

## APPENDIX F: IMPACT ASSESSMENT

### METHODOLOGY USED IN DETERMINING SIGNIFICANCE OF POTENTIAL IMPACTS

Potential environmental impacts on the environment will be determined in terms of the following in order to determine the significance of each impact:

- Probability (how likely is it that the impact will occur?)
- Magnitude (how severe will the impact be?)
- Duration (how long will the impact last?)
- Scale of the impact (what size of the area will be affected?)

Thereafter, mitigation measures will be proposed in order to reduce or eliminate negative impacts and enhance positive impacts. The impact of the proposed activity on the environment will be considered for the pre-construction, construction and operational phases. The necessary mitigation measures will be consolidated in the form of an Environmental Management Programme (EMPr).

#### Assessment of significance – method

The significance of every environmental impact identified will be determined using the following approach:

In assessing the potential significance of an impact two aspects will be considered:

- i) Occurrence
  - ii) Severity
- Occurrence will be sub-divided into:
- Probability of occurrence
  - Duration of occurrence
- Severity will be sub-divided into:
- Magnitude (severity) of impact
  - Scale/extent of impact

In order to assess each of these factors for each impact, ranking scales were employed as follows:

<b>Probability:</b>	<b>Duration:</b>
5 - Definite/don't know	5 - Permanent
4 - Highly probable	4 - Long-term*
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 - Improbable	1 - Immediate
0 - None	0 - None
<b>Scale:</b>	<b>Magnitude:</b>
5 - International	10 - Very high/don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
0 - None	0 - None

\*impact ceases after operational life of the activity

Once the above factors had been ranked for each impact, the overall risk (environmental significance) of each impact will be assessed using the following formula:  $SP = (magnitude (M) + duration (D) + scale(S)) \times probability (P)$ . The maximum value is 100 significance points (SP). Environmental impacts will be rated as either of **High**, **Moderate** or **Low** significance on the following basis:

- SP  $\geq$  60 indicates high environmental significance;
- SP 31  $\geq$  59 indicates moderate environmental significance;
- SP  $\leq$  30 indicates low environmental significance.

**ASSESSMENT OF IMPACTS:**

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
<b>AIR AND DUST POLLUTION</b>														
Possible air and dust pollution	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p> <p><b>Decommissioning Phase:</b> Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	2	2	4	40	M	<ul style="list-style-type: none"> <li>Dust will be suppressed through a watering management programme, especially during windy conditions.</li> <li>Dust generated will be carefully monitored by the OHS&amp;E and should be suppressed by means of watering regularly.</li> <li>Access roads will be watered regularly, especially in the dry winter months and in periods of high wind.</li> <li>Vegetation will not be unnecessary stripped.</li> <li>Domestic fires will be prohibited on site.</li> <li>Heavy vehicle will be serviced regularly to ensure emission control.</li> <li>All heavy vehicles, excavators and generators used for the mining will be in good working condition and will be serviced regularly.</li> <li>Should a vehicle have a break down, it will be serviced immediately.</li> </ul>	2	2	3	1	8	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
<b>SOIL EROSION</b>														
Possible soil erosion	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p> <p><b>Decommissioning Phase:</b> Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	4	2	2	2	16	L	<ul style="list-style-type: none"> <li>Topsoil, if any, will be removed over the whole mining area and stored in a perimeter berm. The height of the topsoil berm will not exceed 3m.</li> <li>The topsoil berm will be inspected for erosion daily.</li> <li>Minimal amounts of topsoil shall be lost due to erosion, either by wind or water.</li> <li>Condition of soil in walk or drive areas should be checked daily for erosion.</li> <li>Access road condition will be checked daily.</li> <li>If erosion is noted at walk and drive areas, access road or topsoil berms, the erosion channel will be fixed by placing cut vegetation, sandbags or rocks within the erosion channel and the cause of the erosion will be mitigated through the creation of runoff channels.</li> </ul>	2	2	2	2	12	L
<b>NOISE</b>														
Possible Noise Impact	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p>	8	2	2	5	60	H	<ul style="list-style-type: none"> <li>The working hours shall be limited to between 07:00 hrs and 18:00 hrs on weekdays, and 07:00 hrs and 16:00 hrs on Saturdays, or as per contract documentation.</li> <li>Vehicles must be driven at a moderate speed (50 kph) on private roads.</li> </ul>	2	2	2	5	30	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION						
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP	
	<b>Decommissioning Phase:</b> Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area								<ul style="list-style-type: none"> <li>Noise generated from the trucks that transport the material and the excavator that is used to mine the material shall only be carried out during normal working hours.</li> <li>Extended working hours will be in accordance with contract documentation.</li> <li>Concor Infrastructure shall be obligated to maintain vehicles used at the mining area in a good condition;</li> <li>Concor Infrastructure will be obliged to ensure that all personnel on site apply occupational health and safety requirements with respect to hearing protection.</li> </ul>						
<b>VISUAL</b>															
Possible visual impacts	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p> <p><b>Decommissioning Phase:</b> Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	2	2	2	3	18	L	<ul style="list-style-type: none"> <li>Concurrent rehabilitation of the mining area will take place.</li> <li>All unused material would be levelled to ensure that the mining area blends back into the existing landscape fabric.</li> <li>No stockpiled material is to be retained on site.</li> <li>The mining area will be shaped to ensure no stockpiled heaps and that the area blends in with the existing landscape.</li> <li>All stockpiled topsoil and vegetative material will be spread over the bottom of</li> </ul>	2	2	2	2	12	L	

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<p>the mining area to ensure proper seed bed for the re-establishment of vegetative growth. Placing a berm of topsoil along the perimeter of the mining site to obscure the visual impact of the excavation.</p> <ul style="list-style-type: none"> <li>Access road to be rehabilitated.</li> </ul>						
<b>AQUATIC AND TERRESTRIAL ECOLOGY</b>														
Possible impacts on terrestrial ecology	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p> <p><b>Decommissioning Phase:</b> Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	2	2	4	40	M	<p>Construction &amp; Operation Phase</p> <ul style="list-style-type: none"> <li>No temporary accommodation or temporary storage facilities may be setup within 100m of the any watercourse, including drainage lines and farm dams.</li> <li>No temporary facilities (including portable toilets) to be positioned within a 100m of the edge of any watercourses.</li> <li>Only existing roads to be used by vehicles during construction / set up phase as far as possible.</li> <li>Access roads to be maintained at all times.</li> <li>All construction material, equipment and any foreign objects brought into the area by contractors to be removed immediately after completion of the construction / set up phase.</li> <li>Proper rubbish/waste bins to be provided. These to be emptied weekly and the waste to be removed to an official waste disposal site.</li> </ul>	4	2	2	2	16	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<ul style="list-style-type: none"> <li>During the operation phase the gravel access roads need to be continually maintained. Storm water run-off and erosion of gravel access roads are important considerations, including damaged caused by heavy vehicles.</li> <li>A site-specific rehabilitation plan for the closure of the quarry has to be compiled and implemented.</li> </ul> <p>Maintenance phase</p> <ul style="list-style-type: none"> <li>A weed control programme must be implemented to monitor and destroy any weeds / alien plants brought into the area through project-related activities.</li> <li>All litter / rubbish in the area to be continually clean-up and removed from the area to proper landfill sites.</li> </ul>						
<b>HYDROCARBON SPILLAGES</b>														
Hydrocarbon spillage	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p> <p><b>Decommissioning Phase:</b> Sloping and</p>	6	3	2	3	27	L	<ul style="list-style-type: none"> <li>All heavy vehicles, excavators and generators used for the mining will be in good working condition.</li> <li>A drip tray will be available to place underneath haul vehicles while the vehicles are parked at night.</li> <li>Should a vehicle have a break down, it will be serviced immediately. If soil contamination with diesel and oils</li> </ul>	2	3	2	2	14	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
	Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area							<p>occurred, the spill will be cleared up promptly. If the spill is small, it will be cleaned with a spill kit. if the spill is large, a spill clean-up company will be used to clean-up the spill;</p> <ul style="list-style-type: none"> <li>Proper functioning of heavy vehicles will be ensured.</li> </ul>						
<b>ALIEN VEGETATION</b>														
Possible alien vegetation infestation	<p><b>Construction Phase:</b> Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p><b>Operational Phase:</b> Excavations, Stockpiling and Transporting of gravel material</p> <p><b>Decommissioning Phase:</b> Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	2	2	4	40	M	<ul style="list-style-type: none"> <li>Every 3 months casual labour will be employed to circumnavigate the site to hand pull out known alien vegetation that may have established in the disturbed area. Special attention will be given to the perimeter topsoil berm.</li> <li>Casual labour will be provided with photographs of the alien vegetation that could establish.</li> </ul>	4	2	2	2	16	L
<b>SANITATION FACILITIES</b>														
Provision and management of sanitation facilities	All phases	8	2	2	4	48	M	<ul style="list-style-type: none"> <li>Chemical toilet facilities shall preferably be used on site. The toilets shall be services every second week by a service provider.</li> </ul>	4	2	2	3	24	L

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		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
<b>HERITAGE, ARCHAEOLOGICAL AND PALEONTOLOGICAL ISSUES</b>														
Possible archaeological sites and graves to be affected	Construction phase	6	5	1	5	60	H	<ul style="list-style-type: none"> <li>If an artefact or grave on-site is uncovered, work in the immediate vicinity shall be stopped immediately and it should immediately be reported to a heritage consultant so that an investigation and evaluation of the finds can be made. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article.</li> <li>The South African Heritage Resources Agency (SAHRA) shall be contacted such that an archaeological/heritage resources consultant can be appointed to record the site and excavate if necessary. Work may only resume once clearance is given in writing by the archaeologist/heritage resources consultant.</li> </ul>	6	5	1	2	24	L
<b>SAFETY</b>														
Safety of sloped areas and safety of employees	All phases – employees Decommissioning phase – sloped areas	6	5	1	5	60	H	<ul style="list-style-type: none"> <li>Cutting terraces into the steep walls could prevent vertical surfaces. The quarry cannot be free draining as the existing excavations are up to 10m deep and cut into solid rock. Proper fencing around the quarry and clearly visible signage indicating a dangerous area shall be put into place.</li> </ul>	5	1	2	24	L	

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		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<ul style="list-style-type: none"> <li>The quarry will be mined in steps with at least the following end result: <ul style="list-style-type: none"> <li>A slope of 1:1.5;</li> <li>A 3 m wide step at every 10 m depth.</li> </ul> </li> <li>Appropriate safety clothing will be worn at all times i.e. head gear, shoes, ear plugs.</li> </ul>						