

A. Impact Rating: Construction		BMM Bioremediation site													
No.	ASPECT	IMPACT	WITHOUT MITIGATION						WITH MITIGATION						Short Description of Mitigation Measures
			Probability	Extent	Duration	Magnitude	Receiving Environment	Without Mitigation Score (Baseline)	Probability	Extent	Duration	Magnitude	Receiving Environment	With Mitigation Score (Impact Assessment)	
1	Botanical	Loss of vegetation	-1	-1	8	-1	-1	-1	-1	-1	-1	-1	-1	-1	<p>The biodiversity statement conducted (Appendix D) stated that the loss of vegetation is negligible as the area is previously disturbed with no vegetation growth. Work should remain with the demarcated area chosen for the bioremediation site.</p> <ul style="list-style-type: none"> Topsoil must be removed and stored separately for re-use for rehabilitation purposes. The topsoil and vegetation should be placed over the disturbed area to provide a source of seed bed to encourage re-growth of the species removed during construction/operation. Once construction is completed, all further movement must be confined to the access tracks to allow vegetation to re-establish over excavated areas. The BMM ECO must oversee compliance to mitigation measures for this project.
			-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
2	Heritage	Loss of archaeological/ paleontological resources	-1	-1	7	-1	-1	-1	-1	-1	-1	-1	-1	<p>A heritage impact assessment will still be conducted (Appendix D). It is very unlikely to be negligible that any heritage aspects will be affected at bioremediation site as the site is already disturbed. If any archaeological remains (i.e. fossil bones and shells, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts and bone remains, structures and other built features, rock art and rock engravings) are discovered during the construction/ operation phase, they must immediately be reported to SAHRA and must not be disturbed further until the necessary approval has been obtained from SAHRA.</p> <ul style="list-style-type: none"> Should any human remains/ burial or archaeological material be disturbed, exposed or discovered during construction/ operations, these should immediately be reported to the South African Heritage Resources Agency. The ECO and Engineer should also be informed. 	
3	Water	Contamination of freshwater eco systems from construction activities	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	<p>No large watercourses are in close proximity to the proposed site. Ensure dip trays are placed under stationary vehicles. No hazardous materials should be stored on site. Staff should be trained on spill response</p>	
4	Dust	Potential dust pollution from construction activities	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	<p>Dust will be monitored. If dust becomes a problem, dust will be controlled by means of water spray vehicles. No over watering of the mining area or roads surfaces should occur. Speed limits must be enforced in all areas to limit the levels of dust pollution. Max speed of 40km/h must be maintained. Under extreme windy conditions, work will be stopped</p>	

B Impact Rating: Operations		BMM Bioremediation site													
No.	ASPECT	IMPACT	WITHOUT MITIGATION					WITH MITIGATION					Short Description of Mitigation Measures		
			Probability	Extent	Duration	Magnitude	Receiving Environment	Without Mitigation Score (Baseline)	Probability	Extent	Duration	Magnitude		Receiving Environment	With Mitigation Score (Impact assessment)
1	Water	Contamination of freshwater ecosystems	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	No large watercourses are in close proximity to the proposed site. If leaching occurs the it will carry bacteria to eliminate the effect. Windrows should be located on 1000-micron lining to prevent leaching and vertical migration of hydrocarbons. The liner must be thick and durable to prevent leaching of any contaminants into the soil below.
2	Botanical	Soil contamination	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Contaminated soil should be handled with care when taken to the bioremediation site for treatment. Bioremediation of contaminated soil should only take place within the dedicated area. To prevent leaching of hydrocarbons and contaminating the soil below, windrows should be located on 1000-micron lining to prevent leaching and vertical migration of hydrocarbons.
2	Dust	Potential dust pollution	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Due to the anticipated moisture content of the soils contained within the windrows, it is considered unlikely that airborne dust generation will be a problem during soils turning operations. The addition of organic matter is known to promote soil moisture retention. • All operations will be visually monitored by Eco-Con staff, should significant airborne dust be generated, works will be suspended until appropriate control measures have been put into place. • Workers will be provided with suitable PPE • Under extreme windy conditions, work will be stopped.
3	Odours	Odours	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	The majority of odours will be released during the initial excavation of contaminated soil from storage to the bioremediation site and will last for a relatively short period. With regards to bioremediation works, some odour release may occur during the initial turning phases of the treatment. The addition of organic matter and bioremediation process tends to bind odours, which should mitigate against the generation of excessive odours. The location of the site is in an area of the mine, which is considered to be of low sensitivity with regards to odour generation.

C	Impact Rating: Rehabilitation Phase	BMM Bioremediation site	WITH MITIGATION												Short Description of Mitigation Measures
			WITHOUT MITIGATION						WITH MITIGATION						
No.	ASPECT	IMPACT	Probability	Extent	Duration	Magnitude	Receiving Environment	Without Mitigation Score (Baseline)	Probability	Extent	Duration	Magnitude	Receiving Environment	With Mitigation Score (Impact assessment)	
1	Dust	Dust emissions from placing topsoil	-2	-1	-1	-1	-1	-1.2	-1	-1	-1	-1	-1	-1	Topsoil will be removed from all areas where physical disturbance of the surface will occur, prior to the disturbance occurring. Dust will be monitored if dust becomes a problem, dust will be controlled by means of water spray vehicles or other practical means. No over-watering of the mining area or roads surfaces should occur. Under extreme windy conditions work will be stopped.
2	Botanical	Soil contamination from trucks and excavator/ TLB on site	-2	-1	-1	-2	-1	-1.4	-1	-1	-1	-1	-1	-1	The contractor should ensure drip trays are placed under stationary vehicles/ excavator/ TLB Spill kits must be available Workers should be trained how to use spill kits to rectify a spill immediately Records must be kept of any spills
		Bad topsoil management	-2	-1	-1	-1	-1	-1.2	-1	-1	-1	-1	-1	-1	Topsoil will be removed from all areas where physical disturbance of the surface will occur, prior to the disturbance occurring. Topsoil will be stockpiled separately and protected for site rehabilitation after the project is completed. A topsoil management plan must be agreed upon site start up meeting.