

Low There would be a no impact at all – not even a very low impact on the system or any of its parts.

2.3.2 Potential impact of each main activity in each phase, and corresponding significance assessment

Stripping and stockpiling of topsoil:

Visual intrusion associated with the establishment of the mining area

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	3	1	2.3	5	1	3	6.9

Dust nuisance caused by the disturbance of the soil.

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	1	1	1.3	4	2	3	3.9

Noise nuisance caused by machinery stripping and stockpiling the topsoil.

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	1	1	1.3	4	2	3	3.9

Infestation of the topsoil heaps by weeds or invader plants

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	3	1	2.3	4	2	3	6.9



Loss of topsoil due to incorrect storm water management

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	3	3.5	9.1

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	4	4	10.4

Blasting:

Health and safety risk posed by blasting activities

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	1	3	3	3	3	9

Dust nuisance caused by blasting activities

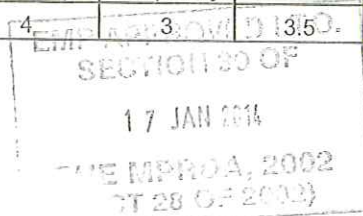
Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	2	3.3	5	3	4	13.2

Noise nuisance caused by blasting activities

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	4	3	13.5	10.5



Excavations:

Visual intrusion associated with the excavation activities

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	5	5	5	13

Dust nuisance due to excavation activities

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	5	4.5	11.7

Noise nuisance generated by excavation equipment

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	3	5	4	9.2

Contamination of surface or groundwater due to effluent runoff from excavation area

Rating: Medium – High

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	4	4	4	4	4	16

Unsafe working conditions for employees

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	1	3	4	5	4.5	13.5



Negative impact on the fauna and flora of the area

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	2	3	7.8

Potential damage to cultural or heritage aspects

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	5	1	3.3	1	1	1	3.3

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	5	4	4.5	11.7

Weed and invader plant infestation of the area

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	2	3	7.8

Crushing:

Dust nuisance due to the crushing activities

Rating: Medium – High

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	2	3.3	5	5	5	16.5

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MPRDA, 2002
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Noise nuisance generated by the crushing activities

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	5	5	5	13

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	2	3.3	4	4	4	13.2

Stockpiling and Transporting:

Visual intrusion associated with the stockpiled material and vehicles transporting the material

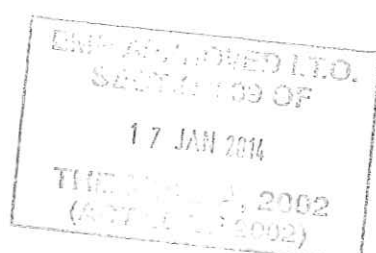
Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	2	3.3	4	5	4.5	14.9

Loss of material due to ineffective stormwater handling

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	3	3.5	9.1



Weed and invader plant infestation of the area due to the disturbance of the soil

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	2	3	7.8

Dust nuisance from stockpiled material and vehicles transporting the material

Rating: Medium - high

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	5	5	5	15

Degradation of access roads

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	4	5	4.5	13.5

Noise nuisance caused by vehicles

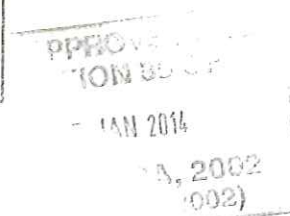
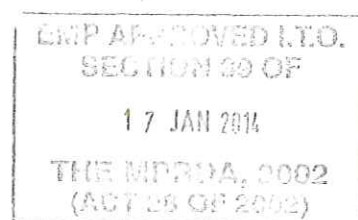
Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	4	5	4.5	13.5

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	4	3	3.5	10.5



Sloping and Landscaping:

Soil erosion

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	5	1	3.3	4	5	4.5	14.9

Health and safety risk posed by un-sloped areas

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	5	1	3.3	4	1	4	13.2

Dust nuisance caused during sloping and landscaping activities

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	2	3	7.8

Noise nuisance caused by machinery

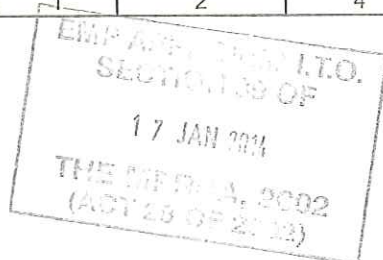
Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	2	1	2	4	2	3	6

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	2	1	2	4	2	3	6



Replacing the Topsoil and Re-Vegetating the Disturbed Area:

Loss of reinstated topsoil due to the absence of vegetation

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	3	1	2.3	4	1	4	9.2

Infestation of the area by weed and invader plants

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	5	1	3	4	2	3	9

2.3.3 Assessment of potential cumulative impacts.

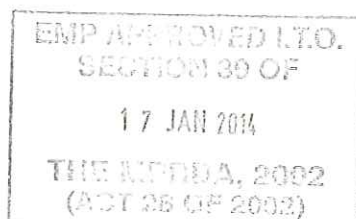
The proposed mining activity will entail the establishment of a mining area in a greenfield area not previously disturbed for mining activities. The disturbance of the natural areas must be contained within the boundaries of the site.

The cumulative impacts associated with the addition of mining as land use to the area was identified to be the following:

- Additional traffic on the local roads during construction and operational phases,
- The influx of people into the area during construction and operational phases,
- Additional water supply to the area.

Rating: Medium – High

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	5	5	5	15



The influx of people in the area during construction and operational phases

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	2	2.6	5	5	5	13

Additional water supply to the area

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	5	5	5	11.5

2.4 Proposed mitigation measures to minimise adverse impacts.

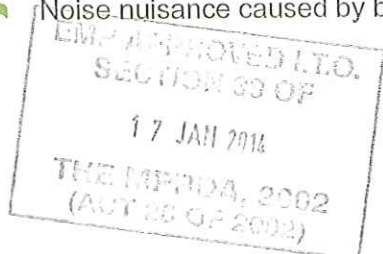
2.4.1 List of actions, activities, or processes that have sufficiently significant impacts to require mitigation.

Stripping and stockpiling of topsoil:

- Visual intrusion associated with the establishment of the mining area
- Dust nuisance caused by the disturbance of the soil
- Noise nuisance caused by machinery stripping and stockpiling the topsoil
- Infestation of the topsoil heaps by weed or invader plants
- Loss of topsoil due to incorrect storm water management
- Contamination of area with hydrocarbons or hazardous waste materials

Blasting:

- Health and safety risk posed by blasting activities
- Dust nuisance caused by blasting activities
- Noise nuisance caused by blasting activities



Excavations:

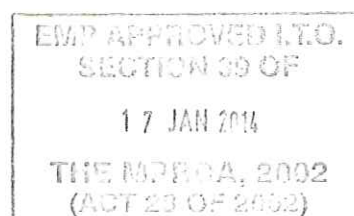
- Visual intrusion associated with the excavation activities
- Dust nuisance due to excavation activities
- Noise nuisance generated by excavation equipment
- Contamination of the area with hydrocarbons or hazardous waste materials
- Unsafe working conditions for employees
- Negative impact on the fauna and flora of the area
- Contamination of the area with hydrocarbons or hazardous waste materials
- Weed and invader plant infestation of the area

Crushing:

- Dust nuisance due to the crushing activities
- Noise nuisance generated by the crushing activities
- Contamination of the area with hydrocarbons or hazardous waste materials

Stockpiling and transporting:

- Visual intrusion associated with the stockpiled material and vehicles transporting the material
- Loss of material due to ineffective stormwater handling
- Weed and invader plant infestation of the area due to the disturbance of the soil
- Dust nuisance from the stockpiled material and vehicles transporting the material
- Degradation of access roads
- Noise nuisance caused by vehicles
- Contamination of area with hydrocarbons or hazardous waste materials



Sloping and landscaping:

- Soil erosion
- Health and safety risk posed by un-sloped areas
- Dust nuisance caused during sloping and landscaping activities
- Noise nuisance caused by machinery
- Contamination of area with hydrocarbons or hazardous waste materials

Replacing the Topsoil and Re-Vegetating the Disturbed Area:

- Loss of reinstated topsoil due to the absence of vegetation
- Infestation of the area by weed and invader plants

2.4.2 Concomitant list of appropriate technical or management options

(Chosen to modify, remedy, control or stop any action, activity, or process which will cause significant impacts on the environment, socio-economic conditions and historical and cultural aspects as identified. Attach detail of each technical or management option as appendices)

Visual Mitigation:

- The site needs to have a neat appearance and be kept in good condition at all times.
- Upon closure the site needs to be rehabilitated and sloped to insure that the visual impact on the aesthetic value of the area is kept to a minimum.

Dust Handling:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.
- The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust



- Roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.
- All stockpiles must thoroughly be soaked to ensure dust suppression on the site.

MANAGEMENT COST TO IMPLEMENT DUST SUPPRESSION MEASURES:

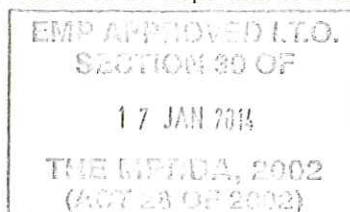
Noise Handling:

- The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.
- The type, duration and timing of the blasting procedures must be planned with due cognisance of other land users and structures in the vicinity. Surrounding land owners must be notified in writing prior blasting occasions,
- Noise mufflers and/or soft explosives could be used during blasting.

MANAGEMENT COST TO IMPLEMENT NOISE MANAGEMENT MEASURES:

Management of weed or invader plants:

- A weed and invader plant control management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of Conservation of Agricultural Act (Act No 43 1983).
- Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
 - "The plants can be uprooted, felled or cut off and can be destroyed completely."
 - "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide."
- The temporary topsoil stockpiles needs to be kept free of weeds.



MANAGEMENT COST TO IMPLEMENT WEED/INVADER PLANT CONTROL:

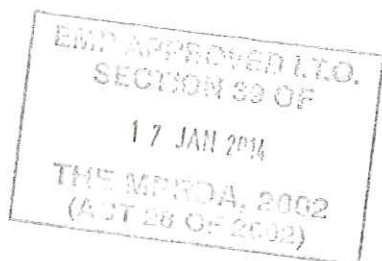
Stormwater Handling:

- Stormwater should be diverted around the topsoil heaps, stockpile areas and access roads to prevent erosion and loss of material.
- Runoff water should also be diverted around the stockpile areas with trenches and contour structures to prevent erosion of the work areas.
- Mining should be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water Affairs (DWA), and any other conditions which that Department may impose:
 - Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
 - Dirty water must be collected and contained in a system separate from the clean water system.
 - Dirty water must be prevented from spilling or seeping into clean water systems.
 - The storm water management plan must apply for the entire life cycle of the mine and over different hydrological cycles (rainfall patterns).
 - The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management plan.

MANAGEMENT COST TO IMPLEMENT STORMWATER HANDLING:

Management of Health and Safety Risks:

- The type, duration and timing of the blasting procedures should be planned with due cognisance of other land users and structures in the vicinity,
- The surrounding landowners and communities should be informed in writing ahead of any blasting event,

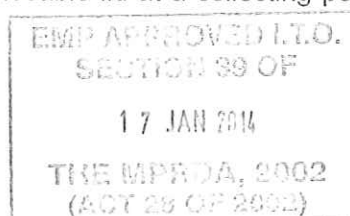


- Noise mufflers and/or soft explosives could be used during blasting to mitigate the noise impact on the surroundings,
 - Measures to limit flyrock should be taken,
 - Audible warning of a pending blast should be given at least 3 minutes in advance of the blast,
 - All flyrock (of diameter 150mm and larger) which falls beyond the working area, together with the rock spill should be collected and removed,
 - Workers should have access to the correct personal protection equipment (PPE) as required by law.
-
- All operations should comply with the Occupational Health and Safety Act.

MANAGEMENT COST TO MITIGATE HEALTH AND SAFETY RISKS:

Waste Management:

- No processing area or waste pile may be established within 100m of the edge of any river channel or other water bodies.
- Any vehicle repairs may only take place within the service bay area and all waste products must be disposed of in a 200 litre closed container/bin found inside the emergency service area.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility.
- Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognised facility.
- Suitable covered receptacles should be available at all times and conveniently placed for the disposal of waste.
- Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a closable lid at a collecting point and collected



on a regular basis and disposed of at a recognised landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.

- Biodegradable refuse generated should be handled as indicated above.

MANAGEMENT COST TO IMPLEMENT WASTE MANAGEMENT MEASURES:

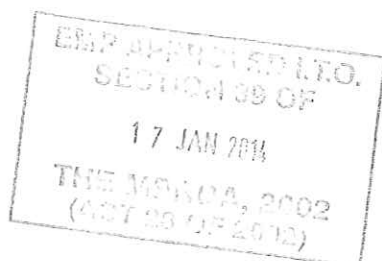
Management of Access Roads:

- Newly constructed access roads (if applicable) must be adequately maintained so as to minimise dust, erosion or undue surface damage.
- Storm water should be diverted around the access roads to prevent erosion.
- Erosion of access road: Vehicular movement must be restricted to existing access routes to prevent crisscrossing of tracks through undisturbed areas. Rutting and erosion of the access road caused as a result of the mining activities should be repaired by the applicant.

MANAGEMENT COST TO MANAGE ACCESS ROAD:

Topsoil Handling:

- Where applicable the first 300mm of topsoil should be removed in strips and stored at a demarcated and signposted stockpile area. Stockpiling of topsoil must be done to protect it from erosion, mixing with overburden or other material. The topsoil must be used to cover the rehabilitated area and improve the establishment of natural vegetation.
- The temporary topsoil stockpiles of each removed strip should be kept free of weeds.
- Topsoil stockpiles should be placed on a levelled area and measures should be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water.
- Topsoil heaps should not exceed 2m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.



- Storm- and runoff water should be diverted around the stockpile area and access roads to prevent erosion.

MANAGEMENT COST TO MANAGE TOPSOIL:

Cost covered under Management of Weed and Invader Plants and Stormwater Handling

Protection of fauna and flora:

- The site manager should ensure that no fauna is caught, killed, harmed, sold or played with.
- Workers should be instructed to report any animals that may be trapped in the working area.
- No snares may be set or nests raided for eggs or young.
- No plants or trees may be removed without the approval of the ECO.

2.4.3 Review the significance of the identified impacts (After bringing the proposed mitigation measures into consideration).

Stripping and stockpiling of topsoil:

Visual intrusion associated with the establishment of the mining area

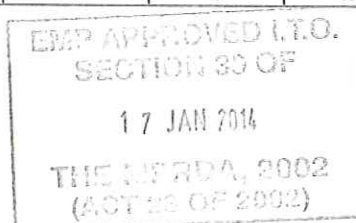
Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	3	1	2.3	5	1	3	6.9

Dust nuisance caused by the disturbance of the soil.

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	1	1	1.3	3	1	2	2.6



Noise nuisance caused by machinery stripping and stockpiling the topsoil.

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	1	1	1.3	2	2	2	2.6

Infestation of the topsoil heaps by weeds or invader plants

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	2	1	1.6	3	2	2.5	4

Loss of topsoil due to incorrect storm water management

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	2	2	2	4.6

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	1	1	1.6	3	2	2.5	4

Blasting:

Health and safety risk posed by blasting activities

Rating: Low – Medium



			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	1	3	2	2	2	6

Dust nuisance caused by blasting activities

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	2	3	5	3	4	12

Noise nuisance caused by blasting activities

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	2	2.6	3	3	3	7.8

Excavations:

Visual intrusion associated with the excavation activities

Rating: Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	4	5	4.5	10.4

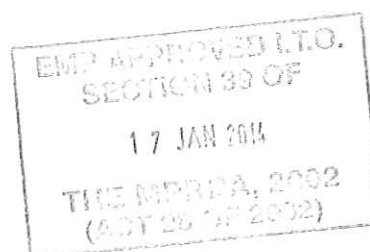
Dust nuisance due to excavation activities

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	3	3	3	6.9

Noise nuisance generated by excavation equipment

Rating: Low – Medium



			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	3	3	3	6.9

Contamination of surface or groundwater due to effluent runoff from excavation area

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	1	3	2	2	2	6

Unsafe working conditions for employees

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
4	4	1	3	2	2	2	6

Negative impact on the fauna and flora of the area

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	2	2	2	4.6

Potential damage to cultural or heritage aspects

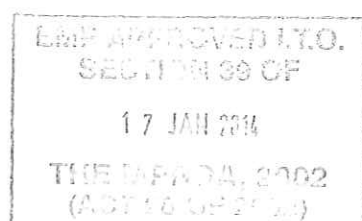
Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	5	1	3.3	1	1	1	3.3

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Low

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	3	3	3	4.8



Weed and invader plant infestation of the area

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	2	2	2	5.2

Crushing:

Dust nuisance due to the crushing activities

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	3	3	3	6.9

Noise nuisance generated by the crushing activities

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
2	4	1	2.3	3	2	2.5	5.8

Contamination of area with hydrocarbons or hazardous waste materials

Rating: Low – Medium

			Consequence			Likelihood	Significance
Severity	Duration	Extend		Probability	Frequency		
3	4	1	2.6	4	3	3.5	9.1

