APPENDIX 6

Impacts Tables

APPENDIX 6A

Impacts Assessments Table

No	Phase	Activity	Specialist assessment	Impact	Mitigation	Criteria	Risk rating without mitigation	Risk rating with mitigation
							Specific factors	
1	C	Dismantling of existing infrastructure; Site establishment, including clearing of vegetation and soil stripping and stockpiling of soils; Disturbance of soils and altered runoff patterns leading to increased occurrence of erosion within adjacent areas; An increase in alien and invasive floral species as a result of disturbance; Construction of mining infrastructure, including access and haul roads, and clean and dirty water trenches; Movement of	Terrestrial Biodiversity	Loss of natural vegetation and intact floral habitat; Loss of plant species, floral diversity and priority floral species;	The mine layout as presented should not be altered to encroach on natural habitats; Direct and indirect disturbance of high and intermediate sensitivity floral habitat during the pre-construction and construction phases must be avoided; Disturbances beyond the designated and approved construction footprint areas should be avoided; Proposed construction areas must be clearly designated on site by semi-permanent means/ material, in order to control movement of personnel and vehicles, and ensure that all dismantling and construction activities remain within these footprints; The proposed infrastructure development footprint areas should remain as small as possible; The area of vegetation cleared should be limited to which is required for construction in order to minimise erosion potential, uncontrolled runoff and loss of topsoil; Construction camps, contractors' laydown areas and other temporary infrastructure (including stockpiles) are to be placed within already modified areas; No new temporary access roads are to be allowed within ecologically sensitive areas. Existing access roads must be utilised as far as possible; Natural grassland areas south and northwest of the study area should be designated as No-Go areas for personnel and construction vehicle, unless in instances where personnel require access on foot	**Severity:**	**Severity**	
							2	1.5
						Consequence:	**Severity**	
							2	1.5
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							2	2
							Freq. of incident	
							2	2

		construction vehicles through vegetation units of increased floral ecological sensitivity; Compaction of soils due to vehicular movement; Dust generation due to vehicle movement; Littering and dumping of waste material outside of designated areas; Removal or collection of medicinal/ protected floral species beyond the project footprint area; Uncontrolled fires within natural grassland areas due to increased human activity.			for alien and invasive species control; Wetland areas (including buffer zones) outside of the approved development footprint area should be designated as No-Go areas for personnel and vehicles; Clean and dirty water separation must commence as early on in the project as possible; Topsoil must be stockpiled in such a manner as to limit loss thereof through compaction and to prevent loss of the seed bank; An alien and invasive species eradication strategy should be developed at the onset of the project for implementation throughout all development phases; Dust suppression measures should be implemented during the construction phase; The collection of plant material for medicinal or other purposes within the study area should be strictly prohibited; Open fires by construction personnel, unless within areas designated for this purpose, should be prohibited; Should any floral SCC or provincially protected floral species be encountered within the proposed mining footprint areas, such species must be rescued and relocated to suitable similar habitat within the vicinity of their occurrence, the process overseen by a suitably qualified botanist. Prior to rescue and relocation, a relocation plan must be developed for approval by GDARD and the necessary permits obtained.		***Legal issue***	
							1	1
							Detection	
							1	1
						Significance	***48***	***39***
						Risk Rating	***LOW (-)***	***LOW (-)***
2	C	Operation of construction machinery and construction vehicles within the mining area and on unpaved	Terrestrial Biodiversity	Degradation of vegetation within the study area and surrounds due to dust, alien invasive floral	Dust suppression procedures should be implemented during the construction phase of the project to reduce and control dust on the access roads and at construction areas; Topsoil stockpiles should be vegetated and managed accordingly to avoid dust generation;	**Severity:**	**Severity**	
							2	1.5

		roads; Ongoing disturbance of soils which may lead to erosion; Proliferation of alien and invasive plant species as a result of disturbance.		species and erosion	A rehabilitation plan for the mine must be developed as soon as possible, taking concurrent rehabilitation and revegetation requirements into consideration; An alien and invasive species eradication strategy should be developed at the onset of the project and an invasive species management programme must be developed for implementation throughout all development phases; Erosion should be avoided by limiting vegetation clearance to the minimum area required per working area, prohibiting access of vehicles within areas of high and sensitivity floral habitat (including wetland and wetland buffers), managing stormwater runoff on site and rectifying early signs of erosion as soon as such is noted.			
						Consequence:	**Severity**	
							2	1.5
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							3	3
							Freq. of incident	
							3	3
							Legal issue	
							1	1
							Detection	
							2	1
						Significance	***81***	***52***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
3	C	Establishment of	Terrestrial	Loss of faunal	Avoid roads in areas designated as having high	**Severity:**	**Severity**	

		the construction site and laydown areas; Clearing of vegetation for construction purposes; Internal roads; Construction activities increasing edge effects and isolation of remaining fragments; Site establishment; Operation of construction equipment; Establishment of initial box cuts and ramps	Biodiversity	habitat; Fragmentation of faunal habitat; Disturbance of nesting avifaunal species in natural areas.	ecological sensitivity; Use existing roads as far as possible and ensure that unnecessary impacts on natural vegetation do not occur, e.g. driving around remaining natural areas; Avoid the fragmentation of faunal habitats i.e. construction should be restricted to demarcated areas only. Maintain and support the connectedness of faunal habitats - faunal movements through the human modified matrix are important to maintain metapopulation dynamics and prevent local extinctions; Disturbance (e.g. noise, dust) should be avoided near areas identified as sensitive in this assessment; Dust suppression procedures should be implemented to reduce and control dust emitting from the access road and stockpile areas; Noise emanating from construction machinery and equipment should be kept at a minimum by the fitting of exhaust silencers and through the regular maintenance of construction vehicles and equipment; Sediment traps and windshields may be necessary to prevent erosion, dust and soil movement if the topsoil dumps are exposed for extended periods of time; African grass owls usually nest during November – May. Construction activities that affect grass owl habitat (wetland areas, high ecological sensitivity areas identified during this assessment) should be avoided during this time.		2.5	1.5
						Consequence:	**Severity**	
							2.5	1.5
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							3	3
							Freq. of incident	
							3	3
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***76***	***52***

						Risk Rating	***MEDIUM (-)***	***LOW (-)***
4	C	Operation of construction equipment; Construction of haul roads inside the mining area.	Terrestrial Biodiversity	Harm to faunal Species of Conservation Corncern	All personnel should undergo induction with regards to fauna to ensure particular awareness about not harming or collecting species such as snakes, skinks, birds and tortoises; Any fauna threatened by the construction activities should be removed to safety by the environmental control officer or appropriately qualified environmental officer. Collection of any species, eggs or nests should not be tolerated.	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							1.5	1
							Spatial scale	
							1	1
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							2	2
							Freq. of incident	
							2	1
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***45***	***36***
						Risk Rating	***LOW (-)***	***LOW (-)***

5	O	Ongoing clearing of vegetation and mining of opencast areas; Vehicular movement extending beyond the designated mining areas and approved access roads; Ongoing disturbance within the study area and alteration of runoff patterns leading to erosion, sedimentation of watercourses and alteration of floral habitat; Contamination of natural habitat through effluent or waste material; Ongoing disturbance leading to further alien and invasive plant species proliferation; Removal or collection of medicinal/ protected floral species beyond	Terrestrial Biodiversity	Loss of natural vegetation and intact floral habitat; Loss of plant species, floral diversity and priority floral species;	The mine layout as presented should not be altered to encroach on natural habitats; The development footprint must be clearly demarcated by semi-permanent means in order to provide protection against edge effects and prevent disturbance by adjacent natural habitat outside of the approved development footprint; As per the mine layout, no mining and associated activities should take place within areas designated as being of high ecological sensitivity; Direct and indirect impacts on areas beyond the designated operational footprint areas should be avoided; Only areas earmarked for immediate opencast mining (per section) should be cleared of vegetation to limit erosion potential; Effluents and waste material of any nature must be prevented from entering natural habitat; Specific care should be taken to avoid disturbance to the natural grassland and wetland habitat in construction of the proposed overburden stockpile immediately to the north thereof. It is proposed that these areas be fenced off from adjacent mining activities to prevent unauthorised access; Contamination of natural habitat from any potential source must be prevented and a suitable waste management plan must be developed and implemented; A concurrent rehabilitation and revegetation plan should be implemented as and when areas become available for rehabilitation. Rehabilitation should be undertaken to high standard. Due to the high number of alien and crop species present, it is likely that an alien seedbank will be present in topsoil stockpiles and alien invasive control will likely be required in rehabilitated areas. It is important that grass species utilised for revegetation are indigenous to the area and specific to the Soweto	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							3	2
							Biota	
							3	2
						Consequence:	**Severity**	
							2	1.5
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							3	2
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***72***	***39***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***

		the project footprint area; Uncontrolled fires within natural grassland areas due to increased human activity.			Highveld Grassland vegetation type (refer to Appendix B). Topsoil should be removed prior to opencast mining, stored separately and adequately, without compaction and loss of seed banks, and replaced during rehabilitation; An invasive species management programme must be implemented during the operational phase to prevent spread of alien species into surrounding open grasslands; The collection of plant material for medicinal or other purposes within the study area should be strictly prohibited; An emergency response plan should be in place should unforeseen fires that may spread into adjacent grassland areas, occur. No illicit fires must be allowed during any phases of the proposed mining development; Should any floral SCC or provincially protected floral species be encountered within the proposed mining footprint areas during mine operations and ongoing opencast pit expansion, such species must be rescued and relocated to suitable similar habitat within the vicinity of their occurrence, with the process overseen by a suitably qualified botanist. Prior to rescue and relocation, a relocation plan must be developed for approval by GDARD and the necessary permits obtained; Should landscaping be implemented around office and workshop areas, such species used should be locally indigenous.			
6	O	Ongoing mining operations; Transportation of coal and on- site vehicle movement; Stockpiling;	Terrestrial Biodiversity	Degradation of vegetation within the study area and surrounds due to alien invasive species propliferation and erosion	Dust suppression procedures should be implemented to reduce and control dust emitting from the access road and stockpile areas; An invasive species management programme must be strictly implemented during the operational phase to prevent spread of alien species into surrounding open grasslands. Care must be taken to eradicate invasive species along the site boundaries, and specific attention must be paid to the	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							3	1

		Dust outfall and blown coal dust will affect the adjacent undisturbed vegetation directly by settlement on the leaves and indirectly through contamination of soil and surface water; Alien and invasive species proliferation due to habitat destruction and disturbance.			eradication of NEMBA Category 1b invasive species. Erosion and alien invasive species encroachment into natural grassland area must be addressed immediately if noted; Regular internal walkthroughs of the mining areas must be undertaken by a designated employee and early signs of erosion must be rectified as soon as such is noted and areas of significant invasive species reported to be actioned.		**Biota**	
							3	1
						Consequence:	**Severity**	
							2	1
							Spatial scale	
							3	2
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							3	2
							Legal issue	
							1	1
							Detection	
							2	2
						Significance	***81***	***49***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
7	O	Ongoing clearing of vegetation and mining of opencast areas; Mining through wetland/ moist grassland habitat; Risk to low ridge/ rocky	Terrestrial Biodiversity	Loss and/or harm to faunal Species of Concervation Concern associated with faunal habitat destruction; Disturbance of nesting avifaunal species in	The development footprint must be clearly demarcated by semi-permanent means in order to provide protection against edge effects and prevent disturbance by adjacent natural habitat outside of the approved development footprint; As far as possible, no mining and associated activities should take place within areas designated as being of high ecological sensitivity. Where mining activities are proposed to extend through the southern channelled valley bottom wetland, all mitigation measures as proposed by the wetland/	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							4	2
							Biota	

		grassland as a result of overburden stockpile placement; Operation of construction equipment; Construction of haul roads inside the mining area; Road mortalities when mine vehicles utilise the on-site road network; Site establishment; Operation of construction equipment; Establishment of initial box cuts and ramps.		natural areas	freshwater specialist are to be implemented. This may include a stream diversion, management of erosion and sedimentation and specific rehabilitation and design requirements; Direct and indirect impacts on areas beyond the designated operational footprint areas should be avoided; Areas beyond the designated development footprint areas should remain No-Go areas for mining personnel and vehicles; Dust suppression procedures should be implemented to reduce and control dust emitting from the access road and stockpile areas; Noise emanating from construction machinery and equipment should be kept at a minimum by the fitting of exhaust silencers and through the regular maintenance of construction vehicles and equipment. Speed limits must be established and adhered to by all vehicles. All onsite traffic must be restricted to designated roads. The illegal collection and hunting of any animals should be strictly forbidden by anyone except landowners with the appropriate permits where required; Disturbance (e.g. noise, dust) should be avoided near areas identified as sensitive in this assessment; Dust suppression procedures should be implemented to reduce and control dust emitting from the access road and stockpile areas; Noise emanating from construction machinery and equipment should be kept at a minimum by the fitting of exhaust silencers and through the regular maintenance of construction vehicles and equipment; Sediment traps and windshields may be necessary to prevent erosion, dust and soil movement if the topsoil dumps are exposed for extended periods of time;		4	2
						Consequence:	**Severity**	
							2.5	1.5
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							3	1
							Freq. of incident	
							3	1
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***114***	***52***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***

					Any fauna threatened by the operational activities should be removed to safety by the environmental control officer or appropriately qualified environmental officer.			
8	D	Ineffective rehabilitation and revegetation of exposed and impacted areas and failure to monitor rehabilitation works post-closure; Failure to implement an invasive species management programme post-closure; Clearing, reshaping and revegetation of disturbed areas.	Terrestrial Biodiversity	Degradation of vegetation within the study area and surrounds due to alien invasive species proliferation and erosion; Disturbance of persecution of faunal SCC	Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan. This rehabilitation plan should consider all development phases of the project indicating rehabilitation actions to be undertaken concurrently and during/ after mine closure; Concurrent rehabilitation efforts should be documented in terms of species used, soil amelioration and other variables, in order to act as rehabilitation trials in order to determine the efficiency of rehabilitation methods and the suitability of plant species used for final revegetation purposes; All infrastructure footprint areas should be rehabilitated to a point where natural processes will allow an appropriate level of ecological functioning and biodiversity of the area to be re-instated; Implementation of an alien and invasive species management programme must continue to be implemented during decommissioning and continue post-closure; Any natural areas, including wetland and open grassland areas beyond the development footprint, that have been affected by the mining activities, must also be revegetated using locally indigenous grass species; All soils compacted as a result of mining activities falling outside of the project footprint areas should also ripped, profiled and revegetated as required. Special attention should be paid to alien and invasive control within these areas; Establishment of a nursery may be considered where indigenous plant species are propagated with	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							4	2
							Biota	
							4	2
						Consequence:	**Severity**	
							2.5	1.5
							Spatial scale	
							2	1
							Duration	
							3	3
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							3	2
							Legal issue	
							5	5
							Detection	
							1	1

					focus on rehabilitation; Any priority floral species rescued and relocated during the mining process, should be monitored to determine their re-establishment success; Rehabilitation success and plant species establishment on mining areas must be monitored during the post-closure phase of the project for a period of three years; Faunal species threatened by decommissioning activities should be removed to safety by the ECO or appropriately qualified environmental officer; All hazardous material should be stored in the appropriate manner to prevent land contamination.	***Significance***	***90***	***55***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
9	D	Decommissioning and removal of infrastructure; Backfilling of opencast pits and final voids; Ripping and revegetation of stockpile areas, haul roads and other compacted areas; Clearing, landscaping and replacement of soils over disturbed areas; Rehabilitation of the discard dump and water management infrastructure; Cleaning,	Terrestrial Biodiversity	Revegetation of mining areas; Return of avifaunal species to rehabilitated areas	No waste material or pollution-causing agents may remain on site after closure; It must be ensured that proper surface restoration is undertaken to prevent erosion and that the final landforms are stable, with acceptable slopes; It must be ensured that the rehabilitated areas are free draining, and that no compaction remains. All impacted areas should be ripped, covered with topsoil and revegetated with an indigenous grass species mixture comprising species representative of the Soweto Highveld Grassland vegetation type; Avoid repeated burning. If the burnt area is too large and burnt repeatedly localised extinction may occur; Prevent prolonged over-grazing, which may lead to a loss of vigour in the sward, altered species composition and veld degradation, and a resultant change or decrease in bird diversity; Avoid grazing new growth immediately after a burn every year. This can cause soil erosion, loss of nutrients, and the loss of the leaf litter in which many insects live, thereby decreasing prey availability to grassland birds.	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							2	4
							Biota	
							2	4
						Consequence:	**Severity**	
							1.5	2.5
							Spatial scale	
							3	3
							Duration	
							3	5
						Likelihood:	***Freq. of activity***	
							5	5

		landscaping and revegetation of the disturbed area.					***Freq. of incident***	
							5	5
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***90***	***126***
						Risk Rating	***MEDIUM (+)***	***MEDIUM (+)***
10	Pre-C	Site clearing of vegetation	Surface Water	Increased erosion from areas with exposed soils during site clearing and topsoil stockpiles	The footprint of the proposed infrastructure area must be clearly demarcated; Vegetation clearing activities will be restricted to the demarcated infrastructure footprint area; Vegetation clearance will be undertaken in a phased manner; Clean water diversion bunds will be constructed upstream of the construction site prior to clearing areas for new infrastructure; Areas disturbed by pre-construction activities, which will not be required for construction, will be rehabilitated immediately on completion of construction of each area; Activities should be limited to months of low rainfall (dry season) to reduce probability of potential impact.	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							3	1
							Habitat	
							1	1
							Biota	
							1	1
						Consequence:	**Severity**	
							1.5	1
							Spatial scale	
							1	1
							Duration	
							4	2
						Likelihood:	***Freq. of activity***	
							5	5
							Freq. of incident	

							5	3
							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***91***	***48***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
11	C	Development of open pits, overburden dums, ROM stockpile, PCD and haul roads	Surface Water	Deterioration of surface water quality due to erosion (leading to siltation), spillages and accidental discharges; Change in surface water hydrology of the affected area.	Construction should take place in the low flow period (dry season); Stormwater infrastructure should be designed and constructed to accommodate the 1:50-year storm event; Emergency action plans should be drawn up to deal with spillages; Contaminated runoff should be contained and reused as necessary e.g., for dust suppression; Hazardous substances and potentially polluting materials should be stored in appropriately bunded areas located outside of the riparian zone.	**Severity:**	**Flow regime**	
							2	1
							Water quality	
							3	1
							Habitat	
							1	1
							Biota	
							1	1
						Consequence:	**Severity**	
							1.75	1
							Spatial scale	
							2	2
							Duration	
							4	2
						Likelihood:	***Freq. of activity***	
							5	5
							Freq. of incident	
							4	2

							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***100.75***	***55***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
12	O	Operation of the development of open pits and associated activities	Surface Water	Reduced availability of water to downstream water users due to changes in water quality; Reduced availability of water to downstream water users due to changes in MAR; Sedimentation of paddocks/water controls such as channels, and thereby reducing their capacity; Alteration of the watercourse functionality and increased risk of flooding and scouring.	During normal operations, dirty water should be contained in the paddocks designed to handle the 1:50 year event and enable settlement of solids in the contained water prior to reuse, such as for dust suppression; Paddocks should be constructed to reduce uncontrolled runoff from the site entering the clean water system; Proposed pits and infrastructures should be outside the 1:100-year floodline or divert the non-perennial stream around the infrastructures; Reduction of unoccupied footprint area which may alter catchment hydrology.	**Severity:**	**Flow regime**	
							4	1
							Water quality	
							4	1
							Habitat	
							1	1
							Biota	
							1	1
						Consequence:	**Severity**	
							2.5	1
							Spatial scale	
							2	2
							Duration	
							5	2
						Likelihood:	***Freq. of activity***	
							5	5
							Freq. of incident	
							4	2
							Legal issue	

							1	1
							Detection	
							3	3
						Significance	***123.5***	***55***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
13	D	Closure / rehabilitation	Surface Water	Rehabilitation of pits and dumps	The pits and associated infrastructure should be removed, and the footprint areas rehabilitated; Pits will remain in-situ and should be backfilled; All the dumps should be revegetated to manage on-going dust generation and erosion and all rehabilitation activities should be monitored until vegetation is well established; Pits area should be backfilled and vegetated.	**Severity:**	**Flow regime**	
							3	5
							Water quality	
							3	5
							Habitat	
							1	1
							Biota	
							1	1
						Consequence:	**Severity**	
							2	3
							Spatial scale	
							2	3
							Duration	
							2	5
						Likelihood:	***Freq. of activity***	
							3	5
							Freq. of incident	
							3	5
							Legal issue	
							1	1

							Detection	
							1	1
						Significance	***48***	***132***
						Risk Rating	***LOW (+)***	***MEDIUM (+)***
14	C	Site clearing	Aquatic Ecology	Change in EIS, PES; Change in water quality	Application of buffers/ setbacks; Mining to start adjacent to the wetland moving higher topographically; Concurrent rehabilitation is paramount to the minimisation of impacts; Roll over mining in sections of the site with the reinstatement of wetlands after mining; Fortification of wetlands not currently being mined through the application of the duty of care principal of the National Environmental Management Act (act 107 of 1998). This includes the increase in buffer/setback around the wetlands; Removal and storage of any possible hydrophytes in the area (limited volumes expected). A suitable full-time nursery must be set up to cater for the salvaged plants; Stripping of topsoil before mining of area; Stockpiling of the stripped topsoil; Reshaping of area post mining- depression wetland shape will be ideal; Appointment of suitably qualified SACNASP registered aquatic scientist to monitor the wetlands for the life of mine; Attenuation of stormwater; Hydrological connectivity Reintroduction of attenuated stormwater into areas of wetland and	**Severity:**	**Flow regime**	
							Water quality	
							Habitat	
							Biota	
						Consequence:	**Severity**	
							#DIV/0!	#DIV/0!
							Spatial scale	
							Duration	
						Likelihood:	***Freq. of activity***	
							Freq. of incident	
							Legal issue	
							Detection	

					wetland rehabilitation; Compilation of suitable of wetland systems impacted by road crossings must be ensured at both surface and subsurface levels; Inclusion of phytoremediation aspects into the Sustainable urban drainage systems (SuDS) especially in areas where historically depression wetlands occur.; Diversion of the channelled valley bottom wetland must be assessed, designed and planned in a separate report.			
						Significance	***#DIV/0!***	***#DIV/0!***
						Risk Rating		
15	C	Construction of access road	Aquatic Ecology	Decrease in water quality	Placement of sediment barrier during construction. Water must flow into downstream water at water level- i.e. no step in water allowed	**Severity:**	**Flow regime**	
							2	1
							Water quality	
							2	1
							Habitat	
							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							2	1
							Spatial scale	
							2	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							2	1
							Freq. of incident	

							2	1
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***60***	***24***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
16	O	Excavation of Opencast pits	Aquatic Ecology	Area impacted by placement of soils on surface next to excavation; Sediment ingress; Impact on long term ecosystem health; Reduced functionality of buffer; Possible spillage into natural area; Refilling of machinery; Stockpiling of soils; Physical excavation in soil	Ensure area is bunded prior to activities starting; Monitor points of release, ensure bunding of stockpiles; Monitor the systems with emphasis on water quality and preventative measures to ensure degradation is observed and mitigated; Ensure setback of buffer is maintained; Bunding of stockpiles, placement of berms along natural areas to prevent ingress; Refilling to be done outside the confines of the aquatic ecosystems and setback buffers; Bunding of stockpiles, placement of berms along natural areas to prevent ingress; Sequential nature of soils are kept. Stockpiling done outside setback areas, bunding of stockpiles.	**Severity:**	**Flow regime**	
							3	2
							Water quality	
							3	1
							Habitat	
							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							2.5	1.25
							Spatial scale	
							2	2
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							2	2

							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***71.5***	***52.5***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
17	O	Excavation of Opencast pits	Aquatic Ecology	Increased flow volumes Ecotone removal	Monitor points of release, ensure bunding of stockpiles. Installation of windrows to ensure water movement does not concentrate and lead to erosion; Ensure activities adjacent to the aquatic ecosystems are managed/ limited to ensure impact is mitigated	**Severity:**	**Flow regime**	
							3	2
							Water quality	
							2	1
							Habitat	
							1	1
							Biota	
							1	1
						Consequence:	**Severity**	
							1.75	1.25
							Spatial scale	
							2	1
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							2	2
							Freq. of incident	
							2	2
							Legal issue	

							5	5
							Detection	
							1	1
						Significance	***57.5***	***42.5***
						Risk Rating	***LOW (-)***	***LOW (-)***
18	O	Refilling of Machinery	Aquatic Ecology	Hydrocarbon spills	Refill in areas outside wetland and buffers	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							5	2
							Habitat	
							3	2
							Biota	
							1	1
						Consequence:	**Severity**	
							2.5	1.5
							Spatial scale	
							3	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							2	2
							Freq. of incident	
							2	1
							Legal issue	
							5	5

							Detection	
							1	1
						Significance	***75***	***31.5***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
19	O	Handling and loading of coal	Aquatic Ecology	Deterioration of water quality	Stormwater management; Dust abatement; Appointment of Environmental control officer with suitable SOP for mitigation of impacts.	**Severity:**	**Flow regime**	
							2	1
							Water quality	
							4	2
							Habitat	
							4	2
							Biota	
							4	2
						Consequence:	**Severity**	
							3.5	1.75
							Spatial scale	
							2	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							4	4
							Freq. of incident	
							4	2
							Legal issue	
							1	1
							Detection	

							1	1
						Significance	***75***	***30***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
20	O	Rainfall Events	Aquatic Ecology	Impoundment of water	Pump rainfall water impounding in the pit into PCD for management	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							3	1
							Habitat	
							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							2	1
							Spatial scale	
							2	2
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							2	1
							Freq. of incident	
							3	3
							Legal issue	
							5	5
							Detection	
							1	1

						Significance	***66***	***50***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
21	O, D	Application of herbicides; Alien vegetation establishment and spread	Aquatic Ecology	Alien Vegetation spreading and establishment	Compilation and implementation of a systematic long term invasive management plan	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							5	3
							Habitat	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							4	2
							Spatial scale	
							3	2
							Duration	
							5	3
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							5	5
							Detection	
							5	5
						Significance	***240***	***112***

						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
22	D	Decompaction of soil; Infilling of soil;	Aquatic Ecology	Erosion; Sedimentation; Disturbance to habitat	Dedicated rehabilitation plan for the post mining operations must be drawn up with emphasis on impact to the hydrology of destroyed wetlands	**Severity:**	**Flow regime**	
							2	1
							Water quality	
							2	1
							Habitat	
							3	1
							Biota	
							2	1
						Consequence:	**Severity**	
							2.25	1
							Spatial scale	
							2	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							2	2
							Freq. of incident	
							3	1
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***68.75***	***27***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***

23	D	Infilling of soil within regulated areas as per NWA (36 of 1998); Replacement of soil into excavated pit; Clearing of soil from stockpile adjacent to excavation/ backfilling ; Levelling of soils	Aquatic Ecology	Erosion; Sedimentation; Disturbance to habitat	Dedicated rehabilitation plan for the post mining operations must be drawn up with emphasis on impact to the hydrology of destroyed wetlands	**Severity:**	**Flow regime**	
							3	1
							Water quality	
							3	1
							Habitat	
							2	1
							Biota	
							1	1
						Consequence:	**Severity**	
							2.25	1
							Spatial scale	
							1	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							1	1
							Freq. of incident	
							1	1
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***42***	***24***
						Risk Rating	***LOW (-)***	***LOW (-)***
24	D	Replacing	Aquatic Ecology	Erosion of	Dedicated rehabilitation plan for the post mining	**Severity:**	**Flow regime**	

		surface soils		replaced soils if not stabilised or planted before first rain	operations must be drawn up with emphasis on impact to the hydrology of destroyed wetlands		1	1
							Water quality	
							3	1
							Habitat	
							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							2	1
							Spatial scale	
							2	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							2	2
							Freq. of incident	
							2	1
							Legal issue	
							5	5
							Detection	
							2	2
						Significance	***66***	***30***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
25	D	Replacing surface soils	Aquatic Ecology	Alteration in soil chemical properties	Dedicated rehabilitation plan for the post mining operations must be drawn up with emphasis on impact to the hydrology of destroyed wetlands	**Severity:**	**Flow regime**	
							1	1

				reducing soil productivity			**Water quality**	
							2	1
							Habitat	
							1	1
							Biota	
							1	1
						Consequence:	**Severity**	
							1.25	1
							Spatial scale	
							1	1
							Duration	
							2	1
						Likelihood:	***Freq. of activity***	
							1	1
							Freq. of incident	
							2	1
							Legal issue	
							1	1
							Detection	
							2	2
						Significance	***25.5***	***15***
						Risk Rating	***LOW (-)***	***LOW (-)***
26	D	Rehabilitation	Aquatic Ecology	Application of herbicides; Alien vegetation establishment	Systematic long-term mitigation of impact required	**Severity:**	**Flow regime**	
							1	1
							Water quality	

				and spread			5	2
							Habitat	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							4	1.75
							Spatial scale	
							3	2
							Duration	
							5	3
						Likelihood:	***Freq. of activity***	
							5	5
							Freq. of incident	
							5	3
							Legal issue	
							5	5
							Detection	
							5	3
						Significance	***240***	***108***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
27	O	Stripping of all topsoil at open pits; Mixing of soils A and B horizons;	Soil, Land Capability and Agro-Agriculture	Cease of all agricultural production; Deterioration of soils productive ability;	A soil specialist with GIS skills, registered at SACNASP will be appointed to oversee the soil stripping, stockpilling and replacement process; Topsoil at the open pit footprint will be stripped at specified depths as derived from the detailed pre-mining soil assessment and as indicated on the soil	**Severity:**	**Flow regime**	
							5	3
							Water quality	
							5	3

		Stripping to deep or too shallow; Compaction		Reduction is soil quality; Reduction in water holding capacity and water infiltration rates	stripping and replacement plan. It is a condition of support of approval of the project the that whole of Section 9.2 of the soil, land capability and agro-agriculture report be included in the EMP.; The soil stripping depth will be verified progressively on a quarterly basis by the soil specialsit and he/she will generate maps that facilitate soil stripping progressively, based on the mine block plan that overlaid on the soil stripping and replacement plans; Soil stockpiling will take place as describe in Section 9.2.1 of the soil, land capability and agro-agriculture report and soils will be stockpiled as indicated on the soil stripping and replacement plans; The soil replacement process will be monitored by the soil specialist and he/she will assess the soil replacement depth and soil quality by means of procedures described in section 9.2.2 of the soil, land capability and agro-agriculture report; No topsoil will be replaced prior to the prepared section was signed off by the mine surveyor and overseeing soil specialist, confirming that the section has the correct elevation and slope and are free-draining and will tie in with the surrounding undisturbed landscape after the topsoil was replaced at depths; The soil specialist will compile a quarterly report in which a post-mining land capability map will be expanded progressively based on the field assessment monitoring requirements described in Section 9.2.2 of the soil, land capability and agro-agriculture report; Soil compaction will be minimised by tipping sufficient quantities of topsoil at prepared spoil surfaces and by doing a once off leveling on the surface, with minimum traversing and without dozing soil over far distances.		**Habitat**	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							5	2.5
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							5	4
							Freq. of incident	
							5	3
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***176***	***97.5***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***

28	C, O, D	Erection of Mine Structures: Haul Roads	Soil, Land Capability and Agro-Agriculture	Cease of all agricultural production; Compaction	The upper A-horizon should be removed to a depth of 200-400 mm and stored as a berm along the edges. The aim is to leave the B-horizon undisturbed and later replace the A-horizon in its original position, which implies a reconstruction of the original soil horizon sequences and subsequent less deterioration from premining to post-mining land capability; The footprint should then be covered with the required base materials as specified by the engineering design; During the decommissioning phase the footprint should be thoroughly cleaned and all base materials should be removed to a suitable disposal facility; The cleaned footprint (or exposed upper part of the B-horizon) should be ripped thoroughly prior to replacement of the stored A-horizon to alleviate all compaction caused by the structure; The stored A-horizon should be graded evenly over the total structure footprint; The soil should then be ameliorated as recommended by a soil specialist according to soil chemical analysis of samples taken after replacement; The footprint should be re-vegetated with a grass seed mixture.	**Severity:**	**Flow regime**	
							5	3
							Water quality	
							5	3
							Habitat	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							5	2.5
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							5	4
							Freq. of incident	
							5	3
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***176***	***97.5***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
29	C, O,	Erection of Mine	Soil, Land	The PCD	A liner to be constructed according to waste	**Severity:**	**Flow regime**	

	D	Structures: PCD	Capability and Agro-Agriculture	footprint will cover the soil surface and cause a complete cease of agricultural production and food supply; The topsoil will be disturbed and will probably be used to created embankments; The remaining soil horizons will be compacted severely prior to placement of the liner.	classification and engineer's design; The A and B-horizons up to a depth of 1 m can be used for the construction of embankments but should not be mixed with subsoil material; During the decommissioning phase the footprint should be thoroughly cleaned and all sludge and other building material should be removed to a suitable disposal facility; The soil material used for wall embankments should be graded evenly over the entire footprint; The soil should be ameliorated as recommended by a soil specialist according to soil chemical analysis of samples taken after replacement; The footprint should be re-vegetated with a grass seed mixture.		5	3
							Water quality	
							5	3
							Habitat	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							5	2.5
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							5	4
							Freq. of incident	
							5	3
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***176***	***97.5***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
30	C, O, D	Erection of mine Structures: Topsoil, hard and	Soil, Land Capability and Agro-	The topsoil and overburden stockpiles will	Topsoil or overburden material should be dumped directly on the natural surface without removal of any soil horizons. Any disturbance of the soil	**Severity:**	**Flow regime**	
							5	2

		soft overburden dumps	Agriculture	cover the soil surface and cause a complete cease of agricultural production and food supply; The upper natural soil horizons will be compacted severely by the weight of the topsoil and overburden material; All vegetation and animal life at the footprint will be destroyed. All natural soil processes and microbial activities will cease to a large extent or completely.	horizons will only cause a higher impact on the soil; No maximum stockpile height is proposed from a soil's perspective. Stockpile height restrictions causes stockpile footprints sizes to increase and causes larger natural soil footprints to be compacted and simultaneously causes the natural soil processes within a larger footprint to cease to a large extent; The dumped topsoil or overburden should all be removed precisely up to the original natural surface. The surface should be thoroughly cross-ripped to a minimum depth of 400 mm to alleviate all compaction caused by the weight of the dumped material. The surface should then be smoothed with a disc-implement; The soil's fertility status should then be ameliorated as recommended by a soil specialist according to soil chemical analysis; The footprint should be re-vegetated with a grass seed mixture or re-introduced to the pre-mining land use such as crop farming or grazing.		**Water quality**	
							5	2
							Habitat	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							5	2
							Spatial scale	
							2	2
							Duration	
							4	2
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							1	1
							Detection	
							5	3
						Significance	***176***	***60***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
31	C, O, D	Erection of mine structures: ROM Pad	Soil, Land Capability and Agro-Agriculture	The base material that covers the soil surface will cause a	The natural soil surface should be covered with 200-300 mm of noncoaliferous overburden material and should be compacted to restrict contaminated water seeping into the underlying soils. A berm of overburden material should be constructed on the	**Severity:**	**Flow regime**	
							5	3
							Water quality	

				complete cease of agricultural production and food supply; The natural soil horizons underneath the base material will be compacted during construction of the base layer and during operation thereafter; Spilled, low quality water or stormwater that leave the structure footprint may impact negatively on the surrounding soil chemical status.	edges to contain contaminated water; During the decommissioning phase the footprint should be cleaned thoroughly and all overburden material should be removed to a suitable disposal point. The cleaned footprint should be cross-ripped to alleviate compaction; The soil's fertility status should be ameliorated as recommended by a soil specialist according to soil chemical analysis; The footprint should be re-vegetated with agrass seed mixture.		5	2
							Habitat	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							5	2.25
							Spatial scale	
							2	2
							Duration	
							4	2
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							5	2
							Legal issue	
							1	1
							Detection	
							5	3
						Significance	***165***	***56.25***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
32	C, O, D	Erection of mine structures: Workshops, hard parks, offices and other buildings	Soil, Land Capability and Agro-Agriculture	The structure footprint that covers the soil surface will cause a complete cease of agricultural	During the decommissioning phase the footprint should be cleaned thoroughly and all building material should be removed to a suitable disposal point. The cleaned footprint should be cross-ripped to alleviate compaction; The soil's fertility status should be ameliorated as	**Severity:**	**Flow regime**	
							5	3
							Water quality	
							5	2

				production and food supply; The natural soil horizons underneath the structure will be compacted during construction.	recommended by a soil specialist according to soil chemical analysis; The footprint should be re-vegetated with a grass seed mixture.		**Habitat**	
							5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							5	2.25
							Spatial scale	
							2	2
							Duration	
							4	2
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							5	2
							Legal issue	
							1	1
							Detection	
							5	3
						Significance	***165***	***56.25***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
33	C	Numerous, simultaneous construction activities during the day	Noise Impact Assessment	Noise levels above acceptable recommended daytime zone sound level of 55 dBA	The applicant should relocate NSR living within the area that will be developed for mining (NSR staying at points 01, 02 and 03); The applicant can start to develop a berm between NSR 11 and NSR12 before drilling activities start at the boxcut area. The applicant can plan and develop the initial boxcut area further from NSR11 and	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	

					NSR12, to allow time to develop the berm between the opencast area and these NSR; The applicant could use available material (such as available topsoil and soft material) to construct berms between the proposed opencast area and the NSR. These berms should be as high as possible (at least 10m recommended, with a berm of 15m proposed to the east of the Falcon Ridge community). This barrier/berm should only be constructed during the day-time period and do not have any gaps. This berm should be vegetated/landscaped as soon as possible (aesthetic reason, might have a psychoacoustic effect); The applicant must implement a noise monitoring programme at residential dwellings in the area (NSR11/12, NSR13, NSR14 (representative point in Falcon Ridge community) and NSR 45); The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads.		5	2
							Biota	
							5	2
						Consequence:	**Severity**	
							3	1.5
							Spatial scale	
							4	2
							Duration	
							3	2
						Likelihood:	***Freq. of activity***	
							5	2
							Freq. of incident	
							5	2
							Legal issue	
							5	5
							Detection	
							3	1
						Significance	***180***	***55***
						Risk Rating	***HIGH (-)***	***LOW (-)***
34	C	Numerous, simultaneous construction activities during the night	Noise Impact Assessment	Noise levels above acceptable recommended night-time zone sound level of 45 dBA	Implementation of measures recommended for daytime construction activities, which include: Relocation of certain NSR; Development of berms before night-time drilling activities are to take place within 500m from NSR; Design and implementation on noise monitoring programme;	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							5	1

					The use of white noise reverse alarms; and Optimal use of berms to minimize the effect of heavy mobile equipment and hauling activities.		**Biota**	
							5	1
						Consequence:	**Severity**	
							3	1
							Spatial scale	
							3	2
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							5	2
							Freq. of incident	
							5	2
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***128***	***50***
						Risk Rating	***HIGH (-)***	***LOW (-)***
35	O	Numerous, simultaneous operational activities during the day	Noise Impact Assessment	Noise levels above acceptable recommended daytime zone sound level of 55 dBA	The applicant should discuss the relocation of NSR staying within 200m from the proposed opencast pit – NSRs staying at 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 – note: NSR 5, 6, 7 and 8 represent numerous different receptors within the Falcon Ridge community); The applicant could use available material to construct berms between the proposed opencast area and the NSR. These berms should be as high as possible (at least 10m recommended, with a berm of 15m proposed to the east of the Falcon	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							5	2
							Biota	

					Ridge community). This barrier/berm should only be constructed during the day-time period and do not have any gaps. The berm should be completed before mining will take place closer than 500m from the Falcon Ridge community. This berm should be vegetated/landscaped as soon as possible (aesthetic reason, might have a psychoacoustic effect); The applicant can plan active mining at two different locations to minimize cumulative effects; The applicant must implement a noise monitoring programme at residential dwellings in the area (NSR11/12, NSR13, NSR14 (representative point in Falcon Ridge community) and NSR 45); The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads).		5	2
						Consequence:	**Severity**	
							3	1.5
							Spatial scale	
							3	2
							Duration	
							4	2
						Likelihood:	***Freq. of activity***	
							5	2
							Freq. of incident	
							5	2
							Legal issue	
							5	5
							Detection	
							2	1
						Significance	***170***	***55***
						Risk Rating	***HIGH (-)***	***LOW (-)***
36	O	Numerous, simultaneous operational activities during the night	Noise Impact Assessment	Noise levels above acceptable recommended night-time zone sound level of 45 dBA	Continued implementation of measurements identified and recommended for the daytime operational activities; The applicant must minimize drilling activities within 200m from NSR at night; The applicant must use available material (such as available topsoil and soft material) to construct berms between the proposed opencast area and the NSR. These berms should be as high as possible (at least 10m recommended, with a berm of 15m proposed to the east of the Falcon Ridge community). This barrier/berm should only be	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							5	2
							Biota	
							5	2

					constructed during the day-time period and do not have any gaps. The berm should be completed before mining will take place closer than 500m from the Falcon Ridge community. This berm should be vegetated/landscaped as soon as possible (aesthetic reason, might have a psychoacoustic effect); The applicant can plan active mining at two different locations to minimize cumulative effects; The applicant must implement a noise monitoring programme at residential dwellings in the area (NSR11/12, NSR13, NSR14 (representative point in Falcon Ridge community) and NSR 45). Results of noise monitoring should be used to update noise models and adjust night-time mining activities; The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads); If noise monitoring indicates noise levels exceeding 50 dBA at NSR45, the applicant should: the section of conveyor belt passing NSR 45 should be fully enclosed (approximately 50m either side), and, if required, fitted with acoustic absorbing material to reduce noise emissions; or the receptor at NSR 45 could be relocated. The applicant should minimize night-time hauling activities (between 21:00 and 05:00) on public roads.	**Consequence:**	**Severity**	
							3	1.5
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	2
							Legal issue	
							5	2
							Detection	
							2	1
						Significance	***170***	***52***
						Risk Rating	***HIGH (-)***	***LOW (-)***
37	C	Site clearing; Site establishment; Soil stockpiling; Construction of infrastructure; Vehicle movement	Visual Impact Assessment	Decreased visual aesthetic; Dust plumes	**General site management:** Maintain the construction site in a neat and orderly condition at all times; Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing; Ensure that rubble, litter, and disused construction materials are managed and removed regularly; and Ensure that all infrastructure and the site and general surroundings are maintained in a neat and	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							1	1
							Biota	

					appealing way. **Infrastructure:** All constructed facilities and buildings should cause minimum visual disturbance by reducing the contrast and blending in with the surrounding vegetated natural area. This could be achieved by painting rooftops and walls of buildings in the hues and tones of the surrounding vegetation and/or by adding matt paints to highly reflective surfaces, as well as sharp protruding features on the structures; All of these solutions are subject to the technical design of individual buildings and facilities and should be pursued by the technical design and/or construction team, taking into consideration added value from reduced visibility, engineering feasibility and cost. **Dust Management:** Implement dust suppression using a water cart to minimise airborne dust; Apply chemical dust suppressants if deemed necessary; Enforce a 50 km/h speed limit on-site for Light-Duty Vehicles and a 40 km/h speed limit for large construction vehicles and machinery; and Implement a gravimetric dust fallout monitoring programme if high volumes of dust emissions are observed.		1	1
						Consequence:	**Severity**	
							1	1
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***80***	***36***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
38	O	Topographical alteration; Excavation of pits; Coal Handeling; Vehicle movement; Night time	Visual Impact Assessment	Increase in visual intrusion; Impact on sense of place; formation of dust plumes	**Light pollution management:** Plan the lighting requirements of the facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination; Avoid up-lighting of structures by rather directing lighting downwards and focusing on the area to be illuminated; Reduce the height and angle of illumination from which floodlights are fixed as much as possible while still maintaining the required levels of	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							2	1
							Biota	

		security lighting			illumination; Lighting should be shielded in areas where specific objects are to be illuminated. Minimise the use of lighting, where possible; Lighting should exclude the blue-rich wavelengths and be closer to the red-rich wavelength spectrum. Globes used in lighting outside areas should be warm white. This also applies to light spilling out from within buildings. A colour temperature of no more than 3000 Kelvins is recommended for lighting. Light intensity of illuminating lights should be limited as far as possible, i.e., to limit lighting to areas required to serve operational functionality. Illumination where not permanently required should be fitted with timers, motion-activated sensors or be dimmable to reduce total light emitted. **Dust Management:** Implement dust suppression using a water cart to minimise airborne dust; Apply chemical dust suppressants if deemed necessary; Enforce a 50 km/h speed limit on-site for Light-Duty Vehicles and a 40 km/h speed limit for large construction vehicles and machinery; and Implement a gravimetric dust fallout monitoring programme if high volumes of dust emissions are observed. **Site management:** Shape any slopes and embankments to a maximum gradient of 1:4 and vegetate, to prevent erosion and improve their appearance; Utilise vegetation screens as visual screening devices around the proposed project, specifically buildings and pits; Shape and vegetate topsoil stockpiles to prevent erosion;		2	1
						Consequence:	**Severity**	
							1.5	1
							Spatial scale	
							4	3
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							3	2
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***76***	***42***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***

					Plant indigenous trees in all landscaped areas, as well as around plant infrastructure; Keep stockpiles to a maximum height of fifteen (15) metres to limit visual exposure.			
39	D	Final backfill of open pit; Dismantling infrastructure; Rehabilitation of compacted areas; Waste generation	Visual Impact Assessment	Visual intrusion on sensitive receptors; Ineffective rehabilitation leading to landscape scarring, permanent visual contrast and a permanent alteration of the landscape character and sense of place.	Overburden to be stockpiled on site and used for backfilling of the previous mined-out void. This will limit the number of overburden stockpiles that will be visible; Concurrent rehabilitation of the pits using the roll over method to pre-determined maximum gradient/s which will prevent erosion and allow for adequate vegetation growth while taking the appearance of the natural topography into consideration; Stabilise and backfill the opencast pit, and contour to ensure it is free draining; Conduct on-going monitoring and maintenance of the rehabilitated pits to ensure that vegetation establishes successfully and that erosion does not occur; Eradicate invasive alien plant species; Remove all built infrastructure; and Re-shape all footprint areas to be as natural in appearance as possible and revegetate using locally occurring grass species.	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							1	1
							Habitat	
							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							1.5	1
							Spatial scale	
							3	1
							Duration	
							3	1
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							2	1
							Legal issue	
							1	1
							Detection	
							1	1

						Significance	***52.5***	***15***
						Risk Rating	***LOW (-)***	***LOW (-)***
40	C	Overburden stripping, start of pit	Hydrogeological Assessment	Lowering of the Groundwater Levels	Monitor groundwater levels	**Severity:**	**Flow regime**	
							5	3
							Water quality	
							4	3
							Habitat	
							3	1
							Biota	
							3	1
						Consequence:	**Severity**	
							3.75	2
							Spatial scale	
							4	3
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***164.5***	***96***
						Risk Rating	***LOW (-)***	***LOW (-)***

41	C	Spillages and leakages from heavy machinery movement during construction of pit and overburden dump	Hydrogeological Assessment	Impact to groundwater quality	Monitoring of groundwater and surface water quality. Spillages should be cleaned and contaminated soils removed. Dirty surface run-off should be pumped or transferred passively to dirty water dams. These dams should be lined to ensure no future pollution of groundwater resources.	**Severity:**	**Flow regime**	
							5	3
							Water quality	
							4	3
							Habitat	
							3	1
							Biota	
							3	1
						Consequence:	**Severity**	
							3.75	2
							Spatial scale	
							4	3
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***164.5***	***96***
						Risk Rating	***LOW (-)***	***LOW (-)***
42	O	Groundwater seepage into pit will need to be	Hydrogeological Assessment	Lowering of the Groundwater Levels	Ongoing groundwater monitoring as per Chapter 9 of the EMPr.	**Severity:**	**Flow regime**	
							5	3

		pumped out creating a cone of depression			Treated water can be re-introduced to downstream wetlands, if feasible. Mine dewatering strategy should be implemented. Water replacement strategies should be implemented for affected users.		**Water quality**	
							4	3
							Habitat	
							3	1
							Biota	
							3	1
						Consequence:	**Severity**	
							3.75	2
							Spatial scale	
							4	3
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							5	5
						Significance	***164.5***	***96***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
43	O	The total dissolved solids and other constituents in the groundwater	Hydrogeological Assessment	Leaching and seeping of contaminants into the sub-surface	Concurrent backfilling with non-carbonaceous material as far as possible. Carbonaceous material should preferably be placed back on the lowest elevated zones of the coal floor to allow early saturation.	**Severity:**	**Flow regime**	
							1	1
							Water quality	

		will start increasing due to groundwater contact with pit mining operations.		impacting groundwater quality	Dirty surface run-off should be pumped or transferred passively to dirty water dams. These dams should be lined to ensure no future pollution of groundwater resources. Scavenger boreholes can be considered to capture plume migration. Active treatment of dirty water should be considered.		4	1
							Habitat	
							4	1
							Biota	
							4	1
						Consequence:	**Severity**	
							3.25	1
							Spatial scale	
							3	2
							Duration	
							3	2
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							5	5
							Detection	
							4	2
						Significance	***157.25***	***55***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
44	O	Storage of overburden - sulphate leachate emanating from potential waste body footprints	Hydrogeological Assessment	Risk of heavy metals leaching into the environment from potential waste body footprints	Overbuden dumps to be lined with appropriate waste class liner. Concurrent backfilling with non-carbonaceous material as far as possible. Carbonaceous material should preferably be placed back on the lowest	**Severity:**	**Flow regime**	
							1	1
							Water quality	
							4	1

		can increase to 5000 mg/ℓ without mitigation			elevated zones of the coal floor to allow early saturation. Dirty surface run-off should be pumped or transferred passively to dirty water dams. These dams should be lined to ensure no future pollution of groundwater resources. Scavenger boreholes can be considered to capture plume migration. Active treatment of dirty water should be considered.		**Habitat**	
							4	1
							Biota	
							4	1
						Consequence:	**Severity**	
							3.25	1
							Spatial scale	
							3	2
							Duration	
							3	2
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							5	5
							Detection	
							4	2
						Significance	***157.25***	***55***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
45	D	Flooding of mine after mining	Hydrogeological Assessment	Water level recovery in impacted aquifers	Ongoing groundwater monitoring as prescribed in Chapter 9 of the EMPr.	**Severity:**	**Flow regime**	
							4	2
							Water quality	
							4	2
							Habitat	

							2	1
							Biota	
							2	1
						Consequence:	**Severity**	
							3	1.5
							Spatial scale	
							3	2
							Duration	
							3	1
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							3	1
							Legal issue	
							5	5
							Detection	
							4	3
						Significance	***144***	***49.5***
						Risk Rating	***HIGH (+)***	***HIGH (+)***
46	D	Decanting of poor water quality when mine floods post closure	Hydrogeological Assessment	Low risk of poor ground water quality on downstream receptors	Concurrent backfilling with non-carbonaceous material as far as possible. Carbonaceous material should preferably be placed back on the lowest elevated zones of the coal floor to allow early saturation. Dirty surface run-off should be pumped or transferred passively to dirty water dams. These dams should be lined to ensure no future pollution of groundwater resources.	**Severity:**	**Flow regime**	
							4	2
							Water quality	
							4	2
							Habitat	
							2	1

					Active treatment of dirty water should be considered. Decant should be managed.		**Biota**	
							2	1
						Consequence:	**Severity**	
							3	1.5
							Spatial scale	
							3	2
							Duration	
							3	1
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							3	1
							Legal issue	
							5	5
							Detection	
							4	3
						Significance	***144***	***49.5***
						Risk Rating	***HIGH (-)***	***LOW (-)***
47	D	Removal/ Rehabilitation of overburden dumps	Hydrogeological Assessment	Risk to groundwater quality due to contamination during decommissioning	The ROM stockpiles and discard dump is expected to be removed at post closure. Active treatment of dirty water should be considered. Ongoing groundwater monitoring is recommended as per Chapter 9 of the EMPr.	**Severity:**	**Flow regime**	
							4	2
							Water quality	
							4	2
							Habitat	
							2	1
							Biota	

							2	1
						Consequence:	**Severity**	
							3	1.5
							Spatial scale	
							3	2
							Duration	
							3	1
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							3	1
							Legal issue	
							5	5
							Detection	
							4	3
						Significance	***144***	***49.5***
						Risk Rating	***LOW (-)***	***LOW (-)***
48	C, O, D	All Activities near the wetland	Hydropedology: Wetland Flow Drivers	Impact on Channelled valley bottom wetland	Diversion of clean water upgradient of mining activities through diversion berms and interception trenches. This water should then be directed through disperse flow upgradient of the wetland systems; Interception of mine contact water downgradient of mining through interception trenches. The water should then be directed to a lined pollution control dam where the water can be re-used in the mine; Trenches should be done to the depth of the top of the clay layer or hard bedrock expected to be 3-5 m	**Severity:**	**Flow regime**	
							2	1
							Water quality	
							2	1
							Habitat	
							2	1
							Biota	
							2	1

					below surface. The trenches should be permeable on the upgradient side and impermeable on the downgradient side; The water flow and quality in the wetland system should be measured on a quarterly basis for the following variables: • Flow (m3/day) • pH (pH units) • TDS (mg/l) • SO_4 (mg/l) • Full metals by ICP-OES (mg/l) Expected mine contaminated water should be captured in the opencast and either reused in the mine water balance or treated and released to the wetland system; Removal and storage of hydrophytes; Stockpiling of the stripped topsoil; Collect the water arising within any dirty area, including water seeping from mining operations, outcrops or any other activity into a dirty water system; and Design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years.	**Consequence:**	**Severity**	
							2	1
							Spatial scale	
							1	1
							Duration	
							1	1
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							2	1
							Legal issue	
							5	5
							Detection	
							3	2
						Significance	***52***	***30***
						Risk Rating	***LOW (-)***	***LOW (-)***
*** Severity Criteria are Not Applicable (N/A) for the following impacts Impacts, Severity values used below are based on the Magnetitude values given in the respective assessments**								
49	C	Construction of Mine Infrastructure	Social Impact Assessment	Job creation	Set employment targets aimed at increasing local employment; Set monitoring indicators for local employment; To accommodate those that do not have access to android phones or internet, widely advertise employment opportunities using community newspapers, notice boards, etc;	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A

					Ensure that local communities understand the Project's procurement and employment requirements in terms of skills and type of contracts and employment. This will be achieved using existing stakeholder communication channels at zone of influence; Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area; Ways to enhance local community benefits with a focus on broad based BEE need to be explored; Local construction companies should be used whenever possible, especially for subcontracting work; Adopt recruitment strategies that ensure local people are given employment preference; Construction workers should wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce. This should be applicable to all construction workers, including those locally recruited; Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues; A specific contact person should be identified to allow community members and property owners to easily direct their queries and concerns and obtain general information regarding the construction process; Promote employment of women and youth; and Women must be provided with access to types of work traditionally seen as male.		**Biota**	
							N/A	N/A
						Consequence:	***Severity**	
							4	5
							Spatial scale	
							2	3
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							3	4
							Freq. of incident	
							3	4
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***80***	***120***
						Risk Rating	***MEDIUM (+)***	***MEDIUM (+)***

50	C	Multiplier effects stimulated by capital expenditure and construction activities	Social Impact Assessment	Economy Stimulation	Set employment targets aimed at increasing local employment; Set monitoring indicators for local employment; To accommodate those that do not have access to android phones or internet, widely advertise employment opportunities using community newspapers, notice boards, etc; Ensure that local communities understand the Project's procurement and employment requirements in terms of skills and type of contracts and employment. This will be achieved using existing stakeholder communication channels at zone of influence; Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area; Ways to enhance local community benefits with a focus on broad based BEE need to be explored; Local construction companies should be used whenever possible, especially for subcontracting work; Adopt recruitment strategies that ensure local people are given employment preference; Construction workers should wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce. This should be applicable to all construction workers, including those locally recruited; Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues;	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							3	5
							Spatial scale	
							3	4
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							4	5
							Freq. of incident	
							4	5
							Legal issue	
							1	1
							Detection	
							4	3
						Significance	***130***	***182***
						Risk Rating	***MEDIUM (+)***	***HIGH (+)***

					A specific contact person should be identified to allow community members and property owners to easily direct their queries and concerns and obtain general information regarding the construction process; Promote employment of women and youth; and Women must be provided with access to types of work traditionally seen as male.			
51	C	Construction	Social Impact Assessment	Loss of Agricultural Land	Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner; Should Glubay Coal acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes; Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be implemented as part of the decommissioning phase.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	4
							Spatial scale	
							3	2
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							5	4
							Freq. of incident	
							5	4
							Legal issue	
							1	1

							Detection	
							3	3
						Significance	***182***	***120***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
52	C	Construction	Social Impact Assessment	Loss of heritage resources	The historical structures (SRV004 and KF008) could be impacted by the proposed mining activities. This structure should be avoided with at least a 50 m buffer if activities should occur near it; Pre-mining condition documentation of the structures will be required as bench mark for status evaluation during mining operations; Structures older than 60 years are protected under Section 34 of the NHRA; If any additional structures are identified SAHRA should be contacted and a qualified archaeologist appointed to evaluate the structures and make appropriate recommendation on mitigation; The possibility of stillborn burials around the structures must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house; The structures must then provisionally grade as Grade IIIA in regards to burials. All burial grounds and graves should be retained and avoided with a buffer zone of 50m as per SAHRA guidelines; If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations; The ECO for this project must be informed that the Vryheid Formation, has a very High Palaeontological	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							2	2
							Duration	
							5	5
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							5	5
							Detection	

					Sensitivity; The ECO for this project must be informed that the Vryheid Formation (Ecca Group, Undifferentiated Karoo) and Precambrian dolomites and associated marine sedimentary rocks allocated to the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup), has a very High Palaeontological Sensitivity; If fossil remains are discovered during any phase of construction, either on the surface or exposed by new excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries ought to be secured (if possible, in situ) and the ECO ought to alert SAHRA so that appropriate mitigation (documented and collection) can be undertaken by a palaeontologist; These recommendations must form part of the Heritage Management Plan for Springfield Colliery.		*3*	4
						Significance	***216***	***150***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
53	C	LED Projects	Social Impact Assessment	Community Development	Ensure that there is stakeholder buy-in; Aligning LED projects with those of other development role-players; Liaison with beneficiaries to ensure needs are met; Collaboration with other developmental role players (e.g., local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones; Monitoring system to regulate Historically Disadvantaged South African procurement; Tap into the Emfuleni and Local Municipality's existing structures and the existing database of SMMEs to identify needs and requirements such as training and equipment; Make training and capacity building initiatives compulsory;	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							3	5
							Spatial scale	
							3	4
							Duration	

					Set up support initiatives to enhance procurement and small business opportunities wherever feasible; Where feasible, training should be NQF Accredited; and A record of training courses completed per individual should be kept.		*4*	4
						Likelihood:	***Freq. of activity***	
							3	5
							Freq. of incident	
							3	5
							Legal issue	
							1	1
							Detection	
							2	3
						Significance	***90***	***182***
						Risk Rating	***MEDIUM (+)***	***HIGH (+)***
54	C	Influx of workers and job seekers	Social Impact Assessment	Increased social pathologies	Should contractors and/or other persons with specialised skills not be available locally, the main contractor would be required to draw up and submit a housing plan that sets out how he will be dealing with employees from outside the municipal boundaries; Do not create unrealistic job expectations and set clear goals with regards to local employment, employment numbers and so forth. Make this information available to the Ward Councillors to distribute to local communities; Maximisation of the proportion of job opportunities allocated to locals; Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags; Liaise openly and frequently with affected stakeholders to ensure they have information about the Project;	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	4
							Spatial scale	
							3	3
							Duration	
							4	4

					Extensive HIV/AIDS awareness and general health campaign. It should be noted that Glubay Coal has no control over activities related to workers' behaviour, however It is recommended that HIV/AIDS campaigns are conducted within the affected area; Discourage influx of job-seekers by prioritising employment of unemployed members of local communities; Create synergies with local government IDP and other companies' SLP/CSR projects to promote infrastructure development; Community education; and Implement measures to address potential conflict between locals and non-locals.	**Likelihood:**	***Freq. of activity***	
							5	4
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							3	2
						Significance	***156***	***110***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
55	O	Construction of Mine Infrastructure	Social Impact Assessment	Job creation	If possible, a training and skills development programme for the local workers should be initiated prior to the operational phase; Effective implementation of training and skills development initiatives; Recruitment should be formalised and co-ordinated through the Department of Labour- avoid appointments at the gate of the mining operation; Prevent nepotism/corruption in local recruitment structures; Promote employment of women and youth; Prioritise local labour in the recruitment process – this will also limit project-induced in- migration to some extent; Unskilled workers are recruited from the local villages and should be developed (up-skilled) during operations; Medium skilled workers should where possible be	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							3	4
							Spatial scale	
							3	5
							Duration	
							4	4

					recruited from the local communities; and Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers for e.g., security services.	**Likelihood:**	***Freq. of activity***	
							3	5
							Freq. of incident	
							3	5
							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***100***	***182***
						Risk Rating	***MEDIUM (+)***	***HIGH (+)***
56	O	Multiplier effects stimulated by capital expenditure and construction activities	Social Impact Assessment	Economy Stimulation	Preference should be given to capable subcontractors who based within the local municipal area; and Measures recommended to maximise benefits from local employment, skills and economic development.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							3	5
							Spatial scale	
							3	4
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	

							4	5
							Freq. of incident	
							3	5
							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***110***	***182***
						Risk Rating	***MEDIUM (+)***	***HIGH (+)***
57	O	Excavation of open pits	Social Impact Assessment	Loss of Agricultural Land	Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner; Should Glubay Coal acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes; Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be implemented as part of the decommissioning phase.	***Severity:**	**Flow regime**		
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							4	4
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							5	3

							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***182***	***110***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
58	O	LED Projects	Social Impact Assessment	Community Development	Maximise benefits from local employment, skills and economic development.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							4	5
							Spatial scale	
							2	4
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							3	5
							Freq. of incident	

							3	5
							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***100***	***182***
						Risk Rating	***MEDIUM (+)***	***HIGH (+)***
59	O	Influx of workers and job seekers	Social Impact Assessment	Increased social pathologies	Extensive HIV/AIDS, drug abuse and domestic violence awareness campaigns; A voluntary counselling and testing (VCT) programme should be introduced; Align awareness campaigns with those of other organisations in the area; To limit, as far as reasonably possible, social ills caused by influx of workers and job-seekers; To liaise openly and frequently with affected stakeholders to ensure they have information about the Project; and To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							4	4
							Spatial scale	
							3	3
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3

							Legal issue	
							1	1
							Detection	
							4	4
						Significance	***165***	***121***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
60	C, O, D	Mining Operations	Health Impact Assessment	Proliferation of vector-related diseases	Vector Control Programs: Implementing effective vector control measures such as insecticide-treated bed nets, larvicides, and insect repellents can reduce the prevalence of diseases like malaria and dengue fever; Environmental Management: Proper waste management, habitat restoration, and water management practices can help minimize stagnant water and reduce breeding grounds for disease vectors; Community Health Education: Educating mining communities about preventive measures, personal protection, and proper sanitation practices is crucial in reducing the risk of vector-related diseases; Healthcare Access: Ensuring access to healthcare services and regular health screenings for mining workers and nearby communities can aid in early detection and treatment of vector-borne diseases.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							4	2
							Spatial scale	
							2	2
							Duration	
							3	2
						Likelihood:	***Freq. of activity***	
							3	2
							Freq. of incident	
							3	2
							Legal issue	

							1	1
							Detection	
							4	3
						Significance	***99***	***48***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
61	C, O, D	Mining Operations	Health Impact Assessment	Proliferation of communicable diseases	Implementing dust control measures, such as proper ventilation, dust suppression systems, and the use of personal protective equipment (PPE) like masks; Regular monitoring of air quality and dust levels in and around mining sites to assess potential health risks; Providing adequate training and education to workers on the risks associated with respiratory hazards and the use of protective equipment; Ensuring proper occupational health and safety regulations and compliance with standards to minimize exposure to respiratory hazards; By implementing these measures, Glubay can reduce the risk of respiratory health issues among workers and nearby communities impacted by mining activities; Labour policies should encourage hiring of local staff to avoid excessive job-seeking migrants; Additional recruitments should not be at the "front gate" but consider a recruitment office at an off-site location. This will need to consider national recruitment and employment requirements.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							3	2
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1

							Detection	
							4	3
						Significance	***156***	***90***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
62	C, O, D	Mining Operations	Health Impact Assessment	Veterinary Medicine and Zoonotic Issues	Proper waste management practices, such as covering waste, controlling leachate, and minimizing open dumping, can reduce the attractiveness of landfills to vectors and decrease the risk of disease spread; Implementing vector control measures, such as using insecticides, traps, or repellents, can help manage pest populations around landfill sites; Regular monitoring of water sources near landfills to prevent contamination and ensure the safety of the environment for both animals and humans; Awareness programs focusing on responsible waste disposal, animal health, and disease prevention among pet owners, local communities, and waste management workers are also essential in preventing the transmission of veterinary and zoonotic diseases associated with landfill waste.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	3
							Spatial scale	
							3	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							1	1
							Detection	

							3	1
						Significance	***144***	***48***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
63	C, O, D	Mining Operations	Health Impact Assessment	Sexually transmitted Infections including HIV/AIDS	Develop a HIV/AIDS policy that incorporates both the workplace and community considerations; Comprehensive Sexual Health Education: Providing comprehensive sexual health education programs within mining communities to promote awareness, safer sex practices, and reduce stigma associated with STIs, including HIV/AIDS; Access to Healthcare Services: Improving access to STI testing, treatment, counselling, and support services within the PACs. This includes providing free or low-cost condoms and STI screenings; Community Empowerment and Engagement: Engaging with local communities to understand their specific health needs, cultural beliefs, and practices related to sexual health. Involving them in designing and implementing interventions increases their effectiveness; Behavioural Interventions: Glubay can offer behavioural change interventions that target risky sexual behaviours, such as, promote condom use, and encourage regular STI screenings among miners and the wider community; Develop an integrated HIV management program that considers both the workplace and the community. TB and STI must be integrated into this; and Support equal employment opportunities for women and establish livelihood programs to reduce risk for opportunistic sexual encounters and empower women and young girls to earn their own income to be in a position to provide for themselves without having to resort to sexual transactions.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	3
							Spatial scale	
							4	4
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							5	4

						Significance	***195***	***121***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
64	C, O, D	Mining Operations	Health Impact Assessment	Soil, Water and Waste-related diseases	**Preventing soil, water, and waste-related diseases in mining involves implementing various measures:** Cover stockpiles to avoid run-off on them; Establish vegetation on topsoil stockpiles; Reduce runoff on roads by installing cut-off strips on dirt roads; Stockpile different soil horizons in different areas; Keep inventory of stockpiles; Establish vegetation on topsoil stockpile; Reduce coal dust blowing on stockpiles, by minimizing dust generation from roads (by keeping them moist) and limiting dust from blasts; Restrict vehicle movement to designated tracks; Monitor soil compaction; Ripping when topsoil is 500 mm deep; Ripping when bulk density exceeds 1.5 $kg.m^{-3}$; Ripping of compacted areas, such as roads and stockpiles areas, during last phases of rehabilitation; Proper Waste Management: Safe disposal and containment of mine waste, such as tailings dams and appropriate treatment to mitigate contamination risks; Water Management: Implementing water treatment processes, establishing water monitoring programs, and preventing the discharge of contaminated water into natural waterways. Environmental Impact Assessments: Conducting comprehensive assessments before and during mining operations to identify potential environmental and health risks, and taking measures to mitigate these risks. Community Engagement: Involving local communities in monitoring and awareness programs to understand health risks, promoting safe practices, and addressing concerns related to soil, water, and waste management. Compliance with Regulations: Adhering to environmental regulations and standards set by authorities to minimize the impact of mining	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							3	3
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							5	4
						Significance	***182***	***110***

					activities on soil, water, and waste management. By prioritizing responsible environmental practices, implementing effective waste management strategies, and engaging with local communities, mining operations can mitigate the risks of soil, water, and waste-related diseases. All sulphate containing waste material should be stored at the bottom of the opencast and flooded as soon as possible to exclude oxygen; Groundwater and surface water quality must continue to be monitored; Surface hydrology design should include surface drainage and storm water diversion drains, to meet the requirements of the Water Act. This includes the separation of unpolluted from polluted surface water and the containment of polluted water on site in impoundments. Also, where leachate is generated, it must be contained separately from water which is only slightly polluted through contact with the waste; Leachate management is necessary in the case of B+ and hazardous waste disposal sites, where significant leachate is generated. The design includes a liner underlying the site, as well as leachate collection and treatment measures. It must make provision for the control of significant seasonal or continuous leachate generation, predicted by means of the Climatic Water Balance, or the Site Water Balance; Restrict access to project-created water bodies; Good housekeeping such as storage of potentially hazardous material will be within properly constructed and lined or paved areas; Oil traps must be sized, operated and maintained to contain all discarded oil from working areas etc. Conduct baseline water and sanitation studies on the project community based on accepted health indicators; Ensure proper disposal of human waste that is generated from the Project;	***Risk Rating***	***HIGH (-)***	***MEDIUM (-)***
65	C, O,	Mining	Health Impact	Food and	**Ensuring food security and adequate nutrition**	***Severity:**	**Flow regime**	

	D	Operations	Assessment	Nutrition Relation Issues	**in communities affected by mining requires a holistic approach that addresses environmental, social, economic, and health-related factors to mitigate the negative impacts and promote sustainable development. These measures could include:** Addressing food and nutrition-related issues stemming from mining activities; Community Engagement and Support: Providing support to affected communities by promoting alternative livelihoods, supporting sustainable agricultural practices, and ensuring access to clean water and nutritious food; Monitoring and Mitigation Measures: Implementing monitoring programs to assess the impact of mining activities on agriculture and food sources, and taking corrective actions to minimize adverse effects; Regulatory Compliance: Adhering to environmental regulations and standards to ensure responsible mining practices and minimize the impact on food and nutrition in surrounding areas; By integrating sustainable practices, engaging with local communities, and prioritizing responsible mining, Glubay can help mitigate the potential negative impacts on food and nutrition related to their operational activities. Collaboration with local stakeholders and authorities is essential to ensure the well-being and food security of affected communities; Diversification of Livelihoods: encouraging alternative livelihood options and income-generating activities beyond mining to support food security and reduce dependency on mining-related incomes; Implementing strict environmental regulations to minimize soil and water contamination, preserve agricultural lands, and protect food sources from pollution;		N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	2
							Spatial scale	
							2	2
							Duration	
							3	2
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							1	1
							Detection	
							4	3
						Significance	***130***	***48***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***

					Supporting local agriculture, promoting sustainable farming practices, and providing resources for community-led food production initiatives can enhance food availability and access; and Offering nutrition education programs, promoting balanced diets, and ensuring access to nutritional resources and supplements for vulnerable populations.			
66	C, O, D	Mining Operations	Health Impact Assessment	Accidents and Injuries	Training and Education: Proper training for workers on safety procedures, equipment operation, hazard identification, and emergency response is essential. Safety Equipment and Gear: Providing and ensuring the use of appropriate personal protective equipment (PPE) such as helmets, gloves, goggles, and respirators. Regular Inspections and Maintenance: Regular inspection and maintenance of equipment, machinery, and infrastructure to identify and address potential hazards. Compliance with Regulations: Adhering to occupational health and safety regulations and standards set by authorities to ensure a safe working environment. By prioritizing safety protocols, continuous training, and adherence to regulations, mining operations can reduce the occurrence of accidents and injuries, promoting a safer workplace for miners.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							4	2
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							1	1

							Detection	
							3	2
						Significance	***120***	***49***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
67	C, O, D	Mining Operations	Health Impact Assessment	Exposure to Potentially Hazardous Materials, Noise and Malodours	Environmental Regulations: Strict enforcement of environmental regulations and best practices in waste management, emission control, and chemical handling to minimize environmental contamination and exposure risks; Community Engagement and Awareness: Glubay should provide information to communities about potential hazards, their rights, and measures they can take to minimize exposure risks; Health Monitoring and Support: Glubay should establish health monitoring programs to assess and mitigate the health impacts on communities. Offering healthcare support for affected individuals and regular health check-ups can help manage potential health risks; Noise Mitigation Measures: Glubay should implement noise control measures such as barriers, controlled blasting, or limiting working hours in sensitive areas to reduce noise pollution and its impact on community health; Odor Management and Air Quality Monitoring: The Applicant should implement measures to manage malodours, such as using coverings or controlling the release of odorous substances. Regular air quality monitoring can also help identify and address issues as and when they arise; Technology and Innovation: Exploring cleaner and more environmentally friendly extraction methods in mining to reduce the use of hazardous chemicals and minimize the environmental impact; All employees and contractors should receive Health	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							3	3
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							5	4
							Freq. of incident	
							5	4
							Legal issue	
							1	1
							Detection	

					and Safety induction that includes an environmental awareness component (noise). This is to allow employees and contractors to realise the potential noise risks that activities (especially night-time activities) pose to the surrounding environment; Any dust buckets installed should have wind shields attached, in accordance with the specifications provided; Where possible and practical, dust buckets should not be installed within 20m of structures higher than 1m; The ventilation fan should ideally point, away from the identified sensitive receptors; Dust management plan; Apply wetting agents, dust suppressant or binders on the exposed area; Continue with PM monitoring and continue with ongoing dust fallout monitoring; Collect data on a longitudinal basis from the local health centres on incidence of increased respiratory disease - especially respiratory tract infections that could be ascribed to dust. While these may not be specifically ascribed to the Project, the prevailing trends are useful to monitor so that any concerns could be addressed. This may require health systems strengthening to support recording; Establish a monthly and annual reporting structure to appraise performance, compliance and complaints; Continuous air quality monitoring programme must be to ensure that mitigation measures are applied at all times to keep ambient air concentrations of PM10 and PM2.5 within the NAAQS over residential areas; Machines and vehicles to be serviced to the designed requirements of the machinery/vehicles to ensure noise suppression mechanisms are effective.		*4*	3
						Significance	***180***	***120***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
68	C, O, D	Mining Operations	Health Impact Assessment	Impact the social determinants of health	Community Engagement and Empowerment: Engaging with local communities, respecting their rights, involving them in decision-making processes,	***Severity:**	**Flow regime**	
							N/A	N/A

					and empowering them to participate in the development and planning of mining activities; Social Investment and Development Programs: Implementing social responsibility programs that focus on improving education, healthcare, infrastructure, and livelihood opportunities for affected communities; Environmental and Health Impact Assessments: Conducting comprehensive assessments to identify potential social and health impacts before and during mining operations, and implementing measures to mitigate adverse effects; Regulatory Compliance and Standards: Adhering to legal and ethical frameworks, international standards, and regulations to ensure responsible mining practices that prioritize the well-being of local communities; By integrating social considerations, engaging with stakeholders, promoting community well-being, and prioritizing equitable development, mining operations can mitigate the negative social determinants of health and contribute positively to the overall health and well-being of affected communities; Investment in Infrastructure and Services: Investing in infrastructure development, including healthcare facilities, education, housing, and basic amenities, to improve living conditions and access to essential services; Environmental Sustainability: Enforcing strict environmental regulations and sustainable mining practices to minimize environmental degradation and protect natural resources vital for community health; Cultural Preservation and Social Support: Supporting the preservation of cultural heritage and traditional practices while offering social support programs to address mental health and community well-being;		**Water quality**	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							4	4
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							1	1
							Detection	
							3	3
						Significance	***182***	***110***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***

					Social management plans and recommendations as part of the SIA; Plan for mine closure; Identify and support vulnerable groups; and Support graduate training programs for the youth in the community			
69	C, O, D	Mining Operations	Health Impact Assessment	Cultural Health Practices	**To address these impacts and preserve cultural and indigenous health practices, several strategies can be considered:** Community Engagement and Consultation: Engaging indigenous communities in the decision-making process regarding mining activities and their potential impacts on traditional health practices; Cultural Heritage Protection: Implementing policies and measures to protect sacred sites, cultural heritage, and traditional knowledge related to healthcare practices; Support for Traditional Healers and Knowledge Holders: Providing support and recognition for traditional healers and knowledge holders within indigenous communities to preserve and transmit their knowledge and practices; Collaboration and Partnerships: Facilitating collaborations between indigenous communities, governmental agencies, mining companies, and NGOs to ensure the inclusion of traditional health practices in healthcare planning and delivery; Health Education and Integration: Promoting education programs that integrate traditional health practices with modern healthcare systems, acknowledging the value and effectiveness of both approaches; Preserving and respecting the cultural and indigenous health practices of affected communities is crucial for maintaining their health, well-being, and cultural identity amidst the changes brought	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							2	2
							Duration	
							3	2
						Likelihood:	***Freq. of activity***	
							5	2
							Freq. of incident	
							5	2
							Legal issue	
							1	1

					about by mining activities; and Develop a disease-prevention plan that involves traditional healers and build onto indigenous knowledge, including assisting with disease-prevention through use of medicinal plants, home-based care, etc.		***Detection***	
							3	2
						Significance	***140***	***49***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
70	C, O, D	Mining Operations	Health Impact Assessment	Health System Issues	**To strengthen health systems' capacity in mining regions, several strategies can be implemented:** Infrastructure Development: Investing in healthcare infrastructure, facilities, and equipment to meet the increased demand for services and improve access to quality healthcare; Workforce Development: Training and retaining healthcare professionals to ensure a sufficient and skilled workforce in mining areas; Resource Management and Allocation: Ensuring equitable resource allocation between the mining industry and the health sector to maintain a balance that addresses both economic and health needs; Integrated Health Services: Implementing integrated health services that cater to the specific health challenges of mining communities, including occupational health, mental health, and disease surveillance; Community Engagement and Empowerment: Engaging local communities in health-related decisions, empowering them with knowledge and resources, and involving them in health promotion and education initiatives; Balancing the demands of the mining industry with the health needs of communities requires collaborative efforts and strategic planning to ensure that health systems can effectively respond to the challenges posed by mining activities; Influx management and supporting health facilities to cope with the increased population if related to	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							3	3
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							5	4
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	

					project; and Support community volunteer programs through expansion of the community-based peer health educator group.		*3*	3
						Significance	***156***	***110***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
71	C, O, D	Mining Operations	Health Impact Assessment	Non-communicable Diseases	**Addressing NCDs related to mining involves implementing various measures:** Health Education and Awareness: Providing education on healthy lifestyle choices, disease prevention, and access to healthcare services for affected communities; Environmental Management: Implementing measures to minimize environmental pollutants and contaminants that contribute to respiratory and cardiovascular issues; Community Health Programs: Establishing healthcare programs focused on early detection, management, and treatment of NCDs within mining-affected communities; Social Support and Well-being: Promoting mental health support services, community engagement, and social networks to address stressors and mental health concerns related to mining activities; By integrating health promotion strategies, community engagement, environmental management, and access to healthcare, mining operations can contribute to reducing the risk factors and prevalence of non-communicable diseases in affected communities; Adhere to Occupational Health and Safety Act; Embark on clean-up campaigns in surrounding communities.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	4
							Spatial scale	
							4	4
							Duration	
							4	4
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							1	1
							Detection	
							4	3

						Significance	***195***	***120***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
72	C	Clearance and construction	Heritage Impact Assessment	Damage to identified graves and burial grounds due to earth-moving or vegetation clearance activities	All burial grounds and graves should be retained and avoided with a buffer zone of 100m (Regulations 17.6(a) and 17.7(a) of the Mine Health and Safety Act Regulations (2014)). Any blasting or activity within the 100 m buffer will require a consultation process to identify the next of kin and informing them of this activity; A 50 meter buffer is required of no activity as contained in the SAHRA Burial Grounds and Graves Policy. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	3
							Spatial scale	
							3	3
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***182***	***120***

						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
73	C	Clearance and construction	Heritage Impact Assessment	Impact on Structures older than 60 years Sites: SVR007, SVR011, KF012	The buildings will be impacted by the proposed opencast as well as the proposed placement of the processing plant at the preferred Option 1; It is noted that the design of the Option 1 processing plant has taken the existing buildings into account and will not impact directly on those remaining historic powerplant buildings (KF012).	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	2
							Spatial scale	
							1	1
							Duration	
							5	2
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	1
							Legal issue	
							5	5
							Detection	
							3	2
						Significance	***176***	***50***
						Risk Rating	***HIGH (-)***	***LOW (-)***

74	C	Clearance and construction	Heritage Impact Assessment	Impact on Structures older than 60 years Sites: SVR012, KF013	SVR012 and KF0013 and all its structures will require a destruction permit from the Gauteng provincial Heritage Authority (PHRA-G) in accordance with s34 of the NHRA. This application will require the following: i. An application. For a mitigation permit from SAHRA; ii. Documentation of the site through excavations to expose the extent of the structures and then through formal plan drawings. iii. A destruction permit from PHRA-G and SAHRA will be then applied for by the Applicant with the backing of the mitigation report.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	4
							Spatial scale	
							1	1
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							5	5
							Detection	
							2	1
						Significance	***187***	***108***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
75	C	Clearance and	Heritage	Impact on	A buffer of 200 meters from the closest open cast	***Severity:**	**Flow regime**	

		construction	Impact Assessment	provincial heritage site Redan rock art site	mining must be put in place; A Heritage Management Plan (HMP) must be developed in consultation with SAHRA and PHRA-G after approval of the EA; This HMP must include as a minimum: a. Agreed upon buffer distances b. Fencing strategies c. Monitoring strategies d. Roles and responsibilities		N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	2
							Spatial scale	
							3	1
							Duration	
							5	2
						Likelihood:	***Freq. of activity***	
							4	2
							Freq. of incident	
							4	2
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***182***	***50***
						Risk Rating	***HIGH (-)***	***LOW (-)***
76	O	Mining Operations	Heritage Impact Assessment	Impact on provincial heritage site	A buffer of 200 meters from the closest open cast mining must be put in place;	***Severity:**	**Flow regime**	
							N/A	N/A

				Redan rock art site landscape	A Heritage Management Plan (HMP) must be developed in consultation with SAHRA and PHRA-G after approval of the EA; This HMP must include as a minimum: a. Agreed upon buffer distances b. Fencing strategies c. Monitoring strategies d. Roles and responsibilities		**Water quality**	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							3	2
							Duration	
							5	3
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***208***	***96***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
77	O	Mining Operations	Heritage Impact Assessment	Impact on Palaeontology	The ECO for this project must be informed that the Vryheid Formation, has a very High Palaeontological Sensitivity; The ECO for this project must be informed that the	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	

					Vryheid Formation (Ecca Group, Undifferentiated Karoo) and Precambrian dolomites and associated marine sedimentary rocks allocated to the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup), has a very High Palaeontological Sensitivity; If fossil remains are discovered during any phase of construction, either on the surface or exposed by new excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries ought to be secured (if possible, in situ) and the ECO ought to alert SAHRA so that appropriate mitigation (documented and collection) can be undertaken by a palaeontologist; These recommendations must form part of the Heritage Management Plan for Springfield Colliery.		N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							5	3
							Spatial scale	
							1	1
							Duration	
							5	5
						Likelihood:	***Freq. of activity***	
							5	3
							Freq. of incident	
							5	3
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***176***	***108***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***
78	C	Construction activities	Palaeontological study	Loss of fossil heritage	Mitigation comprises the collection and recording of fossils. Preceding excavation of any fossils, a permit from SAHRA must be obtained and the material will have to be housed in a permitted institution.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A

							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							3	1
							Spatial scale	
							1	1
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							4	1
							Freq. of incident	
							4	1
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***126***	***48***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
79	O	Mining Activities	Palaeontological study	Loss of fossil heritage	Mitigation comprises the collection and recording of fossils. Preceding excavation of any fossils, a permit from SAHRA must be obtained and the material will have to be housed in a permitted institution.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	

							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							3	1
							Spatial scale	
							1	1
							Duration	
							5	4
						Likelihood:	***Freq. of activity***	
							4	1
							Freq. of incident	
							4	1
							Legal issue	
							5	5
							Detection	
							1	1
						Significance	***126***	***48***
						Risk Rating	***MEDIUM (-)***	***LOW (-)***
80	C	Construction activities	Air Quality Impact Assessment	<u>Impacts on:</u> Dustfall - 24H; PM_{10} - 24H; PM_{10} - annual; $PM_{2.5}$ - 24H;	Retaining the original trees, shrubs and grasses is one of the most efficient and effective ways of minimising dust emissions. Before any site works commence, plan and locate the vegetation cover that needs to be retained; Protect this vegetation by fencing or blocking off from the rest of the site operations; In other areas, maintain the original vegetation	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A

				$PM_{2.5}$ - annual	cover for as long as possible; Avoid clearing the entire site at once, instead clear areas as required in stages of the operation; Retaining the original trees, shrubs and grasses is one of the most efficient and effective ways of minimising dust emissions. If an area needs to be cleared, transplant established plants that must be disturbed to areas that need vegetation; If existing vegetation must be removed and cannot be immediately transplanted elsewhere, remove and maintain them for replanting at project completion. If trees and plants must be removed and it is not possible for them to be replanted, consider chipping and using the material as mulch; Activities with high dust-causing potential, such as topsoil stripping, should not be carried out during adverse wind conditions. When necessary, topsoil should be stripped in discrete sections, allowing buffer strips (windbreaks) between clearings; Wind barriers should be placed on site before commencement of works; Wind barriers are most effective when placed perpendicular to the prevailing wind, but will have little effect when the wind direction is parallel to the fence; When choosing wind barriers, solid barriers provide significant reductions in wind velocity for relatively short leeward distances, whereas porous barriers provide smaller reductions in velocity for more extended distances; Wind barriers should be at least 2 metres high and the screening material should have a porosity of 50% or less. Planning earth-moving works particularly at the start of an operation can reduce dust emissions by		**Biota**	
							N/A	N/A
						Consequence:	***Severity**	
							3	3
							Spatial scale	
							2	2
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							1	1
							Detection	
							5	4
						Significance	***98***	***77***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***

					limiting the time the site is exposed; Plan earth-moving works so that they are completed just prior to the time they are needed; Observe weather conditions and do not commence or continue earth moving works if conditions are unsuitable e.g., under conditions of strong winds; Reduce off-site hauling via balanced cut and fill operations; Pre-water areas to be disturbed.			
81	O	Operational activitites	Air Quality Impact Assessment	<u>Impacts on:</u> Dustfall - 24H; PM_{10} - annual; $PM_{2.5}$ - 24H; $PM_{2.5}$ - annual	Retaining the original trees, shrubs and grasses is one of the most efficient and effective ways of minimising dust emissions. Before any site works commence, plan and locate the vegetation cover that needs to be retained; Protect this vegetation by fencing or blocking off from the rest of the site operations; In other areas, maintain the original vegetation cover for as long as possible; Avoid clearing the entire site at once, instead clear areas as required in stages of the operation; Retaining the original trees, shrubs and grasses is one of the most efficient and effective ways of minimising dust emissions. If an area needs to be cleared, transplant established plants that must be disturbed to areas that need vegetation; If existing vegetation must be removed and cannot be immediately transplanted elsewhere, remove and maintain them for replanting at project completion. If trees and plants must be removed and it is not possible for them to be replanted, consider chipping and using the material as mulch; Activities with high dust-causing potential, such as topsoil stripping, should not be carried out during	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							3	3
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3

					adverse wind conditions. When necessary, topsoil should be stripped in discrete sections, allowing buffer strips (windbreaks) between clearings; Wind barriers should be placed on site before commencement of works; Wind barriers are most effective when placed perpendicular to the prevailing wind, but will have little effect when the wind direction is parallel to the fence; When choosing wind barriers, solid barriers provide significant reductions in wind velocity for relatively short leeward distances, whereas porous barriers provide smaller reductions in velocity for more extended distances; Wind barriers should be at least 2 metres high and the screening material should have a porosity of 50% or less. Planning earth-moving works particularly at the start of an operation can reduce dust emissions by limiting the time the site is exposed; Plan earth-moving works so that they are completed just prior to the time they are needed; Observe weather conditions and do not commence or continue earth moving works if conditions are unsuitable e.g., under conditions of strong winds; Reduce off-site hauling via balanced cut and fill operations; Pre-water areas to be disturbed.		***Legal issue***	
							5	5
							Detection	
							4	3
						Significance	***153***	***112***
						Risk Rating	***MEDIUM (-)***	***MEDIUM (-)***
82	O	Operational activitites	Air Quality Impact Assessment	<u>Impacts on:</u> PM_{10} - 24H;	Retaining the original trees, shrubs and grasses is one of the most efficient and effective ways of minimising dust emissions. Before any site works commence, plan and locate the vegetation cover that needs to be retained; Protect this vegetation by fencing or blocking off from the rest of the site operations;	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	

					In other areas, maintain the original vegetation cover for as long as possible; Avoid clearing the entire site at once, instead clear areas as required in stages of the operation; Retaining the original trees, shrubs and grasses is one of the most efficient and effective ways of minimising dust emissions. If an area needs to be cleared, transplant established plants that must be disturbed to areas that need vegetation; If existing vegetation must be removed and cannot be immediately transplanted elsewhere, remove and maintain them for replanting at project completion. If trees and plants must be removed and it is not possible for them to be replanted, consider chipping and using the material as mulch; Activities with high dust-causing potential, such as topsoil stripping, should not be carried out during adverse wind conditions. When necessary, topsoil should be stripped in discrete sections, allowing buffer strips (windbreaks) between clearings; Wind barriers should be placed on site before commencement of works; Wind barriers are most effective when placed perpendicular to the prevailing wind, but will have little effect when the wind direction is parallel to the fence; When choosing wind barriers, solid barriers provide significant reductions in wind velocity for relatively short leeward distances, whereas porous barriers provide smaller reductions in velocity for more extended distances; Wind barriers should be at least 2 metres high and the screening material should have a porosity of 50% or less.		N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	**Severity**	
							5	4
							Spatial scale	
							2	2
							Duration	
							4	3
						Likelihood:	***Freq. of activity***	
							4	3
							Freq. of incident	
							4	3
							Legal issue	
							5	5
							Detection	
							4	3
						Significance	***187***	***126***
						Risk Rating	***HIGH (-)***	***MEDIUM (-)***

					Planning earth-moving works particularly at the start of an operation can reduce dust emissions by limiting the time the site is exposed; Plan earth-moving works so that they are completed just prior to the time they are needed; Observe weather conditions and do not commence or continue earth moving works if conditions are unsuitable e.g., under conditions of strong winds; Reduce off-site hauling via balanced cut and fill operations; Pre-water areas to be disturbed.			
83	C, O		Traffic Impact Assessment	Impacts on road capacity	No mitigation measures are required.	***Severity:**	**Flow regime**	
							N/A	N/A
							Water quality	
							N/A	N/A
							Habitat	
							N/A	N/A
							Biota	
							N/A	N/A
						Consequence:	***Severity**	
							1	1
							Spatial scale	
							2	2
							Duration	
							2	2
						Likelihood:	***Freq. of activity***	
							1	1
							Freq. of incident	

							1	1
							Legal issue	
							1	1
							Detection	
							1	1
						Significance	***20***	***20***
						Risk Rating	***LOW (-)***	***LOW (-)***

APPENDIX 6B

Cumulative Impacts Table

Vlakfontein Cumulative Impacts Table

Soil, Land Capability & Agricultural Agro-ecosystem Assessment				
No.	**Aspect**	**Cumulative Impacts**	**Significance without Mitigation**	**Significance with Mitigation**
1	Erection of mine structures	Highly productive soils are mined and then poorly rehabilitated, which causes a permanent loss of high potential and highly productive soils. This is a serious, negative, accumulating impact on our national soil resource that degraded an alarming large area of the highly productive soils on the Eastern Highveld. This accumulating impact reduces food production annually. Increased water ingress at poorly rehabilitated open pits, which is the result of poorly shaped, non-free draining surfaces, insufficient soil volumes (soil depth), and poor quality replaced soil material, causes water levels in backfilled pits to rise, which contaminate groundwater and cause decanting of very low-quality water in the surrounding environment, that lead to severe pollution of streams, rivers and dams.	**High (-)**	**Medium (-)**
Hydrogeology Report				
1	Operational impacts	• Implementation of a dewatering strategy • Concurrent backfilling below saturated level • Active treatment and provision of mine water make to (impacted) farmers and environment • Groundwater monitoring	**High (-)**	**Medium (-)**
Surface Water Report				
1	Construction Impacts	Reduced availability of water to downstream water users due to changes in MAR; Alteration of the watercourse functionality and increased risk of flooding and scouring (Stream diversion); Reduced availability of water to downstream water users due to changes in water quality.	**High (-)**	**Low (-)**

2	Operational Impacts	Reduced availability of water to downstream water users due to changes in MAR; Alternation of the watercourse functionality and increased risk of flooding and scouring (Stream diversion); Reduced availability of water to downstream water users due to changes in water quality.	**High (-)**	**Medium (-)**
Aquatic Ecosystem Delineation				
1	Entire Activity	Cumulative risk to resource quality	**Medium (-)**	**Low (-)**
Terrestrial Biodiversity Assessment				
1	Flora	Cumulative impacts may include the potential ongoing loss of remnant threatened Endangered (EN) Soweto Highveld Grassland. The spread of alien invasive floral species within this vegetation type is likely, with further alien species introduced through disturbance from the proposed mining operations, which may replace indigenous vegetation and contribute to an overall loss of biodiversity in the region.	**Medium (-)**	**Low (-)**
2	Fauna	Cumulative impacts associated with habitat loss may also directly and indirectly affect faunal species and provincial priority floral species. For instance, some faunal SCC have large home ranges and forage widely for food and nesting resources that can be disrupted by the destruction of habitat and other factors associated with construction and mining operations. The transformation of the study area may alter such movements and behaviours and further contribute to the isolation of grassland faunal communities. Effective rehabilitation of the mining operation and opencast areas during the closure and decommissioning phase is essential in order to minimise cumulative impacts resulting from the mining activities.	**Medium (-)**	**Low (-)**
Air Quality Impact Assessment				
1	Air Quality	Emissions from sources need to be assessed in terms of the cumulative impacts in an area. The Code of Practice for Air Dispersion Modelling in Air Quality Management in South Africa (DEA, 2014), outlines the following for sources influenced by background concentrations in urban areas and priority areas: For annual averages, the sum of the highest predicted concentration	**Medium (-)**	**Medium (-)**

		(CP) and background concentration (CB) must be less than the National Ambient Air Quality standards, no exceedances allowed; For short-term averages (24 hours or less), sum of the 99th percentile concentrations and background concentration (CB)must be less than the National Ambient Air Quality Standards. Whenever one year is modelled, the highest concentrations shall be considered. The Vlakfontein Coal Mine is a proposed facility thus the modelled emissions do not yet contribute to background concentrations. Predicted dustfall rates, and PM2.5 and PM10 concentrations decrease as you move further away from the emission source. Thus, cumulative impacts for these pollutants will be higher nearer to the proposed activities.		
Environmental Noise Impact Assessment				
1	Noise	Construction activities will cumulatively increase noise levels in the area (influence up to a distance of approximately 2,000 m from the mining related noise-generating activities). The main other source of noise in this area is road traffic noises from the R82. Operational activities will cumulatively increase noise levels in the area (influence up to a distance of approximately 2,000m from the mining related noise-generating activities). The main other source of noise in this area is road traffic noises from the R82.	**High (-)**	**Low (-)**
Blasting & Vibration Impact Assessment				
1	Cumulation of multiple blasts impacts	Cumulative effects considered is when ground vibration levels are exceeded, air blast levels are exceeded, fly rock is experienced from a specific blast at a specific POI and multiple blasts occurs directly after each other causing an increased time period of possible influence. On multiple blasts conducted there may be enhancement of ground vibration levels, or for the same reason reduction may also occur. It is a process of constructive or destructive interference of the shock waves. Unfortunately, this can only be determined with actual trial blast process. Multiple blasts will also increase the time period of ground vibration and air blast. This will have an effect on structures for longer and could certainly upset people if the blast period is very long. A period	**High (-)**	**Low (-)**

		in excess of 15 seconds long is considered unacceptable. Multiple blasts where the limits at structures are constantly exceeded will contribute to higher probability of damage. Therefore, blasts should be conducted such that the limits are not exceeded.		
Heritage Impact Assessment				
1	Cumulative impacts on historical structures	Impact on Structures older than 60 years Sites.	**High (-)**	**Low (-)**
Palaeontological Study				
1	Impact on Palaeontological Resources	Incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.	**High (-)**	**Low (-)**
Visual Impact Assessment				
1	Sense of Place	The development of this site will add cumulatively to the loss of sense of place.	**Medium (-)**	**Medium (-)**
Social Impact Assessment				
1	Employment opportunities-Economic Process	Direct Employment: Coal mining typically creates direct employment opportunities for workers involved in various stages of the mining process, including extraction, transportation, and processing of coal. These jobs can range from heavy equipment operators to engineers, geologists, and administrative staff. Indirect Employment: Beyond direct employment in coal mining operations, there are also indirect jobs created in related industries such as equipment manufacturing, transportation, and services that support mining activities. For example, companies providing maintenance services for mining equipment or transportation companies that haul coal from mines to processing facilities or ports. In regions heavily reliant on coal mining, such as South Africa the industry can have a significant impact on the local and regional economies. Coal mining operations contribute to tax revenues for local governments, support businesses catering to the needs of	**Medium (+)**	**High (+)**

		mining communities, and provide income for households. Economic Diversification: However, the reliance on coal can also pose challenges for regional economies, especially when there is a downturn in the coal market or regulatory changes affecting the industry. Some regions have been working to diversify their economies away from coal dependency, investing in renewable energy, tourism, or other sectors to create more resilient economies.		
2	Multiplier impacts on the local economy- Economic process	The employment generated by coal mining operations creates a direct impact on the local economy. Wages paid to miners and employees are spent on goods and services within the community, supporting local businesses such as grocery stores, restaurants, and retail shops. These businesses, in turn, hire workers and purchase goods and services from other local suppliers, creating additional employment opportunities. Multiplier impacts refer to the ripple effects of economic activity within a region, where an initial injection of spending leads to additional rounds of spending as money circulates through the local economy. In the context of coal mining, multiplier impacts play a significant role in shaping the overall economic dynamics of mining regions e.g Investment in Infrastructure: Coal mining operations often require significant infrastructure investment, such as roads, railways, ports, and utilities. The construction and maintenance of infrastructure projects contribute to economic activity and employment in the region, both during the initial development phase and through ongoing maintenance and operation.	**Medium (+)**	**High (+)**
3	Potential Loss of Agricultural Land	The clearing of land for the construction and operation of coal mines and a siding, infrastructure such as roads and railways, and waste disposal sites can result in the direct loss of agricultural land, reducing the available area for farming activities. Impact on Food Production. The loss of agricultural land due to coal mining can have significant	**High (-)**	**Medium (-)**

		local and regional implications, affecting both the economy and the environment. Agriculture is a significant economic sector in many regions, providing employment and income for many communities. The loss of agricultural land due to coal mining can lead to job displacement and economic hardship for farmers and agricultural workers. It can also have ripple effects on related industries such as food processing and distribution.		
4	Potential Loss of Heritage Resources	The study identified a total of five heritage features and resources. These consist of one structural remains of ruins (SRV001), two historic houses (SVR004 and KF008) and two recent structures (SVR002 and SVR003) which are not conservation worthy. Heritage resources are integral to the identity and sense of belonging of communities living in mining areas. The destruction of culturally significant sites can lead to a loss of cultural identity and a disconnect from ancestral traditions and history. The loss of heritage resources due to coal mining can have significant impacts at both the local and regional levels, affecting cultural identity, historical preservation, and tourism potential, e.g. The Projects can result in the destruction or degradation of archaeological sites, historic buildings, monuments, and other cultural artifacts that are part of the region's heritage.	**Medium (-)**	**Low (-)**
5	Community Development and Social Upliftment through LED Projects Economic process	Community development and social upliftment projects play a vital role in mitigating the cumulative impacts of coal mining on local communities and promoting sustainable economic processes. Coal mining companies can invest in infrastructure projects such as road construction, water supply systems, schools, and healthcare facilities. Improved infrastructure enhances the quality of life for local residents, facilitates economic development, and creates job opportunities. Skill Development and Training: Community development programs can provide training and skill development opportunities to local residents, equipping them with the skills needed to access employment in the mining industry or other sectors. This helps diversify the local economy and reduces dependence on coal mining	**Medium (+)**	**High (+)**

		for livelihoods.		
6	Effects from Population Influx	The areas surrounding the Project area could possibly experience an influx of job seekers from neighbouring settlements like Aerovaal, Arcon Park, Falcon Ridge, Harmoniesrus, Redan, Rothdene, Rust Ter Vaal, Sonlandpark, Sprincol, Van der Merwes Kroon and Waldrift. It is not possible to accurately predict the amount of job seekers and opportunists that would flood to the area. Population influx can disrupt social cohesion and community dynamics. It may lead to tensions between existing residents and newcomers, as well as cultural clashes in diverse communities. Social services may also become overwhelmed, impacting the quality of life for residents. An influx of people into the potentially affected communities (surrounding the Project area(s)) can strain existing infrastructure such as roads, housing, healthcare facilities, and schools. Local governments and communities may struggle to accommodate the increased demand for services, leading to overcrowding and inadequate infrastructure.	**High (-)**	**Medium (-)**
7	Increased social pathologies linked to influx of workers and job seekers- Demographic change/Socio-cultural wellbeing process	The stressful and transient nature of mining-related employment can contribute to substance abuse and addiction issues among workers and residents. Factors such as easy access to alcohol and drugs, social isolation, and economic insecurity may increase the risk of substance abuse disorders. Population influx can also exacerbate social inequalities and marginalization in mining communities. Temporary workers and migrant populations may face discrimination, stigma, and exclusion from social and economic opportunities, leading to social exclusion and marginalization. The influx of population due to the proposed Projects can indeed bring about various social pathologies and challenges, both at the local and regional levels, e.g increased Regional crime rates: Rapid population growth in mining communities can lead to an increase in crime rates, including theft, vandalism, substance abuse, and violence. The influx of temporary workers and outsiders may strain law enforcement resources and contribute to social disorder.	**Medium (-)**	**Low (-)**
8	Impacts Related	The cumulative impacts of coal mining on community health and	**High (-)**	**Medium (-)**

	to Community Health and Safety	safety can have the potential to not only individuals directly involved in mining activities but also broader populations living in proximity to mining operations. Air Quality Degradation; Water Contamination; Noise and Vibrations; Social and Mental Health Impacts. Cumulative impacts of coal mining on community health and safety can have significant regional implications, affecting not only individuals directly involved in mining activities but also broader populations living in proximity to mining operations		
9	Dependency on the proposed Project for sustaining local economy (during closure)	The heavy reliance on coal mining can create a dependency syndrome, wherein local economies become overly dependent on a single industry for sustenance. This dependency can make communities vulnerable to economic downturns, market fluctuations, and structural changes in the coal industry, leading to job losses, business closures, and social upheaval. Coal mining activities contribute to local and regional income generation through wages, taxes, royalties, and business revenues. The economic benefits derived from coal mining may support various community services and infrastructure projects, including schools, healthcare facilities, roads, and public utilities. When the mine closes, the ripple effects, if not well managed, can be experienced at a regional scale.	**High (-)**	**Medium (-)**
Community Health Impact Assessment				
1	Vector-related diseases	During active operational periods, the proposed Projects may create new breeding sites for key mosquito vectors which would significantly increase the vector-borne disease risk. In addition, existing water bodies, such as surface-water environmental-control dams or new reservoirs, may become magnets for local community members and increase the risks of injury, including accidental drowning. In addition, water storage facilities require careful environmental engineering (for example, vegetation control) to prevent development of vector breeding sites. During construction and operations phases, tires, drums, and other containers may become significant breeding sites for mosquitoes.	**Medium (-)**	**Low (-)**
2	Acute respiratory infections and	Mining activities at the various operations, proposed and existing, can contribute to acute respiratory infections and various respiratory	**Medium (-)**	**Low (-)**

	respiratory effects from housing	effects due to exposure to dust and airborne pollutants generated during mining operations. Studies have connected asthma, nasal skin damage, and septal perforation to workers exposed to mine dust. Lung function loss and generalised obstructive pulmonary disease have both been connected to dust exposure.		
3	Veterinary medicine and zoonotic issues	Coal mining can indirectly influence zoonotic veterinary diseases, which are diseases that can be transmitted between animals and humans. While the direct impact may not be significant, several factors associated with mining activities can contribute to the potential spread or emergence of zoonotic diseases.	**Low (-)**	**Low (-)**
4	Sexually-transmitted infections, including Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS)	The cumulative impacts of coal mining on STIs, including HIV and Acquired Immune Deficiency Syndrome (AIDS), can result from a combination of socio-economic, environmental, and behavioural factors. Coal mining projects often attract a transient workforce, including migrant workers, who may engage in high-risk sexual behaviours due to factors such as separation from family, loneliness, and limited social support networks. Population influx and mobility associated with mining activities can lead to increased sexual encounters and transmission of STIs, including HIV/AIDS, both within mining communities and between mining areas and surrounding regions. In addition to this, coal mining environments may be associated with substance abuse, including alcohol and drug use, which can impair judgment, increase sexual disinhibition, and contribute to risky sexual behaviours. Substance abuse can fuel the spread of STIs, including HIV/AIDS, through unprotected sex, needle sharing, and other high-risk practices among individuals engaged in mining-related activities.	**High (-)**	**Medium (-)**
5	Soil-, water- and waste-related diseases	The cumulative impacts of coal mining on soil, water, and waste can lead to a range of health issues, including diseases related to contamination, pollution, and exposure to hazardous substances. Several coal mining operations within close proximity of one another can result in the release of pollutants such as heavy metals, chemicals, and sediments into surface water and groundwater sources. Contaminated water sources pose risks to human health through ingestion, inhalation, and dermal exposure. Diseases associated with water contamination include gastrointestinal illnesses, skin disorders, and reproductive health issues. Also, coal	**High (-)**	**Medium (-)**

		mining activities, including land clearing, excavation, and waste disposal, can lead to soil erosion, compaction, and contamination with heavy metals, hydrocarbons, and other toxic substances. Contaminated soils can pose health risks to humans through direct contact, inhalation of dust particles, and uptake by food crops. Diseases related to soil contamination include skin disorders, respiratory ailments, and neurological disorders.		
6	Food- and nutrition-related issues	Coal mining-related pollution and environmental degradation can have adverse health effects on communities, including respiratory diseases, water-borne illnesses, and malnutrition. Poor health outcomes can further exacerbate food insecurity by reducing household productivity (loss of agricultural land), increasing healthcare expenses, and limiting access to nutritious foods.	**Medium (-)**	**Low (-)**
7	Accidents/injuries	The cumulative health impacts of injuries and accidents in coal mining can be severe and multifaceted, affecting workers, communities, and the environment. Mining accidents and environmental disasters, such as mine collapses, spills, and releases of toxic substances, pose risks to the health and safety of communities living in proximity to coal mining operations. The cumulative impact of these incidents can lead to injuries, acute health effects, and long-term health risks for residents, including respiratory problems, water contamination, and psychological trauma. In addition to this, the healthcare burden associated with coal mining-related injuries and accidents can strain local healthcare systems and resources. Emergency response and medical care for injured workers and affected communities may be inadequate, particularly in remote or rural areas where coal mining operations are located, leading to delays in treatment and compromised health outcomes.	**Medium (-)**	**Low (-)**
8	Exposure to potentially hazardous materials, noise and malodours	Exposure to potentially hazardous materials, noise, and malodours in coal mining environments can have cumulative impacts on the health of workers and nearby communities. With regards to noise and vibration, some of the surrounding settlements and farm dwellings will be exposed to noise from the operations of various machines on the mine and trucks on the road. Extraction and transport operations of other mines will affect some the receptors. Though blasting will be carried out at other mines, the effects are not synergistic. With	**High (-)**	**Medium (-)**

		modern blasting technologies, the effects are likely to be small, localised, easy to mitigate, and non-cumulative.		
9	Social determinants of health	Coal mining can have significant cumulative impacts on the social determinants of health, which are the conditions in which people are born, grow, live, work, and age, and which shape health outcomes. Rapid population growth and migration to mining areas can strain housing infrastructure, leading to overcrowding, inadequate housing, and homelessness. Poor housing conditions, including lack of access to safe drinking water, sanitation, and heating, can contribute to health disparities, infectious diseases, and respiratory illnesses among mining communities. Furthermore, healthcare access and infrastructure in mining areas may be limited or insufficient. Barriers to healthcare access, including geographic isolation, transportation challenges, and financial constraints, can impede timely diagnosis, treatment, and prevention of diseases among mining populations.	**High (-)**	**Medium (-)**
10	Cultural health practices	The cumulative impacts of coal mining on cultural health practices can be significant, affecting the traditions, customs, and ways of life of communities living in mining areas e.g. coal mining projects may encroach upon areas used for traditional healing practices, such as medicinal plant gathering, spiritual ceremonies, and rituals for health and well-being. Disruption of these practices can limit access to traditional medicine and healing knowledge, affecting the health outcomes and resilience of communities.	**Medium (-)**	**Low (-)**
11	Health systems issues	There are several Healthcare facilities within the affected Local Municipalities. However, the capacity of these facilities remains a challenge. In terms of proposed Project impacts, influx may create increased demand for what is already a scarce resource. The proposed Projects, in conjunction with other like Projects in the vicinity of the Project area have the potential to impact on the national/local health service infrastructure and delivery mechanisms in the following ways: - In-migration - Health service delivery capacity and expectations on the proposed Projects - Healthcare funding - Health service inequalities	**Medium (-)**	**Medium (-)**

12	Non-communicable diseases	The cumulative impacts of coal mining on non-communicable diseases are multifaceted and can arise from various environmental, social, and economic factors associated with coal mining activities. An example of this is air pollution. Coal mining operations, including excavation, transportation, and combustion of coal, can release significant amounts of air pollutants such as particulate matter (PM), sulfur dioxide (SO2), nitrogen oxides (NOx), and volatile organic compounds (VOCs). Prolonged exposure to these pollutants has been linked to respiratory diseases such as chronic obstructive pulmonary disease (COPD), asthma, and lung cancer, as well as cardiovascular diseases.	**High (-)**	**Medium (-)**