

IMPACT DESCRIPTION		PRE - MITIGATION							POST - MITIGATION								IMPACT PRIORITISATION					
Impact	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Concern by I&AP during origina EA	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	
Interference with Existing Land Uses	Construction/Exploration	-1	2	2	2	2	3	-6	-1	1	2	2	2	2	-3.5	Medium	1	1	2	1.17	-4.08	
	Decommissioning	-1	2	1	2	2	3	-5.25	-1	1	1	1	2	2	-2.5	Medium	1	1	1	1.00	-2.50	
Air quality / greenhouse gas emissions	Construction/Exploration	-1	4	4	3	2	3	-9.75	-1	2	2	2	2	2	-4	Medium	2	1	1	1.17	-4.67	
	Decommissioning	-1	3	3	3	2	2	-5.5	-1	1	1	1	2	2	-2.5	Medium	2	1	1	1.17	-2.92	
Nuisance and Impact on Sense of Place	Construction/Exploration	-1	2	2	2	2	3	-6	-1	2	2	2	2	2	-4	Medium	1	1	2	1.17	-4.67	
	Decommissioning	-1	2	2	2	2	2	-4	-1	2	2	2	1	1	-1.75	Medium	1	1	1	1.00	-1.75	
Damage/Disruption of services / infrastructure	Construction/Exploration	-1	3	2	2	2	3	-6.75	-1	2	2	1	2	2	-3.5	Medium	1	1	2	1.17	-4.08	
	Decommissioning	-1	2	2	2	2	2	-4	-1	1	2	1	2	2	-3	Medium	1	1	1	1.00	-3.00	
Employment Opportunities	Construction/Exploration	1	3	2	2	2	3	6.75	1	3	2	3	2	3	7.5	Medium	1	2	1	1.17	8.75	
	Decommissioning	1	3	2	2	2	3	6.75	1	3	2	3	2	3	7.5	Medium	1	2	1	1.17	8.75	
Impact on Groundwater Quality and Quantity	Construction/Exploration	-1	3	2	3	4	3	-9	-1	1	1	2	3	3	-5.25	Low	3	1	2	1.50	-7.88	
	Decommissioning	-1	3	3	3	3	2	-6	-1	2	3	3	3	2	-5.5	Low	2	1	2	1.33	-7.33	
Impact on Surface water Quality and Quantity	Construction/Exploration	-1	3	3	3	4	3	-9.75	-1	2	3	2	4	2	-5.5	Medium	3	1	2	1.50	-8.25	
	Decommissioning	-1	3	2	3	2	3	-7.5	-1	2	2	2	3	2	-4.5	Medium	3	1	2	1.50	-6.75	
Impacts on natural habitat	Construction/Exploration	-1	1	5	3	3	4	-12	-1	1	3	2	2	3	-6	Medium	1	1	3	1.33	-8.00	
	Decommissioning	-1	1	3	3	3	3	-7.5	-1	1	3	2	2	3	-6	Medium	1	1	3	1.33	-8.00	
Impacts on Microorganisms	Construction/Exploration	-1	2	3	4	3	5	-15	-1	2	2	2	2	4	-8	Medium	1	1	1	1.00	-8.00	
	Decommissioning	-1	2	2	3	3	5	-12.5	-1	1	2	2	2	3	-5.25	Medium	1	1	2	1.17	-6.13	
Impacts on Flora species	Construction/Exploration	-1	2	5	4	4	4	-15	-1	1	3	3	3	3	-7.5	Medium	1	2	1	1.17	-8.75	
	Decommissioning	-1	2	5	3	3	3	-9.75	-1	1	3	3	3	3	-7.5	Medium	1	2	1	1.17	-8.75	
Impacts on Fauna species	Construction/Exploration	-1	2	4	4	4	4	-14	-1	2	2	3	3	2	-5	Medium	1	2	3	1.50	-7.50	
	Decommissioning	-1	2	3	3	3	3	-8.25	-1	2	2	3	3	2	-5	Medium	1	2	2	1.33	-6.67	
Disturbance / Destruction of Heritage Features	Construction/Exploration	-1	5	5	4	5	3	-14.25	-1	4	4	3	5	2	-8	Medium	2	1	3	1.50	-12.00	
	Decommissioning	-1	3	5	4	5	3	-12.75	-1	4	3	3	5	2	-7.5	Medium	2	1	3	1.50	-11.25	
Disturbance / Destruction of Palaeontological Features	Construction/Exploration	-1	3	3	4	5	3	-11.25	-1	2	5	3	5	2	-7.5	Medium	1	1	3	1.33	-10.00	
	Decommissioning	-1	3	5	4	5	2	-8.5	-1	2	3	3	5	2	-6.5	Medium	1	1	3	1.33	-8.67	
Impacts on indigenous vegetation	Construction/Exploration	-1	3	2	2	1	5	-10	-1	1	2	1	2	4	-6	High	2	1	2	1.33	-8.00	
	Decommissioning	-1	2	5	3	3	3	-9.75	-1	1	2	2	2	3	-5.25	High	1	2	2	1.33	-7.00	
Impacts on Traffic and road infrastructure	Construction/Exploration	-1	3	3	2	3	2	-5.5	-1	2	3	2	3	2	-5	Medium	1	1	1	1.00	-5.00	
	Decommissioning	-1	3	5	1	2	2	-5.5	-1	3	1	1	2	1	-1.75	Medium	1	1	1	1.00	-1.75	
Soils and Agricultural Potential	Construction/Exploration	-1	3	3	3	3	3	-9	-1	2	2	2	2	2	-4	Medium		2	1	1.00	-4.00	
	Decommissioning	-1	3	2	3	2	3	-7.5	-1	2	1	2	2	2	-3.5	Medium		2	1	1.00	-3.50	
Soil erosion and sedimentation	Construction/Exploration	-1	3	2	2	2	3	-6.75	-1	2	2	2	2	2	-4	Medium	1	1	1	1.00	-4.00	
	Decommissioning	-1	2	2	2	2	2	-4	-1	1	2	2	2	2	-3.5	Medium	1	1	1	1.00	-3.50	
Landownership and displacement of landowners and livestock	Construction/Exploration	-1	2	4	4	4	1	-3.5	-1	1	2	2	2	2	-3.5	Medium	2	1	1	1.17	-4.08	
	Decommissioning	-1	2	3	3	3	1	-2.75	-1	1	2	2	2	1	-1.75	Medium	2	1	1	1.17	-2.04	
Noise Impacts	Construction/Exploration	-1	2	2	3	2	3	-6.75	-1	2	1	1	2	2	-3	Medium	1	1	1	1.00	-3.00	
	Decommissioning	-1	2	1	3	2	3	-6	-1	2	1	1	2	1	-1.5	Medium	1	1	1	1.00	-1.50	
Safety and security (Health and Safety of the Community)	Construction/Exploration	-1	2	2	3	2	3	-6.75	-1	2	2	2	2	1	-2	Medium	2	1	1	1.17	-2.33	
	Decommissioning	-1	2	2	3	2	3	-6.75	-1	2	2	2	2	1	-2	Medium	2	1	1	1.17	-2.33	



IMPACT ASSESSMENT METHODOLOGY PROCEDURE

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The approach may be altered or substituted on a case by case basis if the specific aspect being assessed requires such- such instances require prior EIMS Project Manager approval. The broad approach to the significance rating methodology is to determine the significance (S) of an environmental risk or impact by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relating this to the probability/likelihood (P) of the impact occurring. The S is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the S to determine the overall final significance rating (FS). The impact assessment will be applied to all identified alternatives.

DETERMINATION OF SIGNIFICANCE

The final significance (FS) of an impact or risk is determined by applying a prioritisation factor (PF) to the post-mitigation environmental significance. The significance is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1 below.

Table 1: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)
	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality), or extends into different distinct geographical features, or extends between 5 and 50 km from the site).
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).
Duration	1	Immediate (<1 year, quickly reversible)



	2	Short term (1-5 years, less than project lifespan)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction/ operation/ decommissioning).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected, or affected environmental components are already degraded)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; moderate improvement for +ve impacts; or where change affects area of potential conservation or other value, or use of resources).
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease; high improvement for +ve impacts; or where change affects high conservation value areas or species of conservation concern)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts; or disturbance to pristine areas of critical conservation value or critically endangered species)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring very high time and cost.
	5	Irreversible Impact.

Once the C has been determined, the significance is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 2.

It is noted that both environmental risks as well as environmental impacts should be identified and assessed. Environmental Risk can be regarded as the potential for something harmful to happen to the environment, and in many instances is not regarded as something that is expected to occur during normal operations or events (e.g. unplanned fuel or oil spills at a construction site). Probability and likelihood are key determinants or variables of environmental risk. Environmental Impact can be regarded as the actual effect or change that happens to the environment because of an activity and is typically an effect that is expected from normal operations or events (e.g. vegetation clearance from site development results in loss of species of concern). Typically the probability of an unmitigated environmental impact is regarded as highly likely or certain



(management and mitigation measures would ideally aim to reduce this likelihood where possible). In summary, environmental risk is about what could happen, while environmental impact is about what does happen.

Table 2: Probability/ Likelihood Scoring

Probability	1	Improbable (Rare, the event may occur only in exceptional circumstances, the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <5% chance).
	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).
	4	High probability (Likely, it is most probable that the impact will occur- > 50 and <90% chance).
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).

The result is a qualitative representation of relative significance associated with the impact. Significance is therefore calculated as follows:

$$S = C \times P$$

Table 3: Determination of Significance

Consequence	5- Very High ¹	5	10	15	20	25
	4- High	4	8	12	16	20
	3- Medium	3	6	9	12	15
	2- Low	2	4	6	8	10
	1- Very low	1	2	3	4	5
		1- Improbable	2- Low	3- Medium/ Possible	4- High/ Probable	5- Highly likely/ Definite
	Probability					

The outcome of the significance assessment will result in a range of scores, ranging from 1 through to 25. These significance scores are then grouped into respective classes as described in Table 4.

Table 4: Significance Scores

S Score	Description
≤4.25	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
>4.25, ≤8.5	Low-Medium (i.e. where the impact could have a significant environmental risk/ reward).

¹ In the event that an impact or risk has very high or catastrophic consequences, but the likelihood/ probability is low, then the resultant significance would be Low-medium. This does in certain instances detract from the relative importance of this impact or risk and must consequently be flagged for further specific consideration, management, mitigation, or contingency planning.



S Score	Description
>8.5, ≤13.75	High-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>13.75	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact significance will be determined for each impact without relevant management and mitigation measures (pre-mitigation significance), as well as post implementation of relevant management and mitigation measures (post-mitigation significance). This allows for a prediction in the degree to which the impact can be managed/mitigated.

IMPACT PRIORITIZATION

Further to the assessment criteria presented in the section above, it is necessary to consider each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impacts' post-mitigation significance (post-mitigation). This prioritisation factor does not aim to detract from the significance ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the post-mitigation significance based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 5: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$\text{Priority} = CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to Table 6).



Table 6: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance (FS), the PF is multiplied by the post-mitigation significance scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a higher significance).

Table 7: Final Environmental Significance Rating

Significance Rating	Description
<-25	Very High (Impacts in this class are extremely significant and pose a very high environmental risk. In certain instances these may represent a fatal flaw. They are likely to have a major influence on the decision and may be difficult or impossible to mitigate. Offset's may be necessary.
<-13.75 to -25	High negative (These impacts are significant and must be carefully considered in the decision-making process. They have a high environmental risk or impact and require extensive mitigation measures).
-8.5 to -13.75	Medium-High negative (i.e. Impacts in this class are more substantial and could have a significant environmental risk. They may influence the decision to develop in the area and require more robust mitigation measures).
<-4.25 to <-8.5	Medium- Low negative (i.e. These impacts are slightly more significant than low impacts but still do not pose a major environmental risk. They might require some mitigation measures but are generally manageable).
-1 to -4.25	Low negative (i.e. Impacts in this class are minor and unlikely to have a significant environmental risk. They do not influence the decision to develop in the area and are typically easily mitigated.
0	No impact
1 to 4.25	Low positive
>4.25 to <8.5	Medium-Low positive



Significance Rating	Description
8.5 to 13.75	Medium-High positive
>13.75	High positive

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.