

APPENDIX 1: IMPACT ASSESSMENT TABLES

CONSTRUCTION PHASE: SITE ACCESS AND SITE ESTABLISHMENT		
Potential impact and risk:	IMPACT 1: SOIL EROSION & SOIL COMPACTION: The clearing of laydown areas for site establishment and clearing of site access points will result in the removal of existing vegetation, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from repeated use of access tracks.	
Loss of topsoil, increased dust levels, and soil compaction		
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site and Short term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Reversible	N/A
Indirect impacts:	Dust impacting on adjacent vegetation and causing a nuisance to workers. Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	
Degree to which the impact can be avoided :	High	N/A
Degree to which the impact can be managed :	High	N/A
Degree to which the impact can be mitigated :	High	N/A
Proposed mitigation:	After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. Top soil shall be removed separately and stockpiled separately from other soil base layers. Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. Topsoil storage areas must be convex and should not exceed 2m in height. Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. In particular, topsoil must not be subject to compaction greater than 1 500 kg/m ² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. Reduce drop height of material to a minimum. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.	N/A
Residual impacts:	Potential loss of invertebrates that live in the top layers of the soil.	N/A
Cumulative impact post mitigation:	Low	N/A
Significance rating of impact after mitigation	Low	N/A

Potential impact and risk: Potential Impacts on Water Resources (flow regime; water quality and quantity; aquatic biota)	IMPACT 2: WATER RESOURCE FUNCTIONALITY IN A FEPA RIVER: The removal of sand from the river bank at the access points could impact on flow regime, water quality and quantity, and aquatic biota. The Hartbees River is however, non-perennial and impacts will have little effect on water resource functionality as a whole.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site & Short term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Reversible	N/A
Indirect impacts:	Erosion of banks on adjacent sides of access points during storm events, which are very seldom.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	N/A
Degree to which the impact can be avoided :	Medium	N/A
Degree to which the impact can be managed :	High	N/A
Degree to which the impact can be mitigated :	High	N/A
Proposed mitigation:	<p>Topsoil at access point to be removed prior during construction phase, and replaced during rehabilitation.</p> <p>After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly.</p> <p>Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.</p> <p>Top soil shall be removed separately and stockpiled separately from other soil base layers.</p> <p>Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.</p> <p>Topsoil storage areas must be convex and should not exceed 2m in height.</p> <p>Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. In particular, topsoil must not be subject to compaction greater than 1 500 kg/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles.</p> <p>Temporarily halt material handling in windy conditions.</p> <p>Rehabilitation of the river banks at each access point as soon as that section of the river has been mined.</p> <p>Compacted areas are to be scarified.</p> <p>Shaping of river bank to be returned to original profile.</p>	N/A
Residual impacts:	Alien invasive vegetation establishes quickly in disturbed areas.	N/A
Cumulative impact post mitigation:	Low	N/A
Significance rating of impact after mitigation	Low	N/A

Potential impact and risk: Potential Impacts on Biodiversity	IMPACT 3: LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN AN ECOLOGICAL SUPPORT AREA: Existing disturbed areas have been identified for the laydown areas for site establishment and clearing of existing vegetation in the river bed will result in the loss of vegetation (mostly alien invasive species) and impact on localised ecological functioning.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site & Short term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Reversible	N/A
Indirect impacts:	Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation. Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	N/A
Degree to which the impact can be avoided :	High	N/A
Degree to which the impact can be managed :	High	N/A
Degree to which the impact can be mitigated :	High	N/A
Proposed mitigation:	Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Refer to Site Plan which indicates that existing farm tracks will be used, and disturbed areas have been earmarked for laydown areas. Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area. No indigenous plants outside of the demarcated work areas may be damaged. The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g. snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary.	N/A
Residual impacts:	Laydown areas have been earmarked for existing disturbed areas where clearing would be minimal, resulting in little impact on ecological functioning at a local level during the construction process. The clearing of alien invasive vegetation is a positive impact, and will benefit and improve the ecological functioning of the river bed and adjacent areas.	N/A
Cumulative impact post mitigation:	Very Low	N/A
Significance rating of impact after mitigation	Very Low	N/A

Potential impact and risk: Contamination & Pollution	IMPACT 4: POTENTIAL FOR SOIL AND RIVER SAND CONTAMINATION AND SOLID WASTE POLLUTION DURING CONSTRUCTION PHASE:	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site & Short term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Possible	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Reversible	N/A
Indirect impacts:	Windblown litter will cause visual blight. Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	N/A
Degree to which the impact can be avoided :	High	N/A
Degree to which the impact can be managed :	High	N/A
Degree to which the impact can be mitigated :	High	N/A
Proposed mitigation:	Oils and lubricants must be stored within sealed containment structures if kept on site. Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. Machinery must be kept in good working order and regularly inspected for leaks. A spill kit will be available on each site where mining activities are in progress. Any spillages will be cleaned up immediately. Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. Waste separation must be undertaken if practical for recycling Provide all workers with environmental awareness training. Provide a bin at the site. Regularly dispose of any solid waste at a municipal waste disposal site. Ensure all workers comply with the requirements of the EMP. Provide a mobile ablution facility.	N/A
Residual impacts:	A lack of waste food management encourages vermin.	N/A
Cumulative impact post mitigation:	Low	N/A
Significance rating of impact after mitigation	Low	N/A

Potential impact and risk: Potential Impacts on Visual Landscape	IMPACT 5: VISUAL INTRUSION: Caused by the front end loader, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site access and site establishment. The site is however, remote and rural in nature with no receptors (people) as it is located on private property.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site & Short term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Reversible	N/A
Indirect impacts:	There are few indirect impacts as the area is remote and rural, with no people (receptors) living near the site.	N/A
Cumulative impact prior to mitigation:	Low	N/A
Significance rating of impact prior to mitigation	Low	N/A
Degree to which the impact can be avoided :	Medium	N/A
Degree to which the impact can be managed :	Medium	N/A
Degree to which the impact can be mitigated :	Medium	N/A
Proposed mitigation:	The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. Restrict working hours to normal work day hours with no work over Sundays and public holidays	N/A
Residual impacts:	Good housekeeping will ensure a neat and well maintained construction area reducing visual impact.	N/A
Cumulative impact post mitigation:	Very Low	N/A
Significance rating of impact after mitigation	Very Low	N/A

Potential impact and risk: Potential Impacts on Social, and Biophysical Environments	IMPACT 6: EMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front end loaders) and vehicles, which will emit Greenhouse Gases.		
	ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative		N/A
Extent and duration of impact:	Local & Short Term		N/A
Consequence of impact or risk:	Loss		N/A
Probability of occurrence:	Definite		N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low		N/A
Degree to which the impact can be reversed:	Reversible		N/A
Indirect impacts:	Carbon emissions from vehicle exhausts have a negative impact on the ozone layer. Local residents along the access tracks and roads would be impacted on by noise, dust and vehicle emissions during the construction activities. Increase in Greenhouse Gas Emissions from vehicles.		N/A
Cumulative impact prior to mitigation:	Low		N/A
Significance rating of impact prior to mitigation	Low		N/A
Degree to which the impact can be avoided :	Medium		N/A
Degree to which the impact can be managed :	Medium		N/A
Degree to which the impact can be mitigated :	Medium		N/A
Proposed mitigation:	The Contractor shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding "built-up" area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. Construction and demolition activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise of neighbours. Should the Contractor need to work outside normal working hours, the surrounding neighbours shall be informed prior to the work taking place. No amplified music shall be allowed on site. On public roads adjacent to the site vehicles shall adhere to municipal and provincial traffic regulations including speed limits. Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. Trucks shall have tarpaulins to prevent sand from blowing off in transit.		N/A
Residual impacts:	Carbon emissions have impact on climate change.		N/A
Cumulative impact post mitigation:	Very Low		N/A
Significance rating of impact after mitigation	Very Low		N/A

Potential impact and risk: Potential Impacts on Heritage, Paleontological and Cultural landscape		IMPACT 7: LIMITED POTENTIAL FOR HERITAGE, PALAEOLOGICAL AND CULTURAL IMPACTS: Refer to HIA & PIA attached as Appendix 4.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE	
Nature of impact:	Loss	N/A	
Extent and duration of impact:	Site & Short term	N/A	
Consequence of impact or risk:	No loss	N/A	
Probability of occurrence:	Unlikely	N/A	
Degree to which the impact may cause irreplaceable loss of resources:	No Loss	N/A	
Degree to which the impact can be reversed:	Irreversible	N/A	
Indirect impacts:	None	N/A	
Cumulative impact prior to mitigation:	None	N/A	
Significance rating of impact prior to mitigation	Very low	N/A	
Degree to which the impact can be avoided :	High	N/A	
Degree to which the impact can be managed :	High	N/A	
Degree to which the impact can be mitigated :	High	N/A	
Proposed mitigation:	Refer to Appendix H – none required	N/A	
Residual impacts:	None	N/A	
Cumulative impact post mitigation:	Very low As referenced from Appendix 4: where any archaeological contexts occur, direct impacts are once-off permanent destructive events. Secondary cumulative impacts may occur with the increase in development and operational activity associated with the life of the proposed sand mining.	N/A	
Significance rating of impact after mitigation	Very low	N/A	
Potential impact and risk: Potential Impacts on Socio- Economic Environment		IMPACT 8: CREATION OF EMPLOYMENT & JOB SECURITY DURING CONSTRUCTION PHASE WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE	
Nature of impact:	Positive	Negative	
Extent and duration of impact:	Local, District and Short term	Local, District & Short Term	
Consequence of impact or risk:	Gain	Loss	
Probability of occurrence:	Definite	Definite	
Degree to which the impact may cause irreplaceable loss of resources:	No Loss	Medium	
Degree to which the impact can be reversed:	Irreversible (employment can be lost by an individual due to non-performance but the job provision is irreversible)	Reversible	
Indirect impacts:	Upskilling Local economic spin-offs through increased income earned, and through purchasing of local materials	No upskilling No local economic spin-offs due to lack of income earned, and limited supply of building materials with possible demand exceeding supply.	
Cumulative impact prior to mitigation:	Medium (-)	Medium (-)	
Significance rating of impact prior to mitigation	Low	Medium (-)	
Degree to which the impact can be avoided :	Very low	Medium	
Degree to which the impact can be managed :	High	Medium	
Degree to which the impact can be mitigated :	High	Medium	
Proposed mitigation:	Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)	No mitigation possible with No-Go alternative.	
Residual impacts:	The upliftment of unemployed people, with positive impact on standard of living for their families. Increase in local building materials, which reduce economies of scale for building projects in the region, such as for the renewable energy sector.	No job creation or potential for upskilling of previously disadvantaged labour, and no supply or purchasing of local materials.	
Cumulative impact post mitigation:	Medium (+)	Medium (-)	
Significance rating of impact after mitigation	Medium (+)	Medium (-)	

OPERATIONAL PHASE		
Potential impact and risk: Loss of soil, increased dust levels, and soil compaction	IMPACT 1: SOIL EROSION & SOIL COMPACTION: The sand mining process will disturb the river sand increasing the potential for fine particle suspension by wind. Soil compaction will result from repeated use of access tracks.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site & Long term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Possible	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Reversible	N/A
Indirect impacts:	Dust impacting on adjacent vegetation and causing a nuisance to workers. Compaction of topsoil damages seed bank and habitat for invertebrates.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	N/A
Degree to which the impact can be avoided :	Medium	N/A
Degree to which the impact can be managed :	Medium	N/A
Degree to which the impact can be mitigated :	Medium	N/A
Proposed mitigation:	After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. Incremental clearing of vegetation in river bed should take place to avoid unnecessary exposed surfaces. Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. Reduce drop height of material to a minimum. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.	N/A
Residual impacts:	Unmanaged soil erosion will result in loss of topsoil. Unmanaged dust will cause a nuisance and impact on the health of the workers.	N/A
Cumulative impact post mitigation:	Low	N/A
Significance rating of impact after mitigation	Low	N/A

Potential impact and risk: Potential Impacts on Water Resources (flow regime; water quality and quantity; aquatic biota)	IMPACT 2: WATER RESOURCE FUNCTIONALITY IN A FEPA RIVER: The removal of sand from the river channel could impact on flow regime, water quality and quantity, and aquatic biota. The River is however, non-perennial and impacts will have little effect on water resource functionality as a whole, as there is no permanent surface water, and storm water run-off events are very seldom in the arid climate. Sand will be transported downstream into the mined area over time.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Irreversible	N/A
Indirect impacts:	Water diversion around sand piles in the river, and water accumulation in excavated areas Erosion of banks on adjacent sides of access points during storm events, which are very seldom.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	N/A
Degree to which the impact can be avoided :	Medium	N/A
Degree to which the impact can be managed :	Medium	N/A
Degree to which the impact can be mitigated :	Medium	N/A
Proposed mitigation:	No equipment may be parked within the drainage channel when not in use. No stockpiling to take place within the drainage channel. Shaping of river bed to avoid diversion of stormwater towards banks to prevent erosion of river banks, and to prevent channeling of water that would increase erosive capacity of stormwater. Sand will be washed from upstream to the mining site over time.	N/A
Residual impacts:	Alien invasive vegetation establishes quickly in disturbed areas.	N/A
Cumulative impact post mitigation:	Low	N/A
Significance rating of impact after mitigation	Low	N/A

Potential impact and risk: Potential Impacts on Biodiversity	IMPACT 3: LIMITED LOSS OF NATURAL VEGETATION AND DISTURBANCE OF ECOLOGICAL FUNCTIONING IN AN CBA1: The clearing of existing vegetation in the river bed will result in the loss of vegetation and localized ecological functioning. However, the existing vegetation is mostly alien invasive species and biodiversity will improve as a result. Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The Front End Loader will disturb local fauna.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	N/A
Extent and duration of impact:	Site & Short term	N/A
Consequence of impact or risk:	Loss	N/A
Probability of occurrence:	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A
Degree to which the impact can be reversed:	Irreversible	N/A
Indirect impacts:	Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation. Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.	N/A
Cumulative impact prior to mitigation:	Medium	N/A
Significance rating of impact prior to mitigation	Medium	N/A
Degree to which the impact can be avoided :	Low	N/A
Degree to which the impact can be managed :	High	N/A
Degree to which the impact can be mitigated :	High	N/A
Proposed mitigation:	Identify existing access tracks. Refer to Appendix C , which indicates that existing farm tracks will be used. Demarcate areas for clearing in the river bed. The mining area and stockpile areas must be demarcated and the footprint contained within the demarcated area. Mining areas to be limited to blocks of 500m at a time with rehabilitation of the bank and access areas required before moving upstream to the next block. The annual rehabilitation plan must be implemented. Remove alien invasive vegetation, and ensure ongoing alien vegetation clearing in the area. No indigenous plants outside of the demarcated work areas may be damaged. Identify protected tree species, and leave these intact, such as Camelthorn trees. The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g. snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by the ECO, if necessary.	N/A
Residual impacts:	Laydown areas to be cleared have a small development footprint, and are unlikely to affect ecological functioning at a local level, during the construction process. The clearing of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.	N/A
Cumulative impact post mitigation:	Low	N/A
Significance rating of impact after mitigation	Low	N/A

Potential impact and risk: Contamination & Pollution	IMPACT 4: POTENTIAL FOR SOIL AND RIVER SAND CONTAMINATION AND SOLID WASTE POLLUTION DURING OPERATIONAL PHASE	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Negative	
Extent and duration of impact:	Site & Short term	
Consequence of impact or risk:	Loss	
Probability of occurrence:	Possible	
Degree to which the impact may cause irreplaceable loss of resources:	Low	
Degree to which the impact can be reversed:	Reversible	
Indirect impacts:	Windblown litter will cause visual blight. Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning.	
Cumulative impact prior to mitigation:	Medium	
Significance rating of impact prior to mitigation	Medium	
Degree to which the impact can be avoided :	High	
Degree to which the impact can be managed :	High	
Degree to which the impact can be mitigated :	High	
Proposed mitigation:	<p>Oils and lubricants must be stored within sealed containment structures if kept on site.</p> <p>Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil.</p> <p>When not in use, a drip tray must be placed beneath mechanical equipment and vehicles.</p> <p>Machinery must be kept in good working order and regularly inspected for leaks.</p> <p>A spill kit will be available on each site where mining activities are in progress.</p> <p>Any spillages will be cleaned up immediately.</p> <p>Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility.</p> <p>Waste separation must be undertaken if practical for recycling</p> <p>Provide all workers with environmental awareness training.</p> <p>Provide a bin at the site.</p> <p>Regularly dispose of any solid waste at a municipal waste disposal site.</p> <p>Ensure all workers comply with the requirements of the EMPr.</p> <p>Provide a mobile ablution facility.</p>	
Residual impacts:	A lack of waste food management encourages vermin.	
Cumulative impact post mitigation:	Low	
Significance rating of impact after mitigation	Low	

Potential impact and risk:		IMPACT 5: VISUAL INTRUSION: Caused by the front end loader, topsoil stockpiles, cleared areas, and movement of trucks on site. The site is however, remote and rural in nature with no receptors (people) as it is located on private property.	
Potential Impacts on Visual Landscape			
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE	
Nature of impact:	Negative		
Extent and duration of impact:	Site & Short term		
Consequence of impact or risk:	Loss		
Probability of occurrence:	Definite		
Degree to which the impact may cause irreplaceable loss of resources:	Low		
Degree to which the impact can be reversed:	Reversible		
Indirect impacts:	There are few indirect impacts as the area is remote and rural, with no people (receptors) living near the site.		
Cumulative impact prior to mitigation:	Low		
Significance rating of impact prior to mitigation	Low		
Degree to which the impact can be avoided :	Medium		
Degree to which the impact can be managed :	Medium		
Degree to which the impact can be mitigated :	Medium		
Proposed mitigation:	The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads.		
Residual impacts:	Good housekeeping will ensure a neat and well maintained construction area reducing visual impact.		
Cumulative impact post mitigation:	Very Low		
Significance rating of impact after mitigation	Very low		

Potential impact and risk: Potential Impacts on Social, and Biophysical Environments		IMPACT 6: EMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front end loaders) and vehicles, which will emit Greenhouse Gases.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE	
Nature of impact:	Negative	N/A	
Extent and duration of impact:	Site and short term	N/A	
Consequence of impact or risk:	Loss	N/A	
Probability of occurrence:	Definite	N/A	
Degree to which the impact may cause irreplaceable loss of resources:	Low	N/A	
Degree to which the impact can be reversed:	Low	N/A	
Indirect impacts:	Carbon emissions from vehicle exhausts have a negative impact on the ozone layer. Residents and occupants of work places along the access tracks and roads would be impacted on by noise, dust and vehicle	N/A	
Cumulative impact prior to mitigation:	Low	N/A	
Significance rating of impact prior to mitigation	Low	N/A	
Degree to which the impact can be avoided :	Medium	N/A	
Degree to which the impact can be managed :	Medium	N/A	
Degree to which the impact can be mitigated :	Medium	N/A	
Proposed mitigation:	Ensure sand hauling is during normal working hours and not on weekends No amplified music shall be allowed on site. On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.	N/A	
Residual impacts:	Dust settling on adjacent vegetation can impact on vegetative growth, which is a short-term impact until the rainfall season.	N/A	
Cumulative impact post mitigation:	Very Low	N/A	
Significance rating of impact after mitigation	Very Low		
Potential impact and risk: Potential Impacts on Heritage, Paleontological and Cultural landscape		IMPACT 7: LIMITED POTENTIAL FOR HERITAGE, PALAEOLOGICAL AND CULTURAL IMPACTS: Refer to HIA & PIA attached as Appendix 4.	
ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE	
Nature of impact:	Loss	N/A	
Extent and duration of impact:	Site & Short term	N/A	
Consequence of impact or risk:	No loss	N/A	
Probability of occurrence:	Unlikely	N/A	
Degree to which the impact may cause irreplaceable loss of resources:	No Loss	N/A	
Degree to which the impact can be reversed:	Irreversible	N/A	
Indirect impacts:	None	N/A	
Cumulative impact prior to mitigation:	None	N/A	
Significance rating of impact prior to mitigation	Very low	N/A	
Degree to which the impact can be avoided :	High	N/A	
Degree to which the impact can be managed :	High	N/A	
Degree to which the impact can be mitigated:	High	N/A	
Proposed mitigation:	Refer to Appendix 4 – none required	N/A	
Residual impacts:	None	N/A	
Cumulative impact post mitigation:	Very low As referenced from Appendix H: where any archaeological contexts occur, direct impacts are once-off permanent destructive events. Secondary cumulative impacts may occur with the increase in development and operational activity associated with the life of the proposed sand mining.	N/A	
Significance rating of impact after mitigation	Very low	N/A	

Potential impact and risk: Potential Impacts on Socio- Economic Environment	IMPACT 8: CREATION OF EMPLOYMENT & JOB SECURITY DURING OPERATIONAL PHASE WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS		
	ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Positive		Negative
Extent and duration of impact:	Local, district and Short term		Local, District & Short Term
Consequence of impact or risk:	Gain		Loss
Probability of occurrence:	Definite		Definite
Degree to which the impact may cause irreplaceable loss of resources:	No loss		Medium
Degree to which the impact can be reversed:	Irreversible (employment can be lost by an individual due to non-performance but the job provision is irreversible)		Reversible
Indirect impacts:	Upskilling Local economic spin-offs through increased income earned, and through purchasing of local materials		No upskilling No local economic spin-offs due to lack of income earned, and limited supply of building materials with possible demand exceeding supply.
Cumulative impact prior to mitigation:	Medium (-)		Medium (-)
Significance rating of impact prior to mitigation	Medium (-)		Medium (-)
Degree to which the impact can be avoided :	Very low		Medium
Degree to which the impact can be managed :	High		Medium
Degree to which the impact can be mitigated :	High		Medium
Proposed mitigation:	Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		No mitigation possible with No-Go alternative.
Residual impacts:	The upliftment of unemployed people, with positive impact on standard of living for their families. Increase in local building materials, which reduce economies of scale for building projects in the region, such as for the renewable energy sector.		No job creation or potential for upskilling of previously disadvantaged labour, and no supply or purchasing of local materials.
Cumulative impact post mitigation:	Medium (+)		Medium (-)
Significance rating of impact after mitigation	Medium (+)		Medium (-)

DECOMMISSIONING & CLOSURE PHASE			
Potential impact and risk:	IMPACT 1: REHABILITATION OF MINED AND CLEARED AREAS: Ongoing removal of alien invasive plant species; shaping of river profile and replacing topsoil.		
Potential Impacts on Biophysical Environment	ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Positive		N/A
Extent and duration of impact:	Local & short term		N/A
Consequence of impact or risk:	Gain		N/A
Probability of occurrence:	Definitely		N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss		N/A
Degree to which the impact can be reversed:	Reversible		N/A
Indirect impacts:	Biodiversity of area will improve due to removal of alien invasive vegetation. Fauna will return to the disturbed areas. Sand will move into the mined areas from upstream areas over time.		N/A
Cumulative impact prior to mitigation:	Medium		N/A
Significance rating of impact prior to mitigation	Medium		N/A
Degree to which the impact can be avoided :	Very low (rehabilitation is mandatory)		N/A
Degree to which the impact can be managed :	High		N/A
Degree to which the impact can be mitigated :	High		N/A
Proposed mitigation:	Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan. Compacted areas shall be scarified after use during decommissioning and rehabilitation. Any stored topsoil shall be spread over the scarified surface. Shaping of river bed to avoid steep profiles and hollows. Ongoing removal of alien invasive vegetation. Planting of indigenous vegetation.		N/A
Residual impacts:	Net loss of river sand in the mined area, until sand from upstream is brought downstream by storm events over time.		Storm events cause sand to move downstream.
Cumulative impact post mitigation:	Very Low		N/A
Significance rating of impact after mitigation	Very Low		N/A

Potential impact and risk: Potential Impacts on Socio-Economic Environment	IMPACT 2: CREATION OF EMPLOYMENT, JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS DURING DECOMMISSIONING & CLOSURE PHASE		
	ALTERNATIVE	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
Nature of impact:	Positive		Negative
Extent and duration of impact:	Local, district and Short term		Local, District & Short Term
Consequence of impact or risk:	Gain		Loss
Probability of occurrence:	Definite		Definite
Degree to which the impact may cause irreplaceable loss of resources:	No loss		Medium
Degree to which the impact can be reversed:	Irreversible (employment can be lost by an individual due to non-performance but the job provision is irreversible)		Reversible
Indirect impacts:	Upskilling Local economic spin-offs through increased income earned, and through purchasing of local materials		No upskilling No local economic spin-offs due to lack of income earned, and limited supply of building materials with possible demand exceeding supply.
Cumulative impact prior to mitigation:	Medium (-)		Medium (-)
Significance rating of impact prior to mitigation	Low		Medium (-)
Degree to which the impact can be avoided :	Very low		Medium
Degree to which the impact can be managed :	High		Medium
Degree to which the impact can be mitigated :	High		Medium
Proposed mitigation:	Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		No mitigation possible with No-Go alternative.
Residual impacts:	The upliftment of unemployed people, with positive impact on standard of living for their families.		No job creation or potential for upskilling of previously disadvantaged labour, and no supply or purchasing of local materials.
Cumulative impact post mitigation:	Medium (+)		Medium (-)
Significance rating of impact after mitigation	Medium (+)		Medium (-)