossils are not *in situ* would either significantly reduce or completely destroy their scientific significance. • The loss of access for scientific study to any fossil materials present beneath infrastructural elements for the life span of the existence of those constructions and facilities. <u>Pit 2A Extension area:</u> The entire remaining thickness of the Vryheid Formation will be impacted by the mining activities. The entire vertical and aerial extent of the rocks of the Vryheid Formation within the planned mine void will be permanently and irredeemably impacted by the mining activities.	Construction and Operational Phase	Manage	Prevent the destruction of and loss of sites of palaeontological importance.
Socio-economic aspects	Continuation of mining and related activities at Kleinkopje Colliery (through the mining of the Pit 2A Extension area)	**Mining / Development Option: Positive Impact** The continuation of operations at Kleinkopje Colliery (i.e. the mining of the Pit 2A Extension area) will ensure continued job security for the mine's current employees and contractors, along with the continued and benefits for the local community arising from the Social and Labour Plan (SLP). **No-go Option: Negative Impact** Should the Environmental Authorisation not be granted for the proposed Pit 2A Extension, the Life of Mine associated with Pit 2A will not be extended and several jobs may be lost. Skills development may cease and the ore body will remain *in situ* and unutilised	Operational; Decommissioning / Closure	Control Remedy; Control	Enhance the positive impact on the socio-economic aspects.

Aspects affected	Activity	Impact description	Phase Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	Mitigation type	Standards to be achieved
		The impacts on other environmental features as identified in sections above (e.g. dust generation; noise; blasting and vibration; visual aspects etc.) may also pose an impact on surrounding communities and I&APs. However, mining is already undertaken at the existing Pit 2A, as well as the remainder of Kleinkopje Colliery and at other mines within the surrounding area. The existing mining activities at Kleinkopje Colliery and the large number of opencast coal mines in the region, together with the historical nature of the mining in the Emalahleni region (over 100 years of mining history) will most likely have desensitised local residents and frequent travellers through the area.		Control; Stop; Remedy; Modify	To prevent and / or limit impacts on I&APs and the surrounding community
	Cessation of mining activities at Pit 2A (including the Pit 2A Extension)	During and subsequent to the cessation of mining activities at Pit 2A (and its extension) a loss of jobs may occur which may not only impact on the employees but on the socio-economic status of the local community and economy.	Decommissioning / Closure Phase	Control; Remedy	To prevent or minimise the impacts on the local community and economy as a result of the cessation of mining activities during Closure

1.6 Impact Management Actions

Table 87: Impact management actions, identifying the manner in which the impact management objectives and outcomes will be achieved.

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
Geology				
Mining of the ore reserve	A permanent impact on the localised geology of the areas associated with the proposed extension area will result from the mining and removal of coal.	Control	During the Operational Phase (until 2025)	In compliance with the Mining Rights issued in terms of the MPRDA (2002), the approved EMPr (and its associated documentation)
Topography				
• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	The existing and continued mining activities at Pit 2A has altered the topography. The construction and progressive development of the open pit (as part of the Pit 2A Extension activities) and the establishment of various associated stockpiles will continue to temporarily alter the topography until such time as rehabilitation activities have been undertaken.	Control; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	• In terms of Government Gazette 39425. Government Notice R.1147 dated 2015 (Financial Provision Regulations) and any amendments thereto • In compliance with Kleinkopje Colliery's Rehabilitation, Decommissioning and Closure Plans • Storm Water Management Plan (Annexure E4); the NWA, 1998 and GN704, 1999 • Compliance with a detailed Wetland Mitigation Strategy
• Construction and use of haul roads within and around the open pit extension area(s) • Continuation of the disposal of mine residue within the existing footprint of the current Klippan Co-disposal site, located at Kleinkopje Colliery. • Construction and operation of a new pollution control dam	The continuation of disposal of residue within the existing footprint of the Klippan Co-Disposal Facility will continue to influence the nature of the topography that is typical of the surrounding area[84]	Control; Remedy		
	The construction of the haul road and pollution control dam will lead to an alteration of the topography and subsequently the alteration of drainage patterns on-site.	Control; Remedy		
Soil				
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Susceptibility to erosion will be largely increased once the vegetation is cleared and the soils become exposed to wind and storm water.	Stop; Remedy	During the Construction- and Operational Phase (until 2025)	**Soil management:** • In compliance with principles in the MPRDA, 2002, NEMA, 1998, NEM: WA, 2008, Regulations there under and amendments thereto. • In Compliance with the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GNR.331 of 2014), thereunder. • In compliance with the Kleinkopje Colliery Rehabilitation, Decommissioning- and Closure plan and Closure Objectives. • Implementation in compliance with the mine's internal procedures (spill handling, incident reporting, emergency response,

[84] Not a listed activity applied for as part of this EIAR / EMPr. The mentioned existing facility was included in the approved EMPR dated 2012 which EMPR is deemed to be approved in terms of the National Environmental Management: Waste Act (NEMWA), 2008. Therefore, this activity is not applied for as a waste management activity. However the continued impact on the topography as a result of the Pit 2A Extension activities has been included in this Risk Assessment Report.

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Heavy equipment traffic is anticipated to cause significant soil compaction during construction activities. The severity of this impact is anticipated to be particularly highest in the vicinity of the proposed hauling road and during stripping within the application area.	Stop; Control	During the Construction Phase	training, waste management, topsoil management). • Procedures to be in line with the latest legislation.
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline) • Potential in-pit emergency maintenance on equipment or machinery. • Use and maintenance of chemical / portable toilets at open pit extension area(s).	The soil contamination impact is largely dependent on the nature, volume and/or concentration of the contaminant of concern, and all of the identified soils are considered to be equally predisposed to contamination, as contamination sources are unpredictable and typically occur as incidental spills or leaks, and or decant of contaminated mine water in such mining projects.	Stop; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
	The incorrect handling and disposal of general waste, scrap metal and industrial waste (e.g. waste tyres) will have a long-term impact on the local area. Impact will not only effect soil but could also impact on the habitat of fauna and impact of fauna, surface water and groundwater. In addition, the visual character of the area will be impacted on. The incorrect handling and disposal of hazardous waste can also have a permanent negative impact on the local area. Soil, water sources and fauna habitats can be adversely affected and human health can be impacted on.	Stop; Remedy; Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
Land Use and Land Capability				
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures	The main impact from a land capability perspective at Klein Kopje Mine is land degradation and loss of land capability from the proposed mining pit extension area. The soils that will be impacted by the proposed mining activities include the following: • Clovelly/Hutton; • Longlands/Fernwood;	Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	• In terms of Government Gazette 39425. Government Notice R.1147 dated 2015 (Financial Provision Regulations) and any amendments thereto

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
• Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	• Westleigh; • Katspruit; and • Dresden soil forms.			• In compliance with the Kleinkopje Colliery Rehabilitation, Decommissioning- and Closure plan and Closure Objectives. • Implementation in compliance with the mine's internal procedures (spill handling, incident reporting, emergency response, training, waste management, topsoil management). • In compliance with principles contained in the MPRDA, 2002, Mine Health and Safety Act, 1996, NEMA, 1998, NEM:WA, 2008, Regulations there under and amendments thereto. • The continued implementation of requirements contained in the NEM:BA (2004) and the regulations thereunder.
Flora				
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	The Kleinkopje Colliery mining area has been impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area (Wetland Consulting Services, 2016). The project area is situated within an area vegetated by the Moist Sandy Highveld Grassland vegetation type according to Low & Rebelo (1998) with the most recent vegetation classification, classifying it as Eastern Highveld Grassland (Mucina & Rutherford 2006). The vegetation type is considered to be Endangered nationally with none conserved and 55% altered, primarily by cultivation. The conservation status of this vegetation type is very poor, with large parts that are either currently cultivated or have been previously ploughed, and the remaining untransformed vegetation that occurs as patchy remnants that are often heavily grazed. The Kleinkopje Colliery mine lease area is situated in an endangered ecosystem. This means that the ecosystem has undergone degradation of ecological structure, function or composition as a result of human intervention, although it is not critically endangered (Digby Wells, 2014). A number of impacts on the study area were observed on site by the wetland specialist (Wetland Consulting Services, 2016) (Annexure E3):	Stop; Control	During the Construction- and Operational Phase (until 2025)	**Biodiversity management:** The continued implementation of requirements contained in: The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Mpumalanga Parks and Tourism Board Act, Mpumalanga Biodiversity Sector Plan.

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	• Mining activities in and downstream from the direct catchment of the area, • Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area); • Contaminated seepage with elevated salinities from the adjacent discard dump; • Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area; • Numerous trenches cross the study area, diverting and intercepting flows; • A number of old excavations occur within the study area; • Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area; • Numerous roads and tracks cross the study areas; and • Impoundment of flow in dams and upstream of road crossings. As per the Biodversity Action Plan (BAP) for Kleinkopje Colliery (Digby Wells, 2014), the areas associated with the proposed location of the Pit 2A Extension and related activities fall within an area with low biodiversity value (Annexure E1). Only one species *Gladiolus macneilii*, which is included in the BAP even though it does not occur on the National Herbarium of Pretoria (PRE) Computerised Information system (PRECIS) list for the area, is endangered, and may require special measures to protect any populations that are positively identified. The remainder of the threatened species are in the vulnerable and near threatened categories indicating that conservation efforts aimed at the level of habitat conservation are adequate in the surface rights area (Digby Wells, 2014). However, the BAP also indicates that the wetland systems within Kleinkopje Colliery's mine boundary area (and thus also the hillslope seepage wetland associated with the proposed Pit 2A Extension area and associated haul road and dewatering pipeline) provides unique habitat for various flora species, especially potential Red Data *Nerine gracillis, Callilepis leptophyll, Crinum bulbispermum, Crinum macowanii* , and *Aspidoglossum validum.* The possibility thus exist that potentially occurring conservation important species may be impacted upon, if not mitigated appropriately.			

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	During the clearance, construction and operational phase activities and following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems (Wetland Consulting Services, 2016).	Remedy; Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase; Post-Closure	**Biodiversity management:** The continued implementation of requirements contained in: The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Mpumalanga Parks and Tourism Board Act, Mpumalanga Biodiversity Sector Plan.
Fauna				
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) and associated storm water management measures • Construction and operation of a new pollution control dam • Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	Loss and degradation of untransformed faunal habitat as a direct result of clearing of vegetation and habitat to allow for mining and farming activities as well as related infrastructure establishment. This in turn may affect the biodiversity regionally, as present ecological systems may be altered and replaced by another less sensitive system. Refer however also to discussions under Section 5.5 above (Flora) regarding the biodiversity value of the mining area and project area specifically. Habitat fragmentation may occur as a result of the degradation and seclusion of possible natural corridors and habitat types. This results in the disruption of ecological connectivity and migration routes of larger animals as well as territorial infringement. Surface and groundwater related impacts may result in an impact on fauna including loss of species, loss of habitat and overall loss of ecological integrity. Furthermore, noise and lighting disturb animal migration, occupation patterns and natural foraging activities.	Stop; Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	**Biodiversity management:** The continued implementation of requirements contained in: The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Mpumalanga Parks and Tourism Board Act, Mpumalanga Biodiversity Sector Plan.
	This impact includes the potential loss of natural animal individuals through increase of traffic through natural areas resulting in potential collisions with animals on roads. Direct mortality is highly likely of ground-living animals as a result of blasting operations and operation of heavy mining machinery. Animals may also become trapped or drown in the pollution control dam.	Stop	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
Surface water				
Construction and use of haul roads	The surface area of the new proposed haul road will be compacted to ensure that the road will be able to carry heavy vehicle activity. As a result,	Stop; Remedy	During the Construction- and Operational Phase (until 2025)	**Surface water management:**

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	increased volumes of surface runoff will be generated during storm events that might lead to erosion of the road itself.			• In line with the DWS Best Practice Guidelines, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas; GN704, dated 1999; the NWA (1998) and Regulations there under and amendments thereto; the storm water management plan and / or amendments thereto; specialist recommendations; and the WUL conditions (once issued). • Implementation also to be in compliance with the mine's internal water management and maintenance procedures. • Procedures to be in line with the latest legislation.
Operation of channels, trenches and return water dams	Silt accumulation within the conveyance channels is a continual problem at coal mining operations and thereby, as a result, reducing channel capacities, blocking silt traps and compromising the capacities containment facilities such as the plant return water dams. Surface water quantity: Process water spillages within the plant area will result in a reduced amount of water recycled within the process resulting in additional water that has to be sourced for usage. Ponding of surface water runoff at the plant also have a negative effect on plant operations.	Stop; Remedy; Modify	During the Operational Phase (until 2025)	
Operation of Ramp 7 trench	The current Ramp 7 trench and Ramp 7 sump should be used as an additional measure to contain any possible spillages or overflows from the current plant return water dams or the proposed pollution control dam. Ineffective maintenance of the trench and the sump might cause overflow towards the Olifants River located approximately 700 meters downstream. Surface water quality: Contaminated process water will alter the ecological function and water quality within the Olifants River.	Stop	During the Operational Phase (until 2025)	
Rainfall ingress into the ramps	Surface runoff and rainfall directly into the ramps, voids and areas in the vicinity of the mining operations are inevitable. Surface water quantity: Rainfall and surface runoff into the respective ramps will cause a reduction in catchment yield towards the adjacent clean water areas.	Control	During the Operational Phase (until 2025)	
Surface runoff ingress into mine working from remaining north-west catchment	Currently there is a small catchment area in the upper north-western section of the 2A extension area which generates clean runoff towards 2A Dam. The proposed 2A extension area will encroach the small catchment area and therefore it is important to divert and prevent the ingress of any clean surface runoff that will be generated from the remaining catchment into the mine workings. Due to the topographical characteristics and proposed structures that will prevent surface runoff ingress into the workings, the impact is considered as low.	Control	During the Operational Phase (until 2025)	
Removal of 2A dam as a result of proposed mining activities	The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit resulting in a reduced storage capacity for excess process water at Kleinkopje Colliery. Surface water quantity:	Remedy / Modify; Control	During the Construction- Phase	

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	The removal of the current 2A Dam from the Kleinkopje water management circuit will require that all sources that are currently connected to 2A Dam be rerouted to the plant return water dams. Surface water flood modelling and the average dry and wet season water balance indicated that the current plant return water dams do not have sufficient buffer capacity and storage capacity to contain excess mine process water. Significant overflow of the plant return water dams will occur resulting the mine process water discharge towards the Olifants River.			
	As per the scenarios presented in the water balances in Section 5 of the Hydrology report (Storm water management plan) (Annexure E4), for both wet and dry season scenario, a significant volume of excess water has been calculated to report to 2A Dam. It is however believed that significant seepage from 2A Dam occurs that is reflected in the high dewatering volume and subsequently also in the excess water. All seepage is contained in the underground affected water system and pumped back to surface for safe continuation of mining activities. <u>Surface water quantity:</u> The proposed 2A Dam Extension Area will entail removing the current 2A Dam from the mining water management circuit. Should 2A Dam in future be replaced with a facility designed to minimise seepage (e.g. membrane or clay of high plasticity), the dewatering requirements could substantially reduce. The management requirements for dewatering operations would also be simplified and the associated costs associated with dewatering will substantially reduce.	Remedy / Modify; Control	During the Construction- Phase	
Groundwater				
• Clearance of vegetation • Construction and use of haul roads within and around the open pit extension area(s) • Construction of new pollution control dam	Site clearing and removal of topsoil, may lead to ponding of surface water in the cleared areas during the wet season and could potentially lead to increased infiltration to aquifers. Groundwater quality impacts during the construction phase are expected to be insignificant if the proposed management measures are implemented. The stripping and stockpiling of topsoil and subsoil from the pit and infrastructure surface areas is considered negligible since no chemical interaction is envisaged that could have an adverse impact on groundwater quality. The stripping of topsoil before the advancing pit may result in a very slight increase in groundwater recharge, which is a slight positive effect on the groundwater environment. The duration of the activity is however so limited that the effect will not be measurable.	Control	During the Construction- and Operational Phase (until 2025)	**Groundwater management:** • In line with the DWS Best Practice Guidelines; GN704, dated 1999; the NWA (1998) and Regulations there under and amendments thereto; the storm water management plan and / or amendments thereto; specialist recommendations; and the WUL conditions (once issued). • Implementation also to be in compliance with the mine's internal water management and maintenance procedures.

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	The construction of the above mentioned infrastructure will cause a very small reduction in recharge to the aquifer due to the compaction of the surface area. This impact is countered by the fact that vegetation clearing may result in ponding and slight increases in recharge. Runoff water will contribute to the catchment yield. Carbonaceous material found within the mine lease area has the potential to generate acidic leachate, which means that any construction undertaken with carbonaceous material may be a potential source of poor quality leachate.			• Procedures to be in line with the latest legislation. • Mine residue classification and characterisation in compliance with GNR 635 of August 2013, "National Norms and Standards for the Assessment of waste for landfill disposal" and GNR 636 of August 2013, "National Norms and Standards for disposal of waste to landfill", in terms of NEMWA, 2008
Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting)	Blasting activities may impact negatively on the groundwater quality if significant amounts of explosives are spilled or incompletely detonated. The chemical residues in the form of NH_4 and NO_3 may potentially leach to the groundwater table. Any nitrogen contamination that may occur will be localised within the pit area during the operational phase, due to the dewatering activities within the pit acting as a sink preventing plume migration.	Stop; Control	During the Operational Phase (until 2025)	
	Poor quality seepage from unlined return water/dirty water dams is inevitable and could have the following consequences on the local groundwater regime: Groundwater mounding directly underneath the dam/s. Downstream movement of a pollution plume within the weathered zone aquifer. It should be noted that the preferred option is the construction and operation of a new pollution control dam (refer Annexures D and E4). The new pollution control dam will be lined facility. The alternative option considered during the process relates to the upgrading and use of the existing Plant Return Water Dam. The Plant Return Water Dam is an unlined facility. Therefore, the two options have been rated separately (below). New pollution control dam at sites 1; 2; 3; 4 or 5 (lined)	Stop; Modify	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
	Upgrading and use of existing Plant Return Water Dam (unlined)			
Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	Acid base accounting data reviewed[85] showed that a likely possibility exists for AMD development from the overburden and coal seams. During the operational phase of mining, the impact on pit and PCD quality is believed to be moderate given the short residence time and contact with carbonaceous material of water in the pit. If the PCD is unlined contamination of the upper weathered or perched aquifer may occur but	Stop; Control; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	

[85] Landau Colliery data

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	migration thereof will be limited during the LoM given the hydraulic conductivities of the Karoo type aquifer. Due to the pit acting as a sink during the operational phase, no seepage from the pit towards adjacent aquifers (plume migration) is likely to occur. Overburden of stockpiles and backfilling have the potential to pollute aquifers.			
Dewatering activity: Pumping of water collecting in the open pit extension area	During the operational phase the open pit mining will be active which will cause the dewatering of the surrounding aquifer(s), the degree of which will depend upon the depth and extent of the open pit. The aquifers affected by the cone of depression will depend on the final depth of the pit. It is expected that the pit will not exceed a depth of 60 m. No privately owned boreholes are situated within the modelled cone of depression.	Control; Remedy	During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
Backfilling activity - Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s)	A pollution plume will start to migrate during the decommissioning and closure phases when mining and dewatering has ceased. The following impacts may be expected: • Deterioration of groundwater quality within the backfilled opencast mine workings due to AMD reactions. • Downstream movement of a groundwater pollution plume. • Decant may occur at the lowest topographical point. • Risks towards receptors are deemed to be low due to absence of privately owned boreholes or natural rivers/streams in the near vicinity. Plume will start to migrate during decommissioning and closure when dewatering has ceased but dilution of the contaminant/s and absence of significant receptors reduces the final impact.	Control; Modify	During the Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
Sensitive Landscapes (Wetlands)				
Vegetation clearing; earthworks; opencast mining	**Loss and disturbance of wetland habitat – Construction** All wetland habitats falling directly within the mining footprint will be permanently destroyed by the proposed opencast mining activities. This amounts to the direct loss of roughly 145 hectares of wetland habitat (and a further 22.7 ha of dam habitat), consisting mostly of hillslope seepage wetland habitat that has been largely modified (PES D) and which is considered of Moderate importance and sensitivity. A haul road will also be constructed around the northern and western edge of the proposed opencast pit and will cross the hillslope seepage wetland remaining upslope of the opencast pit. This will further contribute to the loss and degradation of wetland habitat.[86]	Remedy; Control	During the Closure / Decommissioning Phase)	**Wetland management and mitigation:** The continued implementation of requirements contained in: • The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National

[86] It is however probable that construction activities will result in further disturbances to wetland habitat outside the direct development footprints through activities such as temporary stockpiles, construction camps, vehicle turning circles, unauthorised hunting/poaching activities etc. extending beyond the development footprint. This could lead to disturbances and resultant degradation of the adjacent wetland habitat. Given the distance between the proposed activities and the wetland boundaries, this impact is considered to be of low probability.

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	Although a wetland system can be recreated over the mined out area, this wetland will differ in terms of hydrological drivers, seasonality and species composition from the natural system.			Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA); Mpumalanga Parks and Tourism Board Act, NWA, 1998; Mpumalanga Biodiversity Sector Plan. • Compliance with the biodiversity, soil, and wetland specialist recommendations.
Vegetation clearing; earthworks; opencast mining	**Increased sedimentation in adjacent wetlands – Construction** Construction activities associated with the opencast pit and associated activities (including the haul road, stockpiles and required PCD) will involve the clearing of large areas of soil, as well as the movement of soil and overburden with subsequent stockpiling. This will expose large areas and large volumes of soil to erosion by wind and water, which will likely be aggravated by an increase in surface runoff from bare soil areas and concentration of flows. Sediment could be transported downslope via surface runoff to the adjacent wetland areas, leading to: • Increased turbidity with resultant impacts on aquatic habitats, including loss of sensitive species; and • Increased sediment deposition in wetlands, leading to habitat degradation as these areas become colonised by alien and pioneer species. Severe sedimentation could also impact flow distribution within the wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Stop; Control; Remedy	During the Construction- and Operational Phase (until 2025)	
	Increased turbidity and water quality deterioration – Construction During the construction phase, as activities are taking place adjacent to wetlands, there is a possibility that water quantity and quality can be impaired through contaminated surface runoff entering the wetlands. Typically, impairment will occur as a consequence of sediment disturbance resulting in an increase in turbidity. Water quality may also be impaired as a consequence of accidental spillages and the intentional washing and rinsing of equipment within the wetlands. It is possible that hydrocarbons will be temporarily stored and used on site, as well as cement and other potential pollutants. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project	Stop; Remedy	During the Construction- and Operational Phase (until 2025)	
Vegetation clearing; earthworks; opencast mining (including stockpiling)	**Decreased flows within adjacent wetlands – Construction** The opencast pit and associated surface infrastructures will be designated a dirty water area and as such will be isolated from the surrounding catchment.	Control	During the Construction- and Operational Phase (until 2025)	

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	In addition, the opencast pit will intercept any shallow subsurface seepage from upslope. Water inputs to downslope wetlands could thus decrease, resulting in partial desiccation of these systems. However, in the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. The 2A Dam is already classed as a dirty water systems and is isolated from downstream water resources. There will therefore be no further reduction in flow to downstream wetlands and water resources.			
	Increased sedimentation in adjacent wetlands – Operation Various stockpiles will be required as part of the proposed mining activities, including overburden and topsoil stockpiles. Such stockpiles will be characterised by bare soil, steep side slopes that generate significant surface run-off. Run-off from these stockpiles is likely to be sediment rich. Where run-off from these stockpiles enters adjacent wetlands, sediment will be deposited and changes in vegetation are likely to occur, with pioneer species such as *Typha capensis* and *Phragmites australis* or other weedy species likely to become dominant. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project.	Control	During the Construction- and Operational Phase (until 2025)	
Vegetation clearing; earthworks; opencast mining	**Water quality deterioration – Operation** Mining and related activities that could lead to water quality deterioration in adjacent water resources via a number of pathways: • Ineffective clean and dirty water separation; • Storm water typically contains various pollutants that could contribute to deteriorating the water quality in the wetlands where storm water is released into such as the valley bottoms; • Potential discharge of contaminated water; • Decant points from the mine workings; • Leakage/seepage/overflow out of pollution control dams; and • Overflow of dams from water treatment plant directly into the seepage wetlands. In the case of the 2A Dam area, no downslope wetlands remain, and no connectivity currently exists to downstream water resources, as the downstream area has been mined by opencast methods. This impact is therefore of limited significance in this specific project	Stop; Remedy	During the Construction- and Operational Phase (until 2025)	

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
Rehabilitation of opencast pit	**Altered hydrology – Decommissioning and Closure** Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality.	Remedy; Control	During the Closure / Decommissioning Phase	
Rehabilitation of opencast pit	**Increased sediment transport into wetlands – Decommissioning and Closure** The rehabilitated mine impacted areas will be susceptible to erosion following rehabilitation, especially in areas that are sparsely vegetated and/or steep sloped areas. This will result in increased sediment loads in the downslope wetlands, leading to deteriorating water quality (increased turbidity and TSS) and changes in the aquatic fauna and flora. Changes in wetland vegetation can also occur as sediment thriving plants (e.g. *Phragmites australis*) become dominant. As a watercourse across the rehabilitated area will be reinstated, sediment rich flows derived from the rehabilitated area would be discharged into the Olifants River.	Stop; Remedy	During the Closure / Decommissioning Phase	
	Increased in alien vegetation – Decommissioning and Closure Following the completion of decommissioning, the recently replaced and disturbed soils will be susceptible to invasion by alien vegetation, e.g. *Acacia mearnsii* (black wattle). This was observed happening on other rehabilitated sites within the Kleinkopje mining rights area and can be assumed to become a problem on the rehabilitated 2A Pit as well. These alien species could spread to the adjacent wetland areas and result in decreased flows, increased erosion and decreased biodiversity in these systems.	Remedy; Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
	Altered hydrology – Post-Closure Opencast mining permanently alters the movement of water through the landscape through its impacts on geological strata and soils. Compared to the pre-mining landscape, the rehabilitated opencast pit will have significantly increased infiltration to groundwater and increased surface runoff. Typically, the rehabilitated opencast areas lack the shallow perched water table that characterised the pre-mining landscape. The implications of these changes are that no wetlands are likely to naturally reform on the	Remedy; Control	During the Closure and Post-Closure Phase	

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	rehabilitated opencast areas, and that the remaining wetlands downslope of these areas will be faced with altered runoff characteristics from their catchment. Typically, surface runoff volumes and velocities are expected to increase, leading to increases in flood peaks and erosive energy, while subsurface inputs are expected to decrease, reducing low flows and increasing seasonality			
Rehabilitation of opencast pit	**Water quality deterioration – Post-Closure** Post-mining, the backfilled opencast pit is likely to fill with water as groundwater levels rebound. Opencast mining permanently destroys the aquitard and strata supporting the perched water table, resulting in increased infiltration of surface water, with infiltration values of 14-20% of rainfall being recorded for rehabilitated opencast mines compared to only 1-3% under natural conditions. Water in the pits is expected to become acidic and sulphate rich due to the oxidation of pyrites in the backfilled spoils. Decanting water could potentially be acidic and is likely to be metal and sulphate rich. Decant will eventually enter the Olifants River and downstream Witbank Dam, which are already water quality stressed systems. Acidic, sulphate rich water is likely to lead to a loss of sensitive species (including sensitive aquatic fauna as well as sensitive flora such as orchids) within the affected water courses and result in changes in species composition, with salinity tolerant species likely to become dominant.	Remedy; Control	During the Closure and Post-Closure Phase	

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
Recreation of a watercourse with wetland habitat across the rehabilitated 2A Pit area as well as rehabilitation and protection of identified pans (as part of mitigation to compensate for the proposed wetland loss)	**Positive effect from the re-creation of a watercourse with wetland habitat across the rehabilitated 2A Pit area as well rehabilitation and protection of identified pans)**[87] A positive impact is expected from the recreation of a watercourse with wetland habitat across the 2A Pit area as well as the rehabilitation and protection of two representative pans of the area. The mentioned pans as well as the re-instatement of flow to the Olifants River from the 2A Dam sub-catchment are considered important from a biodiversity support perspective. This sub-catchment is currently an isolated dirty water catchment which, following rehabilitation, will again be a clean water catchment linked to the Olifants River and downstream water resources. Although the re-created watercourse will not resemble the wetland habitat being lost to mining, the re-created water course can be design to re-instate specific desired functions to the landscape, including biodiversity support, flood attenuation and sediment trapping.	Modify	During the Closure and Post-Closure Phase	
Air Quality				
• Clearance of vegetation • Removal and stockpiling of topsoil and overburden • Construction of haul roads • Construction of pollution control dam • Construction of storm / process water management measures	**Impacts during site establishment:** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment.	Control	During the Construction Phase	**Air quality management:** • Environmental Management: Air Quality Act (Act No 39 of 2004); Regulations there under and amendments thereto. • Consideration of and compliance with the Highveld Priority Area Air Quality Management Plan; Provincial Air Quality Management Plans and Municipal Air Quality Management Plans. • Emergency preparedness and response in compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996); MPRDA, 2002; NEMA; 1998 and NWA; 1998 and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), (and regulations there under), and amendments thereto • Compliance with internal emergency procedures.
• Removal and stockpiling of topsoil and overburden. • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Use of haul roads within and around the open pit extension area(s) • Continuation of the disposal within the existing footprint of mine residue on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	**Impacts during mine operation (extension):** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Kleinkopje Colliery is an opencast mine, contributing significantly to surface dust fallout. The inherent air quality of the area is considered poor and is impacted on by the activities of adjacent collieries, industry, and vehicle use and veld fires. Furthermore, dust generation occurs from the existing opencast operations on-site. The operational phase would result in continued air quality related impacts due to the progressive development of the opencast pit.	Control	During the Construction- and Operational Phase (until 2025)	

[87] Development and implementation of a detailed Wetland Mitigation Strategy as recommended in Annexure E3 (Wetland Baseline and Mitigation Report) (Wetland Consulting Services, 2016)

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	The following activities may pose a fire risk on-site, if not management appropriately: • Maintenance activities. • Storage, off-loading and refuelling of hazardous substances (e.g. hydrocarbons (diesel and oil), chemicals etc.). • Operation and handling of explosives • Waste management activities. Furthermore, the risk of spontaneous combustion exists.			• All procedures to be in compliance with latest legislation,
• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (Operational Phase) • Rehabilitation activities during Decommisioning Phase – Haul road, Pollution Control Dam, Klippan Co-disposal Facility and Pit 2A Extension (re-shaping of final void, removal of infrastructure, replacement of topsoil and re-vegetation). • This further includes dust generation from vehicle movement along unpaved roads.	**Impacts during site rehabilitation:** Dust fallout impacts relate to nuisance impacts, i.e. reduced visibility and layers of dust deposited on the surrounding environment. Impacts during the Decommissioning- and Closure Phase are anticipated to be short-term in nature.	Control	During the Closure / Decommissioning Phase	
Noise, Air Blast and Vibration				
• Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) (including blasting) • Construction and use of haul roads within and around the open pit extension area(s) • Construction of pollution control dam and storm water management measures	The study area is characterised by the presence of existing noise sources. There are major coal mining activities within the surrounding area (including Greenside Colliery and Landau Colliery). The proposed project is not expected to worsen the noise levels of the study area as it would be a continuation of the current Pit 2A mining activities. The current ambient noise levels are characterised by the presence of mining and related activities, and road traffic related noises. Noise levels at the proposed site are expected to be the same as that of the current Pit 2A.	Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	**Noise and vibration / blast monitoring:** • In accordance with relevant sections of the National Environmental Management: Air Quality Act (Act No 39 of 2004); Regulations there under and amendments thereto • SABS Code of Practice 0103 of 2008: The measurement and rating of environmental

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	Ground vibration and air blast from the existing Kleinkopje Colliery operations (including Pit 2A) are monitored on a monthly basis. The results from the latest (August 2016) report (Annexure E8) indicated that levels of ground vibration recorded at privately owned structures or houses were within the limits and within the safe blast criteria, the levels recorded at the Dam Wall were within the ground vibration limit and acceleration limits, except for one event which just exceeded the vibration limit. Air blast levels recorded were within the accepted levels currently applied in South Africa of 134 dB at the structures monitored, except for eleven events that were greater than the limit. The possibility of damage is unlikely due to ground vibration and / or air blast at the surrounding structures / buildings. No damage was observed or reported after the blast. Since the Pit 2A Extension will be a continuation of the current Pit 2A operation, the possibility of blasting impacting on structures within and surrounding the mine, still remains.	Control; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	noise with respect to land use, health, annoyance and to speech communication. • SABS Code of Practice 0328 of 2008: Environmental Noise Impact Assessments • United States Bureau of Mines (USBM) criteria (blasts).
Visual Aspects				
• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) • Dewatering activity: Pumping of water collecting in the open pit extension area (i.e. pipeline)	The visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area. During the decommissioning phase, final voids and ramps will be profiled and vegetated thus reducing the impact on visual aesthetics. Filled final voids will progressively be cladded by stockpiled soils. Haul roads will be ripped, shaped and re-vegetated. Vegetation cover on rehabilitated land will reduce fugitive dust generated. Visual impact of final voids will be reduced due to vegetative cover (approved EMPr, 2012).	Control; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	• In compliance with the Rehabilitation, Decommissioning- and Closure plans and Closure Objectives. • In compliance with principles contained in the MPRDA, 2002, Mine Health and Safety Act, 1996, NEMA, 1998, NEM:WA, 2008, Regulations there under and amendments thereto. • Implementation also to be in compliance with the mine's internal procedures. • Procedures to be in line with the latest legislation.
• Continuation of the disposal of mine residue within the existing footprint on the current Klippan Co-disposal site, located at Kleinkopje Colliery.	The visual quality (and 'sense of place') of the environment associated with the existing Klippan Co-disposal site has already been altered due to continued deposition activities on the mentioned facilities as per Kleinkopje Colliery's approved EMPr, 2012. The continuation of the deposition of mine residue on the co-disposal facility during the activities undertaken at the Pit 2A Extension will result in the continued visual impact posed by the establishment and development of the facility.	Control; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
• Site clearance	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the visual	Control; Remedy	During the Construction Phase	

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
• Construction and use of pollution control dam	impact it may pose in terms of visual aesthetics, depending on sensitive receptors, distance and viewing lines from roads etc. Therefore, the visual impact associated with the six site alternatives have been rated separately below. It should however be noted that, in general, the visual quality (and 'sense of place') of the pre-mining environment in the vicinity of the study area and Kleinkopje Colliery as a whole, has already been altered due to the presence of the existing Kleinkopje Colliery infrastructure and mining related activities, as well as other mining operations in the surrounding area. Pollution Control Dam: Alternative Site 5 (preferred alternative) Pollution Control Dam: Alternative Site 1 Pollution Control Dam: Alternative Site 2 Pollution Control Dam: Alternative Site 3 Pollution Control Dam: Alternative Site 4 Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam)			
Protected Areas and Conservation Planning				
• Site clearance • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation.	The Kleinkopje Colliery mining area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the area, as portrayed in the Mpumalanga Biodiversity Conservation Plan 2013 (MBSP 2013) terrestrial biodiversity assessment which classifies large parts of the study area as having no natural habitat remaining (Wetland Consulting Services, 2016) (Annexure E3). An area classified as a Critical Biodiversity Area (CBA) Optimal (Critical Biodiversity Area Optimal) is however indicated as occurring within the northern corner of the proposed opencast pit extension area (refer Figure 26). A number of impacts on the study area were observed on site by the wetland specialist: • Mining activities in and downstream from the direct catchment of the area, • Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland area (i.e. Pit 2A Extension study area);	Control; Remedy	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	• The continued implementation of requirements contained in: The NEM:BA (2004) and the regulations thereunder, the Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, Environmental Conservation Act, 1989 (Act No 73 of 1989), National Forests Act, 1998 (Act No 84 of 1998), National Veld and Forest Fire Act, 1998 (Act No 101 of 1998), National Environmental Management: Protected Areas Act (NEM:PAA) (Act No 57 of 2003), Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA); Mpumalanga Parks and Tourism Board Agency Act, 2005; NWA, 1998; Mpumalanga Biodiversity Sector Plan.

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	• Contaminated seepage with elevated salinities from the adjacent discard dump; • Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the study area; • Numerous trenches cross the study area, diverting and intercepting flows; • A number of old excavations occur within the study area; • Stands of alien vegetation, including stands of *Populus x canescens* and *Eucalyptus trees* within the study area; • Numerous roads and tracks cross the study areas; and • Impoundment of flow in dams and upstream of road crossings. It is also important to note that the remainder of the CBA area (to the north-east of the proposed extension application area) has been earmarked for mining activities of the current authorised Pit 2A as per the mine plans contained in Kleinkopje Colliery's approved EMPr, 2012. Refer to Figure 3 showing the authorised Pit 2A currently being mined, including the proposed Pit 2A Extension.			
• Site clearance • Dewatering activity: Pumping of water collecting in the open pit extension area	It is not anticipated that the dewatering pipeline will cross over the identified CBA area(s) within and in close proximity to the study area (refer to Figure 26). Therefore, no impact in terms of protected areas and conservation planning is envisaged from the placement of the dewatering pipeline.	Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	
• Site clearance • Construction and use of pollution control dam	Six alternatives (as per Figure 25) were considered for the location of the proposed pollution control dam. The six sites will differ in terms of the impact it may pose in terms of protected areas and conservation planning, depending on the location of such PCD sites in relation to critical biodiversity areas or ecological support areas. Therefore, the impact associated with the six site alternatives have been rated separately below	Stop / Modify	During the Construction Phase	
	Pollution Control Dam: Alternative Site 5 (preferred alternative) – Not located in CBA / ESA			
	Pollution Control Dam: Alternative Site 1 - Not located in CBA / ESA.			
	Pollution Control Dam: Alternative Site 2 – Located close to CBA Optimal			
	Pollution Control Dam: Alternative Site 3 - Not located in CBA / ESA.			
	Pollution Control Dam: Alternative Site 4 – Located in ESA Protected Area buffer			
	Pollution Control Dam: Alternative Site 6 (use of existing Plant Return Water Dam) – Not located in CBA / ESA			
Sites of Archaeological Importance				

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and use of pollution control dam	The Phase I HIA study for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area(s), namely (Figure 26): • One graveyard in the Pit 2A Extension mining (application) area (GY01). • Two graveyards directly outside the Pit 2A Extension mining (application) area (GY02, GY03). GY01 will be affected by the Pit 2A Extension Project. GY02 and GY03 fall outside the footprint of the Pit 2A Extension Project and will not be affected by the proposed Pit 2A Extension Project. All graveyards and graves can be considered to be of high significance and are protected by various laws. According to the specialist, all the graveyards hold graves which are older than sixty years. The identified archaeological sites are rated separately, below. No sites of archaeological importance were identified within the proposed pollution control dam study area (refer to Figure 26).	Refer below	Prior to the Construction Phase During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	**Management of heritage resources:** In compliance with the National Heritage Resources Act (Act No. 25 of 1999), and amendments thereto
	GY01 Footprint of the proposed extension of Pit 2A will destroy GY01 with at least five graves.	Stop		
	GY02 and GY03 GY02 and GY03 are located outside the Pit 2A Extension Project area and no impact due to the proposed activities are anticipated on these sites.	Control		
Palaeontology				
• Clearance of vegetation • Mining of the ore reserve and subsequent (concurrent) rehabilitation of the open pit extension area(s) • Removal and stockpiling of topsoil and overburden. • Construction and use of haul roads within and around the open pit extension area(s) and construction of storm / process water management measures for the purpose of clean- and dirty water separation. • Dewatering activity: Pumping of water collecting in the open pit extension area • Construction and use of pollution control dam	The potential negative impacts of the proposed project on the palaeontological heritage of the area are: • Damage or destruction of fossil materials during the construction of project infrastructural elements to a maximum depth of those excavations. Many fossil taxa (particularly vertebrate taxa) are known from only a single fossil and, thus, any fossil material is potentially highly significant. Accordingly, the loss or damage to any single fossil can be potentially significant to the understanding of the fossil heritage of South Africa and to the understanding of the evolution of life on earth in general. • Where fossil material is present and will be directly affected by the building or construction of the projects infrastructural elements the result will potentially be the irreversible damage or destruction of the fossil(s). • Movement of fossil materials during the construction phase, such that they are no longer *in situ* when discovered. The fact that the fossils are	Manage	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase	In compliance with the National Heritage Resources Act (Act No. 25 of 1999), and amendments thereto as well as NEMA, 1998 (as amended)

Activity	Impact description	Mitigation type	Time period for implementation	Compliance with standards
	not *in situ* would either significantly reduce or completely destroy their scientific significance. • The loss of access for scientific study to any fossil materials present beneath infrastructural elements for the life span of the existence of those constructions and facilities. <u>Pit 2A Extension area:</u> The entire remaining thickness of the Vryheid Formation will be impacted by the mining activities. The entire vertical and aerial extent of the rocks of the Vryheid Formation within the planned mine void will be permanently and irredeemably impacted by the mining activities.			
Socio-Economic Aspects				
Continuation of mining and related activities at Kleinkopje Colliery (through the mining of the Pit 2A Extension area)	**Mining / Development Option: Positive Impact** The continuation of operations at Kleinkopje Colliery (i.e. the mining of the Pit 2A Extension area) will ensure continued job security for the mine's current employees and contractors, along with the continued and benefits for the local community arising from the Social and Labour Plan (SLP).	Control	During the Construction- and Operational Phase (until 2025) and During the Closure / Decommissioning Phase and Post-Closure	• Continued implementation in compliance with the DMR Guideline for Consultation with communities and Interested and Affected Parties. As required in terms of Sections 16(4)(b) or 27(5)(b) of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), and in accordance with the standard directive for the compilation thereof as published on the official website of the DMR. • Continued compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996); MPRDA, 2002; National Road Traffic Act; Regulations there under and amendments thereto. • Implementation also to be in compliance with the mine's internal procedures (communication, incident reporting, etc.). • Procedures to be in line with the latest legislation.
	No-go Option: Negative Impact Should the Environmental Authorisation not be granted for the proposed Pit 2A Extension, the Life of Mine associated with Pit 2A will not be extended and several jobs may be lost. Skills development may cease and the ore body will remain *in situ* and unutilised	Remedy; Control		
	The impacts on other environmental features as identified in sections above (e.g. dust generation; noise; blasting and vibration; visual aspects etc.) may also pose an impact on surrounding communities and I&APs. However, mining is already undertaken at the existing Pit 2A, as well as the remainder of Kleinkopje Colliery and at other mines within the surrounding area. The existing mining activities at Kleinkopje Colliery and the large number of opencast coal mines in the region, together with the historical nature of the mining in the Emalahleni region (over 100 years of mining history) will most likely have desensitised local residents and frequent travellers through the area.	Control; Stop; Remedy; Modify		
Cessation of mining activities at Pit 2A (including the Pit 2A Extension)	During and subsequent to the cessation of mining activities at Pit 2A (and its extension) a loss of jobs may occur which may not only impact on the employees but on the socio-economic status of the local community and economy.	Control; Remedy		

1.7 Financial Provision

1.7.1 Describe the closure objectives and the extent to which they have been aligned with the baseline environment described under Regulation 22(2)(d) as described in Section 7.4.1

Table 88: The alignment of Closure objectives to the baseline environment[88]

Closure Objective	Alignment with baseline environment
To rehabilitate mining-related disturbed areas to a land capability that will support and sustain a predetermined mix of post closure land uses.	It should be noted that Kleinkopje Colliery is an existing mine and the proposed activities will be undertaken on modified / already disturbed land. The Closure objectives may thus not be aligned with the *current* baseline environment (relevant to the project) but will aim at improving the baseline environment to as close to pre-mining conditions as possible with the principles of free drainage and establishing a self-sustaining landscape. One of the key measures that would provide such a link between the baseline (and specific pre-mining environment) relates to the development and implementation of the proposed wetland mitigation strategy. During the rehabilitation phase, the identified soils within the project area should be sequentially replaced to mimic the current (pre-mining) conditions which will enable re-establishment of the conditions, as illustrated in the land capability maps in contained in Annexure E9, which is relatively consistent with the recommendations of the post-mining land capability as included in approved EMPr for the greater mining operation. The Kleinkopje Colliery Preliminary Mine Closure Plan (Golder, 2014) identifies the end land use alternatives for Kleinkopje Colliery (reference made thereto in Annexure J). It is assumed that the end use for the Pit 2A Extension will be aligned with the final land use. Ultimately, the overarching aim for land use related closure is that the Kleinkopje site will contribute to a sustainable situation once mining has ceased in the region.To achieve this land uses that will viable in the long run must where possible be progressively reaslied throughout the remaining
To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation.	
To ensure that the plans and actions put in place will meet specific closure-related performance objectives.	
To maximise surface runoff from the rehabilitated mine site to the nearby Tweefonteinspruit and Olifants River.	
To prevent acid mine drainage.	
To limit decant from the open water bodies, as well as the amount of contaminated water seeping from the rehabilitated pits.	
To rehabilitate borrow pits (if any) to be free-draining.	
To remove all surface infrastructure that cannot be beneficially re-used and return the associate disturbed land to the planned final land use.	
To in-fill and slope ramps and voids to be free draining.	
To limit adverse effect on local catchment yield.	
To limit the recharge of rainfall to the rehabilitated pits; to reduce the amount of water to be abstracted; to maintain the in-pit water levels; to prevent surface and/or near surface contaminated excess mine water decant.	

Closure Objective	Alignment with baseline environment
	operational life of the mine. The Land Use Plan (LUP) and associated development strategies must therefore be reviewed over time to align to changes in the receiving biophysical environment, as well as policy changes at national level, planning requirements at local levels, shifts in mine planning and closure focus by Kleinkopje and changing socio-economic conditions in the area. Furthermore, the establishment of a regional land use planning strategy supported by the local and district municpalities as well as all major mines should be persued, to ensure that all role players strive towards an aligned long-term use vision for the region. Individual LUPs such as that of Kleinkopje would inform and form part of the land use master plan for the region.

1.7.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowners and interested and affected parties.

This EIAR / EMPr has been made available to the public for review for a period thirty (30) days. The public are also encouraged to comment on sections of this report (with specific reference to the closure objectives as presented in Section 1.7.1 above), any aspect of the proposed project and raise any concerns and / or issues they may have. Any comments, concerns and / or issues will be addressed and responded to and will be taken into consideration in finalising this EIAR / EMPr.

1.7.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

A rehabilitated plan has been compiled and is included in Annexure J.

1.7.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The rehabilitation plan has been compiled taking the closure objectives into account (e.g. free-draining, sloping and rehabilitating to the agreed end land use etc.). The annual rehabilitation plan is included in Annexure J along with the Decommissioning- and Closure Plan.

1.7.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

Refer to Section 19 (Part A) of this EIAR / EMPr and Annexure J.

1.7.6 Confirm that the financial provision will be provided as determined.

The financial provision as determined above will be provided for in the form of a bank guarantee.

1.8 Mechanisms for monitoring compliance with and performance assessments against the environmental management programme.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

- Monitoring of Impact Management Actions.
- Monitoring and reporting frequency.
- Responsible persons.
- Time period for implementing impact management actions.
- Mechanism for monitoring compliance.

Table 89: Monitoring programmes and compliance thereto

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES[89]	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Mining and related activities	Surface water may become impacted upon as result of mining and related activities.	Implement the surface water monitoring programme	The Environmental Manager is to ensure that surface water monitoring and GN704 Audits are taking place. The resultant monitoring reports and audit reports need to be submitted to the DWS and kept on record.	Surface water quality monitoring to be conducted on a monthly basis. The reports will be submitted to the DWS on a quarterly basis, unless stated otherwise in WUL.
		GN704 Audits are to be conducted to evaluate compliance thereto.		Gn704 Audits to be conducted bi-ennially and submitted to DWS.

[89] Refer to detailed impacts included in relevant sections of this EIAR / EMPr.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES[89]	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Mining and related activities	Groundwater may become impacted upon as result of mining and related activities. Furthermore, impacts on surrounding groundwater users may occur as a result of abstraction activities undertaken by Kleinkopje.	Implementing the groundwater monitoring programme to determine if there are any impacts on groundwater quantity and quality.	The Environmental Manager is to ensure that groundwater monitoring is taking place. The resultant groundwater monitoring reports need to be submitted to the DWS and kept on record.	Groundwater quality and level monitoring to be conducted on at least a quarterly basis. The reports will be submitted to the DWS on a quarterly basis, , unless stated otherwise in WUL.
Activities that may result in the generation of waste.	Waste will be generated at on-site.	A waste monitoring programme is to be developed and implemented as per Regulation GNR 634 of 23 August 2013 under the NEM:WA (2008). Sub-regulation 10 of GNR 634 requires the following: 1) Waste generators must keep accurate and up to date records of the management of the waste they generate, which records must reflect-	The Environmental Manager is to ensure that all departments at the mine are keeping accurate and up to date records of the waste generated. The Environmental Manager will ensure that all waste reports are combined and kept on record.	Internal audits will be conducted on compliance with waste-related legislation.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES[89]	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		a) the classification of the wastes. b) the quantity of each waste generated, expressed in tons or cubic metres per month. c) the quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of. d) by whom the waste was managed. 2) The records contemplated above must be- a) retained for a period of at least five (5) years. made available to the Department upon request.		
Mining and related activities.	Potential environmental impacts resulting from the non-compliance with legislation.	Environmental legal compliance audits are to be conducted to ensure compliance against all applicable	The Environmental Manager is to ensure that the Environmental Legal Compliance audit is	The Environmental Legal Compliance audit is to be conducted on a biennial basis (unless otherwise instructed by the DMR), kept on record and submitted to the DMR.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES[89]	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		environmental legislation and policies.	conducted by an independent and suitably qualified individual.	
		Environmental Audits on the EMPr compliance (as per the EIA Regulations, 2014 (or amendments thereto) are to be conducted.	The Environmental Manager is to ensure that the Environmental audits are conducted by an independent and suitably qualified individual.	The Environmental audit is to be conducted on a biennial basis (unless otherwise instructed by the DMR), kept on record and submitted to the DMR.
Mining and related activities	Dust may be generated as a result of mining and related activities conducted.	The dust fallout and air quality monitoring plan will be continued throughout the Life of Mine in order to determine potential impacts and sources of dust.	The Environmental Manager is to ensure that the dust fallout and air quality monitoring is conducted by a suitably qualified individual.	The dust fallout and air quality monitoring reports are to be submitted to the DMR and Environmental Affairs Mpumalanga on at least an annual basis (unless otherwise instructed).
	Mining and related activities such as opencast mining, use of vehicles on roads, crushing etc. generate noise.	The mine will continue to implement blast and vibration monitoring.	The Environmental Manager is to ensure that noise monitoring is conducted by a suitably qualified individual.	The monitoring reports are to be submitted annually to the DMR as per their requirements.
Decommissioning and rehabilitation activities.	Impacts such as soil erosion, deterioration of vegetation and dust may result in the event that the rehabilitation techniques	The rehabilitation monitoring programme will be implemented to ensure that the rehabilitation techniques that were implemented are sufficient for the rehabilitation of	The Environmental Manager will ensure that the rehabilitation monitoring programme is being implemented, the monitoring techniques were implemented	Monitoring of the rehabilitation success will take place for at least 5 years and will include corrective follow-up action. The rehabilitation monitoring reports will be submitted to the DMR on an annual basis

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES[89]	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	were incorrectly implemented	the open pit and that no significant impact (soil erosion, dust, weed and invasive plant species establishment) are occurring on the rehabilitated areas.	correctly and that no impacts occurring on the rehabilitated areas.	during the Operational and Decommissioning and Post-closure phases, unless otherwise stated by the Department.

1.9 Indicate the frequency of the submission of the performance assessment report.

Unless otherwise instructed by the Competent Authority (in this case, the DMR) or as a condition to the authorisation / EMPr approval, environmental compliance audits on the EMPr will be undertaken on a biennial basis (every second year), and the resultant audit reports will be submitted to the DMR. The auditing process, as well as report format will comply with the requirements as contained in the EIA Regulations, GN R982, dated December 2014.

1.10 Environmental Awareness Plan.

1.10.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Formal training will be provided to all employees regarding the hazards of the duties to be performed to both their health as well as the surrounding environment. It is the responsibility of the Mine Manager and the Health and safety officer to ensure that adequate training is provided to all employees. It is also the responsibility of the relevant Head of Departments to identify the need for further training. As part of the mandatory training provided to all employees and contractors, environmental awareness training will be provided, as described in Section 1.10.2 below.

1.10.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The following Environmental Awareness Training will be implemented by Kleinkopje Colliery in order to inform employees and contractors of the environmental risk that may result from their work, or the risk of their interaction with the sensitive environment. The training will be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site.

The Environmental Awareness Training will, as a minimum cover the following topics:

- Air Quality
    - Activities that may result or mitigate impact on air quality; speeding on roads, covering of haul trucks etc.
    - Negative impacts on the receiving environment if mitigation measures are not implemented.
- Surface and groundwater
    - Risks to surface and groundwater, e.g. fuel and chemical handling and further risks of erosion or damage to riparian vegetation.
    - How incidents should be reported, and emergency requirements.
    - The importance of storm water control, maintenance of pollution control infrastructure.

  - The importance to reuse water and to prevent spillages.
- Cultural Heritage
  - To respect all cultures and believes.
  - To remain within working areas and not to enter or interfere with any cultural heritage.
  - How to report any sightings as identified during operation activities (e.g. fossils).
- Fauna
  - Overview of the fauna found on site and the uniqueness thereof.
  - Mitigation measures that all contractors and employees need to abide by.
  - No contractor or personnel allowed to catch or kill any species, and how any sightings should be reported if further actions are required (e.g. to catch and release).
- Flora
  - Overview of the flora diversity on site, and the rare and endangered nature thereof.
  - Measures taken by the mine to protect species.
  - No contractor or personnel allowed to remove, harvest or destroy any flora species unless clearly instructed based on the construction and operational plans.
- Waste management
  - The correct segregation of general and hazardous waste.
  - Do's and don'ts with respect to waste disposal.
  - Measures to avoid waste generation and to participate in waste minimisation/reduction strategies.
- Traffic
  - Abide by traffic rules, no speeding allowed.
  - To stay on designated roads (and not to drive on areas that are not fit and designed for this purpose).
  - To be aware of the fauna species and to be on the lookout and avoid collisions.
- Natural Resource Consumption
  - Minimise unnecessary use of energy by making use of energy saving devices, switching off non-essential appliances etc.
  - Optimise utilisation of mining and plant equipment, travelling routes etc.
- Emergency Preparedness and Response
  - Designated smoking areas.
  - How to report any emergency or incident.
  - How to respond when emergency alarm goes off.
- General rules and conduct
  - Respect for the sensitive environment.
  - Do not litter.
  - HIV/AIDS awareness.
  - Respect for each other and for different cultures.
  - Safety and health requirements.

1.11 Specific information required by the Competent Authority.

The information, as presented in Table 90 below, will be required by the competent authority.

Table 90: Monitoring information required by the competent authority

Information	Frequency of submission
Quantum of Financial Provision	Annually
Annual Rehabilitation Plan	Annually
Environmental Audit Report on approved EIAR / EMPr and other environmental authorisations	Biennially (every second year) or as per auditing timeframe indicated in authorisation(s)
Legal Compliance Audit Report	Biennially (every second year)
Surface Water Monitoring Reports	Monthly
Groundwater Monitoring Reports	Quarterly
Fall-out Dust Monitoring Reports	Annually
GN 704 Audit Report	Biennially (every second year)[90]
Rehabilitation Monitoring Report	Annually (during Decommissioning / Closure Phase)

[90] Also to be submitted to DWS

2. Undertaking

The EAP (represented by WILDA ELIZABETH MEYER), herewith confirms

(a) the correctness of the information provided in the reports ☑
(b) the inclusion of comments and inputs from stakeholders and I&APs; ☑
(c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☑ and
(d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed. ☑

_____

Signature of EAP representative

Date: 27 September 2016

I CERTIFY that the Deponent acknowledged that she knows and understands the contents of this affidavit which was signed and sworn to before me at PRETORIA on this the ___ day of _____-_____ 2016, by the Deponent who admitted and declared that she understands the content of this declaration, the content thereof is true and correct, that she has no objection to taking the oath and that she considers the oath binding on her conscience, the Regulations contained in Government Notice No R1258 dated 21 July 1972, as amended, having been complied with.

_____

Commissioner of Oaths

- END-