

27 October 2022

To whom it may concern

**SUBJECT: TERRESTRIAL ECOLOGY FINDINGS FOR THE HERCULES PROJECT**

The Biodiversity Company was commissioned to complete a terrestrial assessment for the proposed Hercules energy project. The proposed project comprises of solar facilities and is located approximately 14 km southeast of De Aar, North-Cape Province (see Figure 1).

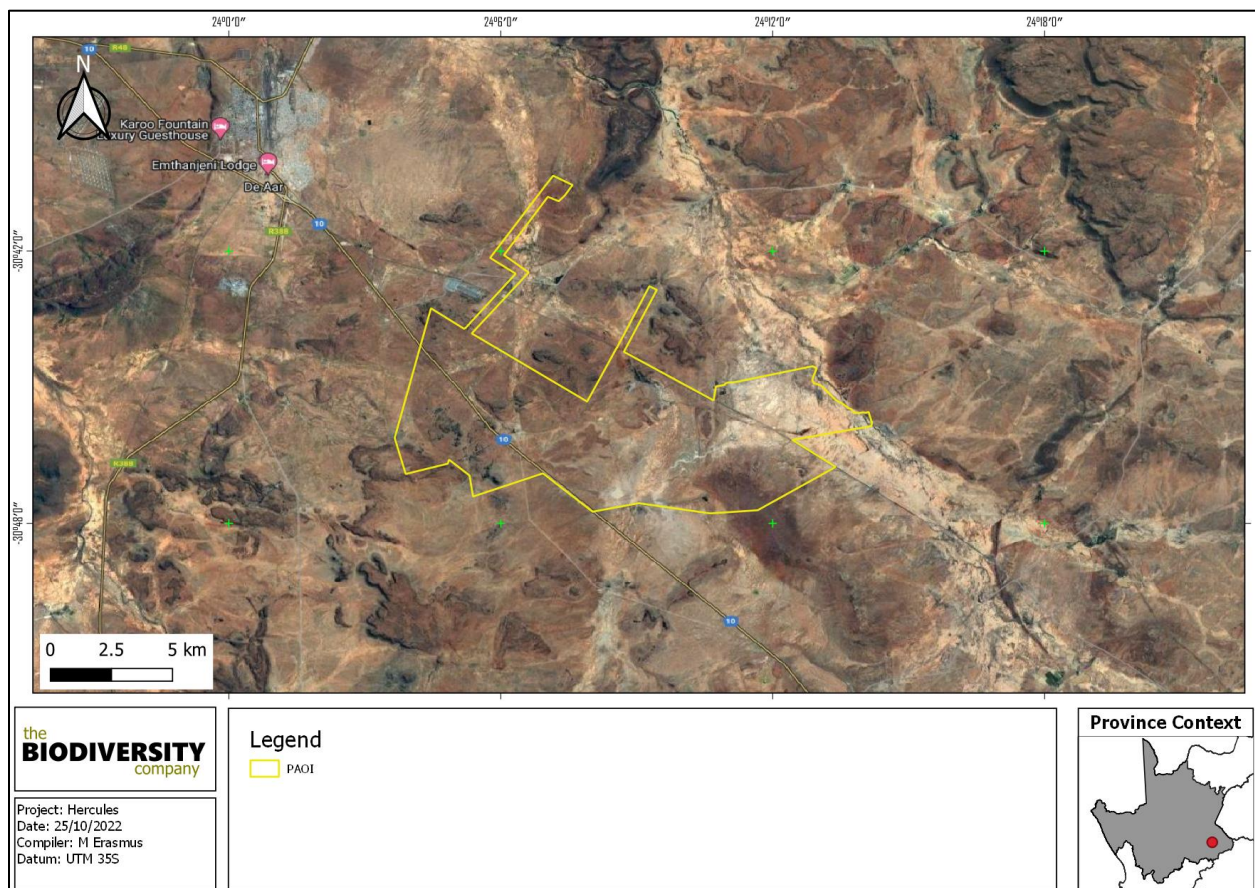


Figure 1 Project area

A site assessment was carried out in October 2022, which constitutes a wet season survey. The different habitat types within the project area were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes (see Figure 2). The determination of the associated sensitivity was in accordance with the method described in the Species Environmental Assessment Guideline (SANBI, 2020).



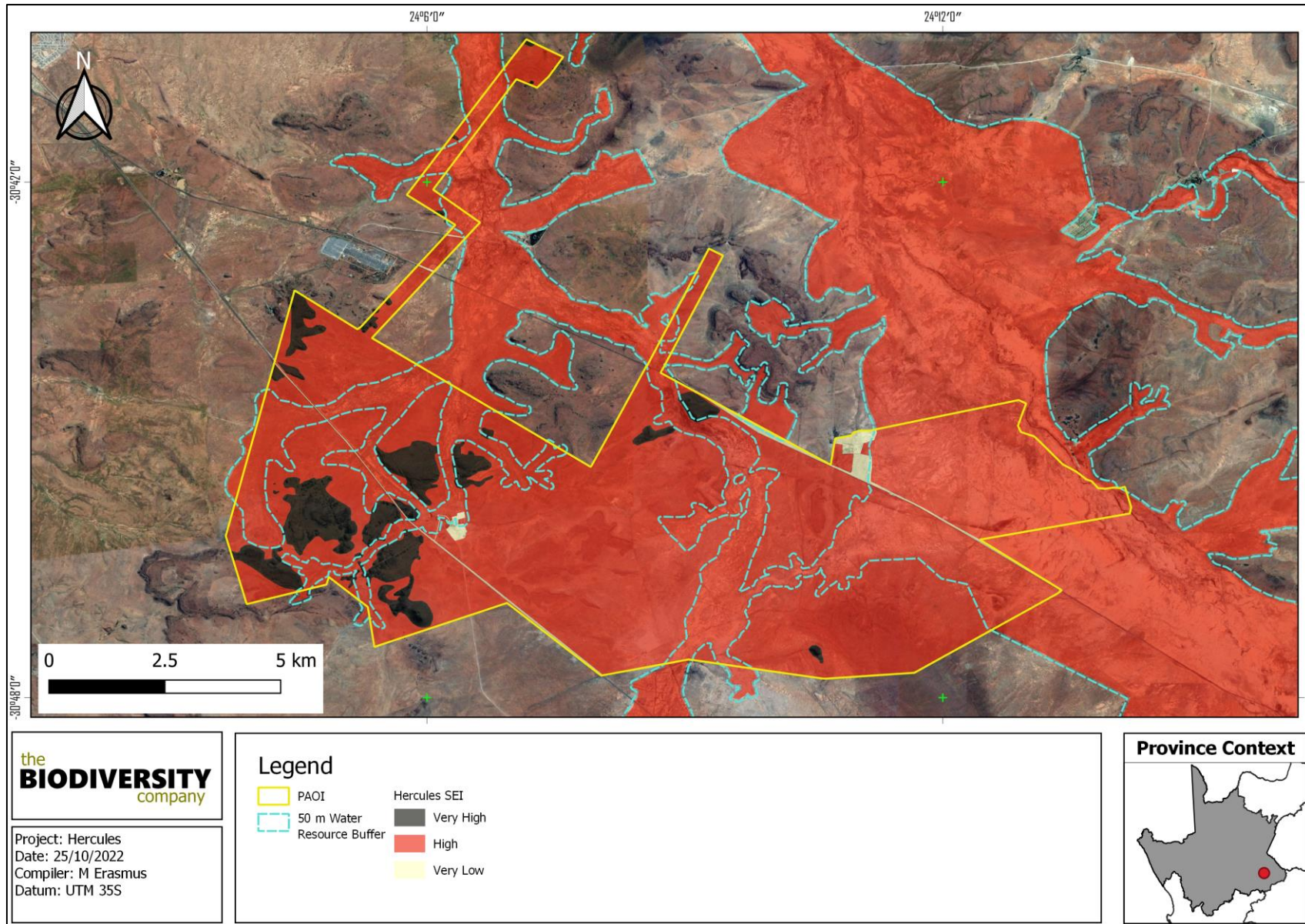


Figure 2 SEI within the project area



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**Terrestrial Site Ecological Importance (SEI)**

SEI Summary of habitat types delineated within field assessment area of project area

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
<b>Hills, Outcrops and Sills</b>	Steep to moderately steep slopes with shallow soils. Distinct and unique habitat features within the relatively homogeneous Upper Karoo region.	Capture and filter precipitation and run-off. Provides unique habitat for numerous species. Provides greater heterogeneity in regional habitat and microclimate.	<b>Medium</b> > 50% of receptor contains natural habitat with potential to support SCC	<b>Very High</b> High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches.	<b>High</b>	<b>Very Low</b> Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring.	<b>Very High</b> Avoidance mitigation – no destructive development activities should be considered. Applicable buffer may be added to the habitats.
<b>Shrubland</b>	Terrain consists of a low to zero slope with deep soils in comparison to the sloped habitats. Variable in the presence or absence of grass species and shrub density.	Provides grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage lines. Important corridor for fauna dispersion within the landscape.	<b>Medium</b> > 50% of receptor contains natural habitat with potential to support SCC.	<b>High</b> Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential.	<b>Medium</b>	<b>Low</b> Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore – less than 50% of the original species composition and functionality of the receptor functionality.	<b>High</b> Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.  The nature of specific impacts to the topsoil is key in Karoo habitats. Mitigations such as retaining vegetation and topsoil layers is applicable, as well as avoiding certain areas and planning infrastructure layouts accordingly.
<b>Drainage Areas and Inland Water</b>	Channels through which surface water naturally collates and flows. Perennial and ephemeral systems were both considered for this habitat type. All the prominent features were identified, as there are numerous inconspicuous drainage features throughout.	Provides surface water resources within the landscape. Aids in trapping sediment and nutrients carried by surface runoff. Corridor for fauna dispersion within the landscape and important foraging and nesting habitat.	<b>Medium</b> > 50% of receptor contains natural habitat with potential to support SCC.	<b>Medium</b> Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status Only narrow corridors of good habitat connectivity. Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance.	<b>Medium</b>	<b>Low</b> Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore – less than 50% of the original species composition and functionality of the receptor functionality.	<b>High</b> Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
<b>Transformed</b>	Homesteads and associated infrastructure as well as prominent roads	N/A	<b>Very Low</b> No natural habitat remaining.	<b>Very Low</b> No habitat connectivity except for flying species or flora with wind-dispersed seeds.	<b>Very Low</b>	<b>Low</b> Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore – less than 50% of the original	<b>Very Low</b> Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.



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Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
						species composition and functionality of the receptor functionality.	



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It is the specialist's opinion that the proposed developability (Figure 3) of the project area is as follows:

**Avoidance:** Avoidance mitigation – no destructive development activities should be considered; these areas should be avoided.

**Avoidance and Minimisation:** Any development in these areas will lead to the direct destruction and loss of portions of functional habitat and their respective conservation plan, Ecological Support Area (ESA) classification, and also the floral and faunal species that are expected to utilise this habitat. Guidelines for development in high sensitivity areas require avoidance mitigation as much as possible. This must include concerted efforts to avoid these sensitive areas where feasible, and disturbances must be kept to an absolute minimum. Changes must be made to project infrastructure design to limit the amount of area/habitat impacted in relation to the title deed area (for example 15%). Limited development activities of low-medium impact acceptable, followed by appropriate restoration activities. The infrastructure layout should consider habitat connectivity to avoid fragmentation, and technology alternatives should opt to retain vegetation under the PV. Offset mitigation may be required for high impact activities.

**Minimisation:** Development activities of medium to high impact acceptable and restoration activities may not be required with minimisation mitigation.

Regards,



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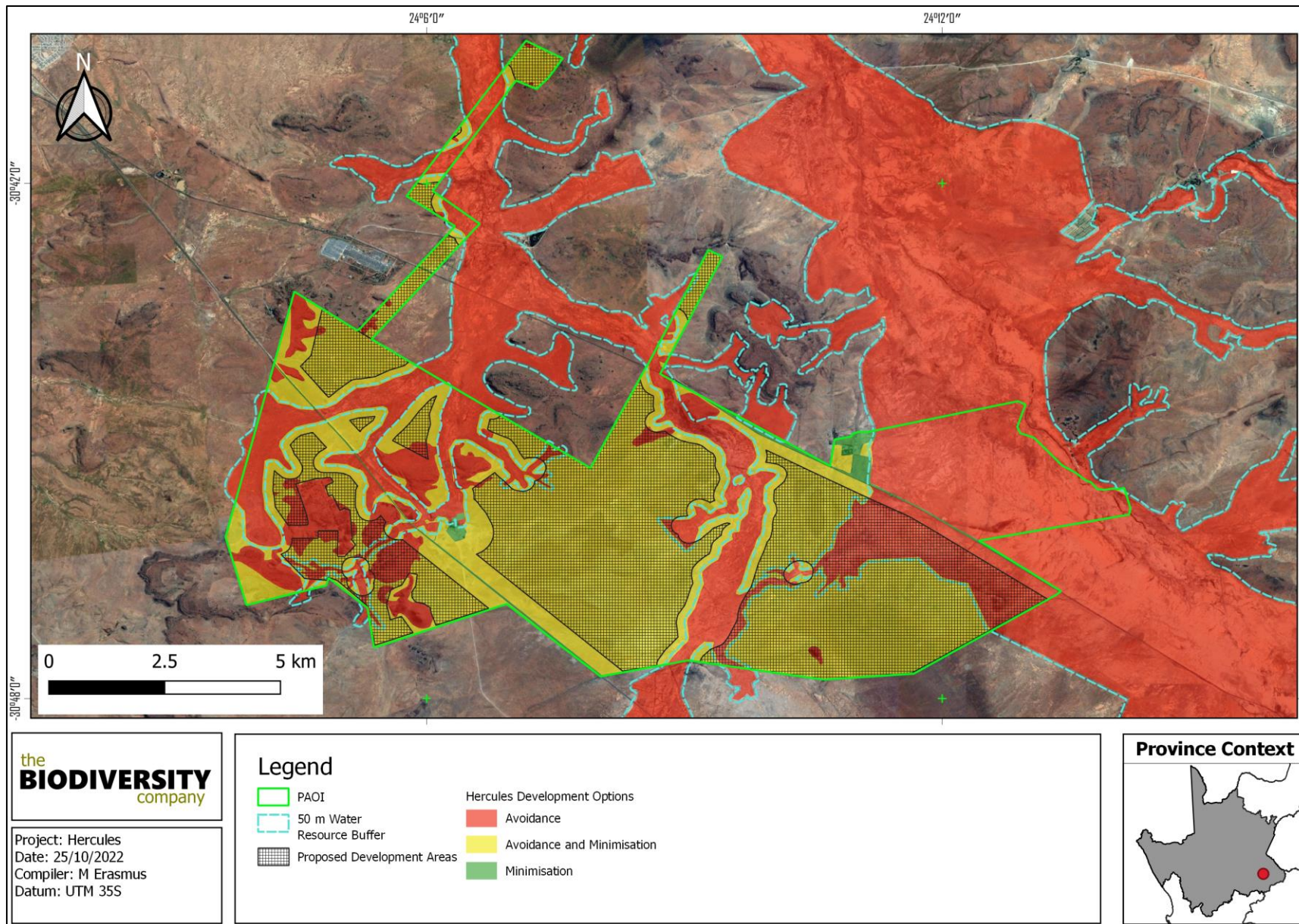


Figure 3 Developability of the project area from a terrestrial perspective.



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**Site Ecological Importance**

The different habitat types within the assessment area were delineated and identified based on observations during the field assessment as well as Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts). BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows. The criteria for the CI and FI ratings are provided in Table Error! No text of specified style in document.-1 and Table Error! No text of specified style in document.-2, respectively.

*Table Error! No text of specified style in document.-1 Summary of Conservation Importance (CI) criteria*

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global extent of occurrence (EEO) of < 10 km <sup>2</sup> . Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of an EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EEO of > 10 km <sup>2</sup> . IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

*Table Error! No text of specified style in document.-2 Summary of Functional Integrity (FI) criteria*

Functional Integrity	Fulfilling Criteria
Very High	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance.
High	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential.



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Functional Integrity	Fulfilling Criteria
<b>Medium</b>	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
<b>Low</b>	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
<b>Very Low</b>	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table Error! No text of specified style in document.-3

Table Error! No text of specified style in document.-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	High	Medium	Low	Very low
Functional Integrity (FI)	Very high	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very low	Medium	Low	Very Low	Very Low	Very Low

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor as summarised in Table Error! No text of specified style in document.-4.

Table Error! No text of specified style in document.-4 Summary of Resource Resilience (RR) criteria

Resilience	Fulfilling Criteria
<b>Very High</b>	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.





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<b>High</b>	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
<b>Medium</b>	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
<b>Low</b>	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
<b>Very Low</b>	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

Subsequent to the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table Error! No text of specified style in document.-5.

Table Error! No text of specified style in document.-5 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)

Site Ecological Importance		Biodiversity Importance (BI)				
		Very High	High	Medium	Low	Very Low
Receptor Resilience (RR)	Very Low	Very High	Very High	High	Medium	Low
	Low	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	High	High	Medium	Low	Very Low	Very Low
	Very High	Medium	Low	Very Low	Very Low	Very Low

Interpretation of the SEI in the context of the proposed development activities is provided in Table Error! No text of specified style in document.-6.

Table Error! No text of specified style in document.-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities (SANBI, 2020)

Site Ecological Importance	Interpretation in relation to proposed development activities
<b>Very High</b>	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
<b>High</b>	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
<b>Medium</b>	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.



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Site Ecological Importance	Interpretation in relation to proposed development activities
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

