

APPENDIX C: DETAILED ASSESSMENT OF POTENTIAL IMPACTS

Potential biophysical, cultural/heritage and socio-economic impacts were identified by SLR, specialists and I&APs. These impacts are discussed under the relevant headings in this section. It should be noted that cumulative impacts and latent impacts are discussed where relevant.

SLR's impact assessment methodology used to rate each impact is outlined in section 7.6. Where applicable, impacts have been considered both incrementally and cumulatively in the context of existing operations at the Wessels Mine.

The potential impacts are rated with the assumption that no management actions (which assumes that no consideration is given to the mitigation of environmental and social impacts) are applied and then again with management actions which is the mitigated scenario and represents the residual impact. In addition to this, the section below also provides a discussion on the impact significance of the proposed project activities within the context of the environment adjacent to the existing Shaft 16 Complex. A summary of the impact assessment is provided in chapter 9.

Management actions identified to prevent, reduce, control or remedy the assessed negative impacts, or enhance positive impacts are provided under the relevant impact discussions sections. Where impacts are considered to be insignificant, no management actions have been identified.

GEOLOGY

ISSUE: LOSS AND STERILISATION OF MINERAL RESOURCES

Mineral resources can be sterilised and/or lost through the placement of infrastructure and activities in close proximity to mineral resources. The proposed project will require excavations at a maximum depth of 2 m for earthwork excavations and piling for structures can be 40 m deep. The proposed railway balloon will be placed primarily on the surface. No existing ore bodies or current underground mining activities will be affected. It follows that the proposed project will not result in the sterilisation of any mineral reserves. This impact has therefore been rated as being **INSIGNIFICANT** and has not been assessed further.

TOPOGRAPHY

ISSUE: ALTERING TOPOGRAPHY

The extension of the railway infrastructure will alter the natural topography of the area and cannot be mitigated. It is important to note that the natural topography of the project area has already been disturbed as a result of existing mining infrastructure at the Wessels Mine. It follows that any potential alteration of topography is expected to be negligible. This impact has therefore been rated as being **INSIGNIFICANT**; however, the management actions outlined below are required to ensure this rating is achieved.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks 		<ul style="list-style-type: none"> • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

MANAGEMENT OBJECTIVES

The objective is to minimise changes to natural topography.

MANAGEMENT OUTCOMES

The outcome is to limit the alteration of topography during the proposed project through rehabilitation.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Minimise the area of disturbance by designing and constructing the most compact infrastructure practically possible; and
- Rehabilitate in accordance with the approved mine closure plan that ensures a suitable post-closure land use is achieved.

ISSUE: HAZARDOUS EXCAVATIONS AND INFRASTRUCTURE RESULTING IN SAFETY RISKS TO THIRD PARTIES AND ANIMALS

Hazardous excavations and infrastructure include all structures into, or off which third parties and animals can fall and be harmed. During the construction phase of the proposed project, excavations may be required for trenches, foundations and localised stormwater controls (diversion channels), hereby creating the potential for safety risks. Further detail is provided below.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks 			

DISCUSSION

Intensity: The proposed project is located on several farm portions, the majority of which is located within disturbed areas (existing mining operations) but also on undisturbed areas (eastern-most section of the railway balloon). The proposed project will cover a maximum area of 10 ha. Gravel farm and access roads are located adjacent to the site (eastern-most section of the railway balloon). In this regard, third parties and animals have access to the site. In the absence of access control to the site and management measures to ensure that the land is safe, the excavations required as part of the proposed project have the potential to cause injury or death to people and animals (free roaming livestock and other wild fauna). In the unmitigated scenario the intensity is rated as **Medium**. This will be reduced to **VERY LOW** with mitigation.

Duration: The impact of death or injury is permanent and therefore the duration in both the mitigated and unmitigated scenario is rated as **VERY HIGH**.

Extent: The impact of soil erosion is localised because the risk occurs where vegetation is removed. However; the impact can extend beyond the site boundary if it is not mitigated, therefore the impact is rated as **Low** and **VERY LOW**, in the unmitigated and mitigated scenario.

Consequence: The consequence is **High** in the unmitigated scenario and reduces to **LOW** with mitigation.

Probability: In the unmitigated scenario, the project components with uncontrolled access and towards the eastern-most section of the proposed project area (close to farmland) may cause possible loss or injury to third parties or animals, rated as **Medium**, due primarily to the low population density in the area. Mitigation measures aimed at making the land safe and controlling access may cause improbable loss or injury, therefore rated as **VERY LOW**.

Significance: In the unmitigated scenario, the significance of this potential impact is **Medium**. In the mitigated scenario, the significance of the impact is reduced to **INSIGNIFICANT**.

ISSUE: HAZARDOUS EXCAVATIONS AND INFRASTRUCTURE RESULTING IN SAFETY RISKS TO THIRD PARTIES AND ANIMALS		
CONSTRUCTION PHASE		
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	VERY LOW
Duration	Very High	VERY HIGH
Extent	Medium	MEDIUM
Consequence	High	LOW
Probability	Medium	VERY LOW
Significance	Medium	INSIGNIFICANT
Nature of cumulative impacts	No cumulative impacts have been identified.	
Degree to which impact can be reversed	Unlikely in the event of death and injury	
Degree to which impact can be avoided	High with mitigation	
Degree to which impact may cause irreplaceable loss	Very High in the event of death and injury	
Degree to which impact can be mitigated	Very High	

MANAGEMENT OBJECTIVES

The objective is to prevent physical harm to third parties and animals resulting from potentially hazardous excavations and infrastructure.

MANAGEMENT OUTCOMES

The outcome is to ensure no third parties or animals are harmed during the proposed project.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- The project area will be fenced off to prevent inadvertent access by third parties and animals;
- Access control will be implemented to ensure access is only granted to those who have authorisation;
- Barriers will be erected around all hazardous excavations;
- Warning signage will be erected at all hazardous excavations;
- Where the proposed project has caused injury to third parties or animals, appropriate compensation will be provided;
- Care must be taken to ensure that third-party infrastructure, such as telephone lines, etc. are not damaged during the construction phase; and
- Notification of the commencement of the construction phase must be provided to Mvelaphande Trading two weeks in advance.

SOILS AND LAND CAPABILITY

ISSUE: SOIL EROSION

The proposed project occupies an area of 10 ha located adjacent to the existing Wessels Mine. The soil resources in the majority of the project footprint have already been influenced by anthropogenic activities (mining operations) to the extent that only minimal floral communities exist. Towards the eastern-most section of the project footprint, the land is undisturbed, except for gravel and access roads used by farmers. During all phases of development, the proposed project presents a risk for soil erosion. Further detail is provided below.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems 	<ul style="list-style-type: none"> • Transport systems • General site management 	<ul style="list-style-type: none"> • Demolition • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

DISCUSSION

Intensity: The proposed project is located on several farm portions, the majority of which is located within disturbed areas (existing mining operations) but also on undisturbed areas (eastern-most section of the railway balloon). The proposed project will cover a maximum area of 10 ha. Gravel farm and access roads are located adjacent to the site (eastern-most section of the railway balloon). Soil erosion is a measurable deterioration that will occur through vegetation removal from the soil surface. Given that soil erosion has the potential to cause indirect impacts, the intensity is rated as **High** and **MEDIUM** in the unmitigated and mitigated scenarios, respectively.

Duration: The impact is permanent and therefore the duration in both the mitigated and unmitigated scenarios is rated as **VERY HIGH**.

Extent: The impact of soil erosion is localised because the risk occurs within the site boundary; however, the spatial scale may extend beyond the site boundary if unmitigated. Therefore, the extent is rated as **Low** and **VERY LOW**, in the unmitigated and mitigated scenarios, respectively.

Consequence: The consequence is **High** in the unmitigated scenario and reduces to **MEDIUM** with mitigation.

Probability: In both the unmitigated and mitigated scenarios, the proposed project may cause probable soil erosion, rated as **High**.

Significance: In the unmitigated scenario, the significance of this potential impact is **High**. In the mitigated scenario, the significance of the impact is reduced to **MEDIUM**.

ISSUE: SOIL EROSION		
CONSTRUCTION PHASE		
Criteria	Without Mitigation	With Mitigation
Intensity	High	MEDIUM
Duration	Very High	VERY HIGH
Extent	Low	VERY LOW
Consequence	High	MEDIUM
Probability	High	HIGH
Significance	High	MEDIUM
Nature of cumulative impacts	No cumulative impacts have been identified.	
Degree to which impact can be reversed	Unlikely where vegetation has been removed, highly likely beyond the project footprint.	
Degree to which impact can be avoided	Unlikely where vegetation has been removed, highly likely beyond the project footprint.	
Degree to which impact may cause irreplaceable loss	Highly unlikely	
Degree to which impact can be mitigated	High	

MANAGEMENT OBJECTIVES

The objective is to minimise the loss of soil resources and related land capability from soil erosion.

MANAGEMENT OUTCOMES

The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Implement the soil conservation procedure as set out in Table 26-3;
- Establish short term perennial vegetation that will stabilise the site but allow the indigenous vegetation to establish over the site;

- Ensure vegetation clearing is undertaken in phases, so as to limit the potential for erosion;
- Use existing established roads;
- Limit vegetation clearance to only the areas where the infrastructure will be constructed;
- Avoid parking of vehicles and equipment outside of designated parking areas;
- Plan vegetation clearance for dry seasons (late autumn, winter and early spring); and
- Re-establish vegetation along the railway infrastructure to reduce the impact of run-off from the compacted surface of the railway area.

ISSUE: DISTURBANCE OF ORIGINAL SOIL PROFILES

The proposed project occupies an area of 10 ha located adjacent to the existing Wessels Mine. The soil resources in the majority of the project footprint have already been influenced by anthropogenic activities (mining operations) to the extent that only minimal floral communities exist. Towards the eastern-most section of the project footprint, the land is undisturbed, except for gravel and access roads used by farmers. During all phases of development, the proposed project presents a risk for original soil profiles to be disturbed, particularly during the construction and through activities such as earthworks (stripping of soils). Further detail is provided below.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems 	<ul style="list-style-type: none"> • Transport systems • General site management 	<ul style="list-style-type: none"> • Demolition • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

DISCUSSION

Intensity: The proposed project is located on several farm portions, the majority of which is located within disturbed areas (existing mining operations) but also on undisturbed areas (eastern-most section of the railway balloon). The proposed project will cover a maximum area of 10 ha. Gravel farm and access roads are located adjacent to the site (eastern-most section of the railway balloon). In this regard, the disturbance of original soil profiles if of an intensity is rated as **Low** and **VERY LOW** in the unmitigated and unmitigated scenarios, respectively.

Duration: The impact is permanent and therefore the duration in both the mitigated and unmitigated scenarios is rated as **VERY HIGH**.

Extent: The impact of original soil profile disturbance is localised because the risk occurs within the site boundary; however, the spatial scale may extend beyond the site boundary if unmitigated. Therefore, the extent is rated as **Low** and **VERY LOW**, in the unmitigated and mitigated scenarios, respectively.

Consequence: The consequence is **Medium** in the unmitigated scenario and reduces to **LOW** with mitigation.

Probability: In the unmitigated scenario, the proposed project may cause probable original soil profile disturbance, rated as **High**. Mitigation measures aimed at controlling original soil profile disturbance may lead to conceivable disturbance, therefore rated as **LOW**.

Significance: In the unmitigated scenario, the significance of this potential impact is **Medium**. In the mitigated scenario, the significance of the impact is reduced to **VERY LOW**.

ISSUE: DISTURBANCE OF ORIGINAL SOIL PROFILES		
CONSTRUCTION PHASE		
Criteria	Without Mitigation	With Mitigation
Intensity	Low	VERY LOW
Duration	Very High	VERY HIGH
Extent	Low	VERY LOW
Consequence	Medium	LOW
Probability	High	LOW
Significance	Medium	VERY LOW
Nature of cumulative impacts	No cumulative impacts have been identified.	
Degree to which impact can be reversed	Unlikely where vegetation has been removed, highly likely beyond the project footprint.	
Degree to which impact can be avoided	Unlikely where vegetation has been removed, highly likely beyond the project footprint.	
Degree to which impact may cause irreplaceable loss	Highly unlikely	
Degree to which impact can be mitigated	High	

MANAGEMENT OBJECTIVES

The objective is to minimise the loss of soil resources and related land capability from physical disturbance and compaction.

MANAGEMENT OUTCOMES

The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Land clearance must only be undertaken immediately prior to construction activities within the development footprint; and
- Level any remaining topsoil that was removed from the railway area and that remained on the surface instead of allowing small stockpiled of soil to remain on the surface.

ISSUE: CHEMICAL POLLUTION OF SOILS

The proposed project occupies an area of 10 ha located adjacent to the existing Wessels Mine. During construction, the proposed project presents a risk for soil pollution. Further detail is provided below.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems 	<ul style="list-style-type: none"> • Transport systems • General site management 	<ul style="list-style-type: none"> • Demolition • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

DISCUSSION

Intensity: The construction phase of the proposed project is limited to 15 months. During this period, the proposed project presents the potential for soil chemical pollution because of potential oil and fuel spillages from vehicles. This impact will also be a risk during other phases of development, but less likely. The pollution of soils is considered to be a low deterioration of the soil resource, therefore the intensity is rated as **LOW** in both the unmitigated and mitigated scenarios.

Duration: The impact is permanent and therefore the duration in both the mitigated and unmitigated scenarios is rated as **VERY HIGH**.

Extent: The impact of soil chemical pollution is localised because the risk occurs within the site boundary; however, the spatial scale may extend beyond the site boundary if unmitigated. Therefore, the extent is rated as **Low** and **VERY LOW**, in the unmitigated and mitigated scenarios, respectively.

Consequence: The consequence is **Medium** in both the unmitigated and mitigated scenarios.

Probability: In the unmitigated scenario, the proposed project may cause probable soil chemical pollution, rated as **High**. Mitigation measures aimed at controlling soil chemical pollution may cause improbable pollution, therefore rated as **VERY LOW**.

Significance: In the unmitigated scenario, the significance of this potential impact is **Medium**. In the mitigated scenario, the significance of the impact is reduced to **VERY LOW**.

ISSUE: CHEMICAL POLLUTION OF SOILS		
CONSTRUCTION PHASE		
Criteria	Without Mitigation	With Mitigation
Intensity	Low	LOW
Duration	Very High	VERY HIGH
Extent	Low	VERY LOW
Consequence	Medium	MEDIUM
Probability	High	VERY LOW
Significance	Medium	VERY LOW

Nature of cumulative impacts	No cumulative impacts have been identified.
Degree to which impact can be reversed	Highly likely with remediation.
Degree to which impact can be avoided	Highly likely with mitigation.
Degree to which impact may cause irreplaceable loss	Highly unlikely
Degree to which impact can be mitigated	High

MANAGEMENT OBJECTIVES

The objective is to minimise the loss of soil resources and related land capability from soil chemical pollution.

MANAGEMENT OUTCOMES

The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Conduct potentially polluting activities (i.e., loading, hauling, tipping, transportation, handling and storage) in a manner that pollutants are contained at source and do not pollute soils. In this regard:
 - Service all vehicles and mobile equipment regularly in workshops, service bays and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps;
 - Design and operate all new and used chemical, fuel and oil storage and handling facilities in a manner that all spillages are contained in impermeable areas and cannot be released into the environment;
 - Report ad hoc spills of potentially polluting substances (whether in dirty areas or in the environment) to the environmental manager immediately and clean up and/or remediate immediately;
 - Implement and maintain a dirty water management system;
 - Implement the waste management practices, as set out in Table 26-2;
 - Educate and train all employees (temporary and permanent) and contractors in pollution prevention; and
 - Implement formalised action plans to enable fast and efficient reaction to contain and remediate pollution incidents.
- Take into account the requirements for long term soil pollution prevention, land function and confirmatory monitoring in the design of any permanent and potentially polluting structures.

BIODIVERSITY

ISSUE: PHYSICAL DESTRUCTION AND DISTURBANCE OF FLORAL SPECIES

The extension of the railway infrastructure has the potential to destroy and disturb floral species in the project footprint and surrounding area. These impacts may be realised in the construction, operation, decommissioning and closure phases of the proposed project. Further detail is provided below.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site management 	<ul style="list-style-type: none"> • Transport systems • General site management 	<ul style="list-style-type: none"> • Transport systems • Demolition • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

DISCUSSION

Intensity: The proposed project will entail the clearance of approximately 10 ha of indigenous vegetation. Habitat units identified within the project footprint are considered representative of the Kathu Bushveld vegetation type (except the Transformed Areas) in terms of structure and function; however, the habitat units are not considered a unique landscape, as it is well-represented at a regional level. Four protected species were identified within the project footprint, namely *Vachellia erioloba* (protected as per the NFA), *Vachellia haematoxylon* (protected as per the NFA), *Harpagophytum procumbens* (protected as per the NCNCA and NEM: BA); and *Boophone disticha* (protected as per NCNCA). In the unmitigated scenario the intensity is rated as **Medium**. This will be reduced to **LOW** with mitigation.

Duration: In both the unmitigated and mitigated scenarios, the impact on floral species and related functionality is short term and will be limited to the construction phase, therefore rated as **LOW**.

Extent: Biodiversity processes are generally not confined to the project site and will extend beyond this boundary. In the unmitigated scenario, the impact is more likely to be extended, therefore rated as **Medium**. In the mitigated scenario, impacts can be managed so as to localise it, therefore reducing the rating to **LOW**.

Consequence: The consequence is **Medium** in the unmitigated scenario and reduces to **LOW** with mitigation.

Probability: Given that land clearing activities will have to be undertaken as part of the proposed project, the probability of the impact is definite in both the unmitigated and mitigated scenario, thus a rating of **VERY HIGH**.

Significance: In the unmitigated scenario, the significance of this potential impact is **Medium**. In the mitigated scenario, the significance of the impact is reduced to **LOW**.

ISSUE: PHYSICAL DESTRUCTION AND DISTURBANCE TO FLORAL SPECIES		
CONSTRUCTION, OPERATION, DECOMMISSIONING AND CLOSURE PHASES		
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	LOW
Duration	Low	LOW
Extent	Medium	LOW
Consequence	Medium	LOW
Probability	Very High	VERY HIGH
Significance	Medium	LOW
Nature of cumulative impacts	The greatest threat to the floral ecology within the project area and broader region is the ongoing expansion of anthropogenic developments (mining activities etc.). The proposed project will add to the overall loss of habitat and habitat fragmentation.	
Degree to which impact can be reversed	Medium	
Degree to which impact can be avoided	Medium	
Degree to which impact may cause irreplaceable loss	Low	
Degree to which impact can be mitigated	Very High	

MANAGEMENT OBJECTIVES

The objective is to prevent the unacceptable loss and disturbance to floral species, and to prevent the proliferation of alien invasive species within and surrounding the project area.

MANAGEMENT OUTCOMES

The outcome is to prevent the spread of alien species in the project area, as well as to limit disturbance as far as practically possible.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- A biodiversity specialist will do a walkdown of the project footprint prior to land clearing activities to identify protected floral species and floral SCC that may have been lying dormant during initial field observations;
- Should any protected floral species and floral SCC be located on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal, they are to be relocated and the relocation success of such species should be monitored for three years post-construction. Immediate actions are to be taken if it becomes evident that relocation is not successful;
- Ensure the removal of indigenous vegetation is restricted to what is absolutely necessary;
- No collection of floral species and floral SCC is allowed;
- No fires are allowed on site;
- Limit edge effects to the surrounding environment by:
 - Demarcating all footprint areas during construction

- Preventing construction rubble or cleared alien and invasive species to be disposed outside of demarcated areas;
- Ensuring that construction rubble and cleared alien and invasive species are taken to a registered waste disposal facility; and
- Managing the spread of alien and invasive species.
- Provide appropriate sanitary facilities and ensure the disposal thereof at a registered licenced facility;
- Ensure no temporary dump sites are created on site;
- Compile an alien invasive species management or control plan for implementation with the following recommendations:
 - A buffer area of 30 m surrounding the railway loop must be monitored continuously for alien invasive species;
 - Remove alien invasive species throughout the construction, operation and maintenance phases;
 - Ensure alien vegetation is removed prior to the removal of indigenous vegetation;
 - Ensure only trained personnel are involved in the chemical control of alien invasive species;
 - Edge effects arising from the proposed project which may affect adjacent areas must be strictly managed;
 - Ongoing alien invasive species monitoring must be undertaken throughout all phases; and
 - Removed alien invasive species must not be placed on unprotected ground as seeds may disperse upon it. All cleared alien invasive species must be disposed of at a licenced waste facility.

ISSUE: PHYSICAL DESTRUCTION AND DISTURBANCE OF FAUNAL SPECIES

The extension of the railway infrastructure has the potential to destroy and disturb faunal species in the project footprint. These impacts may be realised in the construction, operation, decommissioning and closure phases of the proposed project. Further detail is provided below.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> ● Site preparation ● Civil works ● Earthworks ● Transport systems ● General site management 	<ul style="list-style-type: none"> ● Transport systems ● General site management 	<ul style="list-style-type: none"> ● Transport systems ● Demolition ● Rehabilitation 	<ul style="list-style-type: none"> ● Maintenance and aftercare

DISCUSSION

Intensity: The proposed project is expected to have a limited impact on faunal communities. Anthropogenic activities, as well as historic grazing in the local area have resulted in a decline of habitats associated with the project footprint. In particular, overgrazing has led to a decline in more favourable and palatable herbaceous species, impacting on food availability for fauna in the surrounding area. Increased human

presence in the area has further led to a decline of larger mammal species due to increased levels of persecution (snaring/hunting) and competition for space. Due to the arid nature of the environment, food and water resources are not as readily available for fauna. The proposed project will result in localised faunal habitat loss; however, the project footprint is only associated with a moderate diversity of faunal species, dominated by species that are common to the region. No protected faunal species or faunal SCC were located on site and whilst they may occur in the region, they are unlikely to be wholly reliant on the affected project area. For these reasons, in the unmitigated scenario the intensity is rated as **Medium**. This will be reduced to **LOW** with mitigation.

Duration: In both the unmitigated and mitigated scenarios, the impact on faunal species and related functionality is short term and will be limited to the construction phase, therefore rated as **LOW**.

Extent: Biodiversity processes are generally not confined to the project site and will extend beyond this boundary. In the unmitigated scenario, the impact is more likely to be extended, therefore rated as **Medium**. In the mitigated scenario, impacts can be managed so as to localise it, therefore reducing the rating to **LOW**.

Consequence: The consequence is **Medium** in the unmitigated scenario and reduces to **LOW** with mitigation.

Probability: Given that land clearing activities will have to be undertaken as part of the proposed project, which will impact faunal species, the probability of the impact is definite in both the unmitigated and mitigated scenario, thus a rating of **VERY HIGH**.

Significance: In the unmitigated scenario, the significance of this potential impact is **Medium**. In the mitigated scenario, the significance of the impact is reduced to **LOW**.

ISSUE: PHYSICAL DESTRUCTION AND DISTURBANCE TO FLORAL SPECIES		
CONSTRUCTION, OPERATION, DECOMMISSIONING AND CLOSURE PHASES		
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	LOW
Duration	Low	LOW
Extent	Medium	LOW
Consequence	Medium	LOW
Probability	Very High	VERY HIGH
Significance	Medium	LOW
Nature of cumulative impacts	The proposed project will result in the clearance of vegetated areas, which will lead to further isolation and displacement of faunal species within the local area.	
Degree to which impact can be reversed	Medium	
Degree to which impact can be avoided	Medium	
Degree to which impact may cause irreplaceable loss	Low	

Degree to which impact can be mitigated	Very High
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MANAGEMENT OBJECTIVES

The objective is to prevent the unacceptable destruction and disturbance to faunal species.

MANAGEMENT OUTCOMES

The outcome is to ensure that no faunal species are harmed or disturbed in the project area.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- A biodiversity specialist shall do a walkdown of the project footprint prior to land clearing activities to identify faunal species on site and to assist with the relocation thereof;
- It is recommended that culverts of sufficient size be placed beneath the railway line so as to allow for the movement of small faunal species between the remaining habitat inside the railway loop and that of the larger habitat outside. Culverts must be regularly inspected for infilling and blockages, ensuring they are kept clear and open;
- No collection, trapping and harming of faunal species and faunal SCC is allowed;
- While no protected faunal species were identified on site, if any species are encountered on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal/relocation;
- Smaller species that are not readily able to move out of an area ahead of vegetation and ground clearing activities (such as scorpions and reptiles), will be less mobile during rainfall events and cold days. As such, care must be taken to look for these species prior to these activities and should these species be encountered, they are to be carefully and safely moved to an area of similar habitat outside of the project footprint. A suitably trained specialist shall be instructed to carry out the removal of venomous snake species;
- Perimeter fencing installed as part of the project must allow for the movement of small animals (e.g., palisade fencing or cattle fencing). Should impermeable fencing be installed, small openings must be created to allow for the continuous movement of small animals. Such openings must be continuously monitored and cleared of debris;
- Construction personnel are to undergo environmental awareness training pertaining to the potential faunal species located on site.

SURFACE WATER RESOURCES

ISSUE: ALTERATION OF NATURAL DRAINAGE PATTERNS

Surface water resources include drainage lines and paths of preferential flow of stormwater runoff. Due to the relatively flat topography and relatively low rainfall within the broader area, any potential loss of runoff to the catchment is expected to be negligible. This impact has therefore been rated as being **INSIGNIFICANT** and is not assessed any further.

ISSUE: CONTAMINATION OF SURFACE WATER RESOURCES

The proposed project presents a potential for long-term contamination through accidental spills and leaks from trucks, plant, equipment and vehicles during all phases of the project. At elevated pollution concentrations, these contaminants can be harmful; however, it is important to note that the proposed

project does not present sources of contaminants that differ from those at the existing railway. Furthermore, the closest surface water resources, the Ga-Mogara and Kuruman Rivers, are non-perennial and are located approximately 13 km east and 4.7 km north-east of the Wessels Mine, respectively. No other drainage line or wetlands have been identified within or in close proximity to the Wessels Mine and project footprint. For these reasons, the impact has been rated as being **INSIGNIFICANT** and has not been assessed further.

GROUNDWATER RESOURCES

ISSUE: CONTAMINATION OF GROUNDWATER RESOURCES

Groundwater is a valuable resource and is defined as water which is located beneath the ground surface in soil/rock pore spaces and in the fractures of lithological formations. The proposed project presents a potential for long-term contamination through accidental spills and leaks from trucks, plant, equipment and vehicles, that may seep into the ground and affect groundwater resources. This potential exists during all phases of the project. At elevated pollution concentrations, these contaminants can be harmful; however, it is important to note that the proposed project does not present sources of contaminants that differ from those at the existing railway line. This impact has been rated as being **INSIGNIFICANT**; however, the management actions, as outlined in the previous section, are required to ensure this rating is achieved.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site management 	<ul style="list-style-type: none"> • Transport systems • General site management 	<ul style="list-style-type: none"> • Transport systems • Demolition • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

MANAGEMENT OBJECTIVES

The objective is to prevent pollution of groundwater resources.

MANAGEMENT OUTCOMES

The outcome is to ensure that groundwater quality remains within acceptable limits for both domestic and agricultural purposes.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Implement approved management actions pertaining to the containment of dirty water in accordance with Regulation 704 (June 1999);
- Any sheet runoff from compacted areas must be slowed down by the strategic placement of berms; and
- Control stormwater through the implementation of HMM’s existing Stormwater Management Plan.

AIR QUALITY

ISSUE: AIR POLLUTION

The proposed project presents a number of sources that can have a negative impact on the ambient air quality and surrounding land uses in all phases of development. Sources include clearing of vegetation, materials handling, wind erosion from stockpiles and disturbed areas, as well as vehicle tailpipe emissions from vehicles from construction vehicles. The afore-mentioned activities will be limited in time and extent, i.e., to the project area and to the construction phase (15 months). During operation, the proposed project does not present sources of contaminants that differ from those at the existing railway line. In this regard, any potential impact to air quality is expected to be negligible. This impact has therefore been rated as being **INSIGNIFICANT**; however, the management actions, as outlined below are required to ensure this rating is achieved.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site management 	<ul style="list-style-type: none"> • Transport systems • General site management 	<ul style="list-style-type: none"> • Transport systems • Demolition • Rehabilitation 	<ul style="list-style-type: none"> • Maintenance and aftercare

MANAGEMENT OBJECTIVES

The objective is to prevent air pollution health impacts.

MANAGEMENT OUTCOMES

The outcome is to ensure that any pollutants emitted as a result of the proposed project remains within acceptable limits so as to prevent health-related impacts.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Continue the implementation of HMM’s dust fallout monitoring programme;
- Reduce vehicle exhaust emissions through the use of better-quality diesel;
- Implement inspection and maintenance programmes; and
- Implement dust suppression measures (wet and dry) to limit dust impacts.

NOISE

ISSUE: INCREASE IN DISTURBING NOISE LEVELS

Mining activities and infrastructure have the potential to cause an increase in ambient noise levels that may cause a disturbance to nearby sensitive receptors. The noise-generating activities associated with the proposed project is limited in time and extent, i.e., to the project area and to the construction phase (15 months). During operation, the proposed project does not present additional sources of noise-generating activities that differ from those at the Wessels Mine i.e., movement of vehicles, access control,

etc. In this regard, any potential impact to the environment in terms of noise impacts is expected to be negligible. This impact has therefore been rated as being **INSIGNIFICANT** and has not been assessed further. In the unlikely event of a noise-related complaint, it would need to be investigated by HMM.

VISUAL

ISSUE: NEGATIVE VISUAL VIEWS

Mining activities and infrastructure have the potential to alter the landscape character of an area through the establishment of infrastructure. The railway balloon will be established adjacent to the existing Wessels Mine. The nearest sensitive receptor is the town of Black Rock, and the provincial R380 main access road used to gain access to the mine and the gravel and access roads used by adjacent farmers. The proposed project is unlikely to generate additional negative views that will be noticeable, in the context of the environment, already characterised by mining operations and related infrastructure. This impact has therefore been rated as being **INSIGNIFICANT** and has not been assessed further.

TRAFFIC

ISSUE: ROAD DISTURBANCE AND TRAFFIC SAFETY

Traffic from mining projects has the potential to affect the capacity of existing road networks, as well as result in public road safety issues. The proposed project will require the movement of heavy vehicles and an increase in the traffic in the project area during the construction phase. Due to the nature and limited scale and extent of the proposed project, the impact to the towns of Black Rock and Hotazel is expected to be limited. In contrast, the extension of the railway infrastructure is expected to decrease the impact on the surrounding road network as the proposed project will improve the efficiency of the railway infrastructure, hereby reducing the reliance of heavy vehicles to move ore, via road. This impact has therefore been rated as being **INSIGNIFICANT** and has not been assessed further.

CULTURAL/HERITAGE AND PALEONTOLOGICAL RESOURCES

ISSUE: LOSS OF CULTURAL/HERITAGE AND PALEONTOLOGICAL RESOURCES

Mining infrastructure has the potential to impact on cultural/heritage and paleontological resources through the placement of infrastructure and physical disturbance. No cultural/heritage resources have been identified within the project footprint. Moreover, due to the underlying geology of the area (refer to section 7.4.1.1), no palaeontological resources are expected. This impact has been rated as being **INSIGNIFICANT**; however, the management actions outlined below are required to in the event of a chance find.

MINE PHASE AND LINK TO PROJECT-SPECIFIC ACTIVITIES/INFRASTRUCTURE

Construction	Operation	Decommissioning	Closure
<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks 			

MANAGEMENT OBJECTIVES

The objective is to minimise the disturbance of cultural/heritage and palaeontological resources.

MANAGEMENT OUTCOMES

The outcome is to protect heritage resources where possible. If disturbance is unavoidable, then mitigate impact in consultation with a specialist and the SAHRA and in line with regulatory requirements.

MANAGEMENT ACTIONS

The following management actions will be implemented to manage the impact:

- Implement the chance find procedure (see Table 10-1) in the event of the discovery of cultural/heritage and/or palaeontological resources on site.

SOCIO-ECONOMIC

ISSUE: INWARD MIGRATION AND ECONOMIC IMPACT

Mines tend to bring with them an expectation of employment in all project phases prior to closure. This expectation can lead to the influx of job seekers to an area which in turn increases pressure on existing communities, housing, basic service delivery and raises concerns around safety and security. The proposed project is located within and adjacent to the existing Wessels Mine and will result in a limited number, of short-term employment opportunities through usage of registered community vendors during construction. It follows that negative inward migration, which could place additional pressure on housing and municipal services, is not expected to occur. A positive economic impact is expected on the local and regional economies; however, to the limited nature and extent, this impact is considered to be negligible. This impact has therefore been rated as being **INSIGNIFICANT** and has not been assessed further.

ISSUE: CHANGE IN LAND USE

Mining-related activities have the potential to affect land uses both within the mine area and in the surrounding areas. This can be caused by physical land transformation and through direct or secondary impacts. The land on which the project footprint is located was used historically for grazing. This impact has therefore been rated as being **INSIGNIFICANT** and has not been assessed further.