Tournée 2 Solar (Pty) Ltd

Tournée 2 Solar PV Geotechnical Desktop Study

Scoping Report

16 March 2023

Confidential

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Scoping Report

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Contents

1

Introduction

1 Introduction

WSP Group Africa (Pty) was appointed by Tournée 2 Solar (Pty) Ltd to undertake a geotechnical desktop study for the proposed development of the Tournée Solar PV Parks which consists of two solar photovoltaic energy facilities namely:

- 150MW Tournée 1 Solar PV Park (Tournée 1 PV)
- 150MW Tournée 2 Solar PV Park (Tournée 2 PV)

The aim of the geotechnical desktop study is to inform the Environmental Impact Assessment (EIA) process. This report presents the geotechnical desktop study scoping report for Tournée 2 PV.

1.1 Project description

The Tournée 2 PV project will comprise the following:

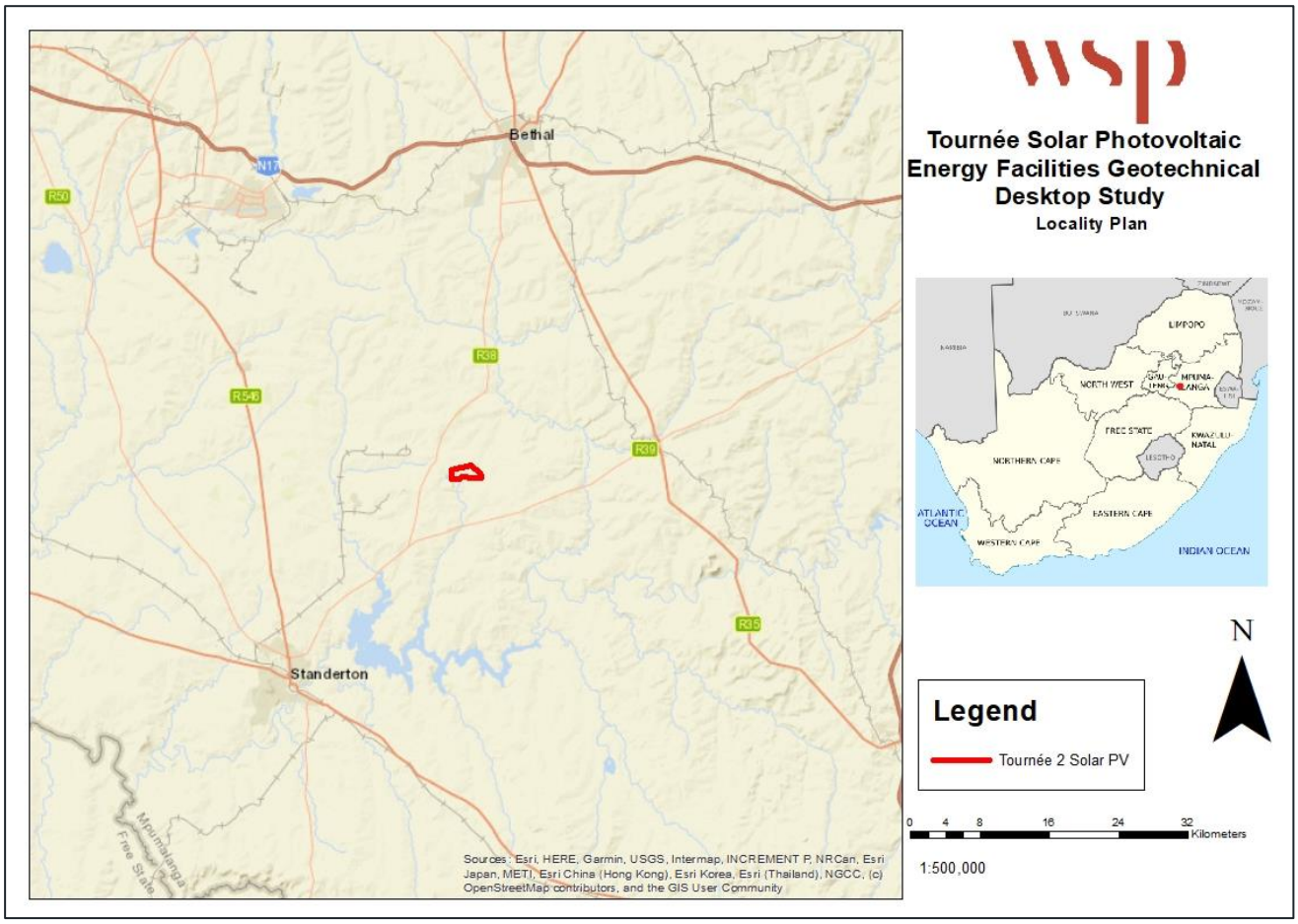
Component	Description
Development	Solar photovoltaic energy facility
Municipality	Lekwa Local Municipality, Gert Sibande District Municipality
Affected Farms	■ Remaining Portion of portion 3 of the Farm Dwars-in-die-Weg 350 IS ■ Portion 6 of the Farm Dwars-in-die-Weg 350 IS
Extent	505.15 hectares (ha)
Buildable area	Approximately 297 hectares, subject to finalization based on technical and environmental requirements
Capacity	Up to 150MW
Power system technology	Solar PV
Operations and Maintenance (O&M) building footprint	Operations building (including stores and workshop) = 1500m^2
Construction	Typical construction camp area 100m x 50m = 5,000m^2 Typical laydown area 100m x 200m = 20,000m^2 Sewage: Septic tanks and portable toilets

Component	Description
Cement batching plant (temporary)	Gravel and sand will be stored in separate stockpiles whilst the cement will be contained in a silo. *The Alternative of utilising ready-mix trucks should also be considered.*
Internal roads	Width of internal road – between 4m and 5m Length of internal roads – approximately 8km.
Cables	Communication, AC and DC cables.
Independent Power Producer (IPP) site substation and battery energy storage system (BESS):	Total footprint will be up to 5.5ha (3ha for the BESS and 2.5ha for back-to-back substation, including IPP and Eskom infrastructure). The substation will consist of a high voltage substation within a yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The associated BESS storage capacity will be up to 150MW/600MWh with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, or Lithium Nickel Manganese Cobalt oxides will be considered as the preferred battery technology. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers.

2 Study Area Information

The proposed Solar PV plant is located approximately 27.7km north-east of Standerton in the Mpumalanga province. The site can be accessed via the R38 and R39. The locality plan is shown in Figure 2-1.

Figure 2-1 - Lacality Plan for Tournée 2 PV



3 Geology

According to the published 1: 250 000 geological map (Sheet 2628 East Rand), the study area is underlain by rocks of the Vryheid Formation (Pv), Ecca Group of the Karoo Supergroup. This Vryheid Formation comprises sandstone, shale and coal beds.

The Vryheid Formation has been extensively intruded by Jurassic age dolerite (Jd). The dolerites occur both as sills and linear dyke structures that may extend over tens of kilometers.

Significant recent surficial deposits, alluvium, blanket the areas along the drainage features.

An excerpt of the published geological map showing the project area is presented in Figure 3-1 and the lithostratigraphy is presented in Table 3-1.

Figure 3-1 - Geology Map of the Project Area (Excerpt from the Geological Map Sheet, 2628 East Rand)

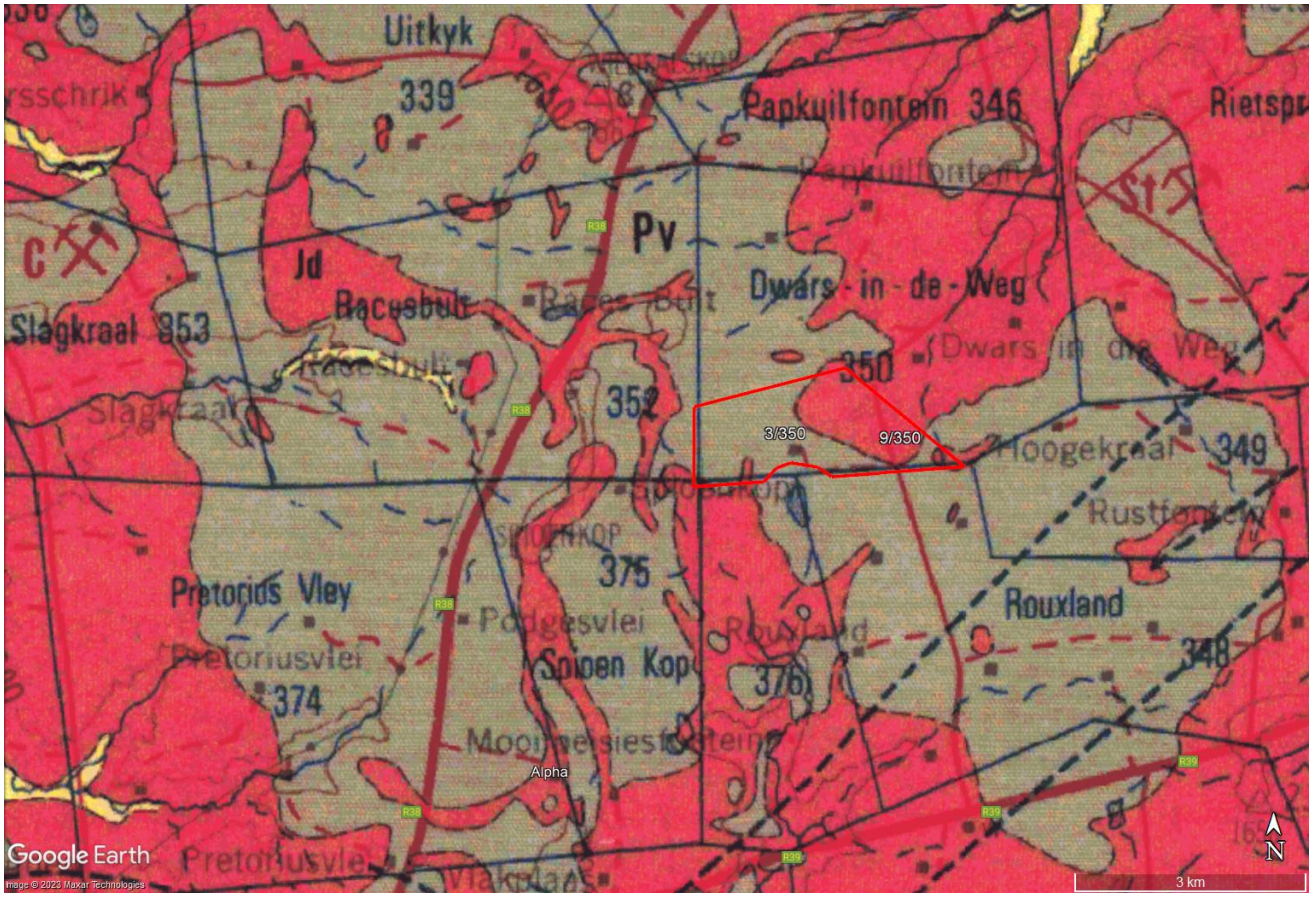


Table 3-1 – Lithostratigraphy of the Area

Supergroup	Group	Formation	Lithology	Map Symbol
			Alluvium	⌒⌒
			Dolerite	Jd
Karoo	Ecca	Vryheid	Sandstone, shale, coal beds	Pv

4 Geotechnical Impact assessment

The geotechnical impact assessment of the proposed Tournée 2 PV development was performed according to the methodology included in APPENDIX A of this report. The plan indicating the proposed layout is indicated in Figure 4-1. The geotechnical impacts are listed in Table 4-1 and the screening in Table 4-2.

Figure 4-1 - : Conceptual Layout Plan

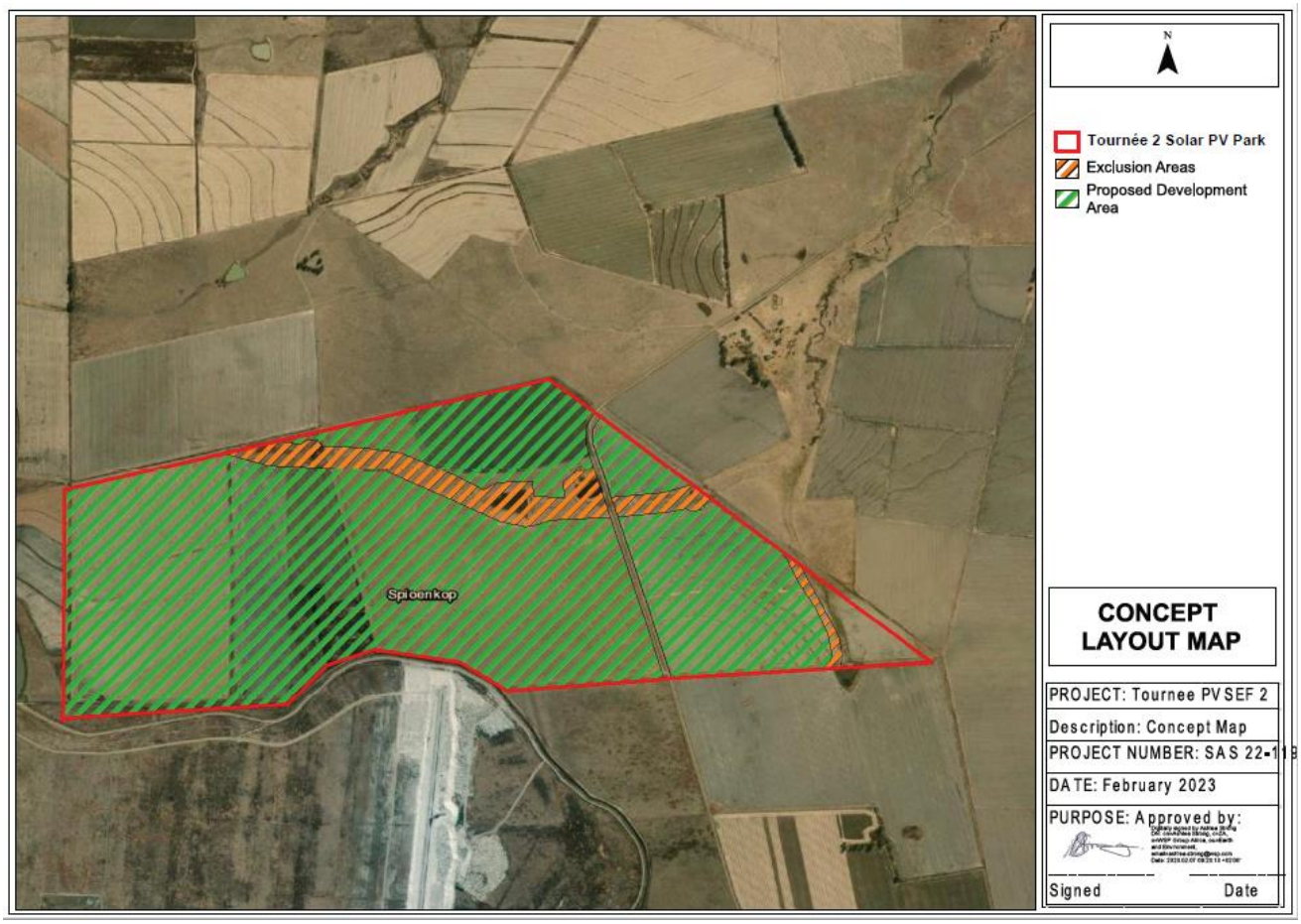


Table 4-1 – Geotechnical Impacts

Aspect	Impact	Mitigation Measures
Construction		
Soil erosion	▪ Increased stormwater velocity. ▪ Increase in soil and wind erosion due to clearing of vegetation. ▪ Creation of drainage paths along access tracks. ▪ Sedimentation of non-perennial features and excessive dust.	▪ Rehabilitation of affected areas (such as revegetation). ▪ Construction of temporary berms and drainage channels to divert surface water. ▪ Minimize earthworks and fills. ▪ Use existing road network and access tracks. ▪ Correct engineering design and construction of gravel roads and water crossings. ▪ Control stormwater flow.
Disturbance of fauna and flora	▪ The displacement of natural earth material and overlying vegetation leading to erosion.	▪ Limited excavations
Oil spillages from heavy plant	▪ Potential groundwater and drainage feature contamination.	▪ Vehicle and construction machinery repairs to be undertaken in designated areas with proper soil protection.
Slope stability	▪ Slope instability around structures.	▪ Avoid steep slopes areas. ▪ Design cut slopes according to detailed geotechnical analysis.
Seismic activity	▪ Damage of proposed development.	▪ Design according to expected peak ground acceleration.
Decommissioning		
Soil erosion	▪ Increase in soil and wind erosion due to clearance of structures. ▪ Displacement of soil and damage to vegetation by vehicles.	▪ Use existing road network and access tracks. ▪ Use of temporary berms and drainage channels to divert surface water. ▪ Minimize earthworks and demolish footprints. ▪ Rehabilitation of affected areas (such as revegetation). ▪ Reinstate channelized drainage features. ▪ Strip, stockpile and re-spread topsoil.

Aspect	Impact	Mitigation Measures
Disturbance of fauna and flora	▪ The displacement of natural earth material and overlying vegetation leading to erosion.	▪ Limited excavations
Potential oil spillage	▪ Potential oil spillages due to clearance of structures.	▪ Vehicle and construction machinery repairs to be undertaken in designated areas with proper soil protection. ▪ Frequent checks and conditional monitoring
Slope stability	▪ Slope instability around structures.	▪ Avoid steep slopes areas. ▪ Design cut slopes according to detailed geotechnical analysis.
Cumulative		
Soil erosion	▪ Increase stormwater velocity. ▪ Increase in soil and wind erosion due to clearing of vegetation. ▪ Creation of drainage paths along access tracks. ▪ Sedimentation of non-perennial features and excessive dust.	▪ Rehabilitation of affected areas (such as revegetation). ▪ Construction of temporary berms and drainage channels to divert surface water. ▪ Minimize earthworks and fills. ▪ Use existing road network and access tracks. ▪ Correct engineering design and construction of gravel roads and water crossings. ▪ Control stormwater flow.
Disturbance of fauna and flora	▪ The displacement of natural earth material and overlying vegetation leading to erosion	▪ Limited excavations
Oil spillages from heavy plant	▪ Potential groundwater and drainage feature contamination.	▪ Vehicle and construction machinery repairs to be undertaken in designated areas with proper soil protection.
Slope stability	▪ Slope instability around structures.	▪ Avoid steep slopes areas. ▪ Design cut slopes according to detailed geotechnical analysis.
Seismic activity	▪ Damage of proposed development.	▪ Design according to expected peak ground acceleration.

Table 4-2 – Geotechnical Impact Screening

Impact	Rating criteria			Screening tool
	Status	Consequences	Probability	
Construction				
Soil erosion	Negative	Moderately severe	Probable	Low
Disturbance of fauna and flora	Negative	Moderately severe	Highly probable	Medium
Oil spillages from heavy plant	Negative	Moderately severe	Probable	Low
Slope stability	Negative	Negligible	Improbable	Very Low
Seismic activity	Negative	Moderately severe	Improbable	Very Low
Decommissioning				
Soil erosion	Negative	Moderately severe	Probable	Low
Disturbance of fauna and flora	Negative	Moderately severe	Highly probable	Medium
Potential oil spillage	Negative	Moderately severe	Probable	Low
Slope stability	Negative	Negligible	Improbable	Very Low
Cumulative				
Soil erosion	Negative	Moderately severe	Probable	Low
Disturbance of fauna and flora	Negative	Moderately severe	Highly probable	Medium
Oil spillages from heavy plant	Negative	Moderately severe	Probable	Low
Slope stability	Negative	Negligible	Improbable	Very Low
Seismic activity	Negative	Moderately severe	Improbable	Very Low

5 Geotechnical Desktop Study EIA Phase Methodology

The detailed geotechnical desktop assessment will include the following:

- Literature reviews of available published and unpublished information including, but not limited to, geological data, geological maps, topographical maps, aerial images and any existing geotechnical investigation reports of the study area
- Assessment of geotechnical evaluation criteria, i.e., excavation conditions across the sites, seismicity, undermining, engineering properties of the underlying geology, slope stability etc.
- Assessment of the relevant geotechnical and geological fatal flaws within the study area
- Site reconnaissance to assess the ground conditions on site.

6 Conclusions

Based on WSP's scoping desktop study, the proposed Tournée 2 PV site is suitable for the operation of a Solar PV Park. A "low to medium" impact was assessed, from a geotechnical perspective, for the pre-mitigation situation. A detailed geotechnical desktop study will be undertaken and provide mitigation measures for the impacts.

6.1 Assumptions and Limitations

The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimize the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by WSP, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

7 References

- 1:250 000 Geological Map Series (2628 East Rand). Published by the Council of Geoscience

Appendix A

Methodology

IMPACT ASSESSMENT METHODOLOGY

SCOPING PHASE

REPORTING REQUIREMENTS

- Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of Baseline Environment
- Site Verification Assessment (including sensitivity mapping) (as applicable)
- Identification and high-level screening of impacts
- Plan of Study for EIA

HIGH-LEVEL SCREENING OF IMPACTS AND MITIGATION

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and, consequence (**Table 0-3**), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and consequence are detailed in **Table 0-3** and **Table 0-2** respectively.

Table 0-1: Probability Scores and Descriptors

SCORE	DESCRIPTOR
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur
2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable:** The possibility of the impact occurring is very low

Table 0-2: Consequence Score Descriptions

SCORE	NEGATIVE	POSITIVE
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.

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3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.

Table 0-3: Significance Screening Tool

CONSEQUENCE SCALE

PROBABILITY SCALE		1	2	3	4
	1	Very Low	Very Low	Low	Medium
	2	Very Low	Low	Medium	Medium
	3	Low	Medium	Medium	High
	4	Medium	Medium	High	High

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e. beneficial) or negative (-ve) (i.e. harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (**Table 0-4**) has been applied according to the nature and significance of the identified impacts.

Table 0-4: Impact Significance Colour Reference System to Indicate the Nature of the Impact

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	Negligible
Very Low	Very Low
Low	Low
Medium	Medium
High	High

EIA PHASE

REPORTING REQUIREMENTS

- Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of methodology (as required)
- Update and/or confirmation of Baseline Environment – including update and / or confirmation of sensitivity mapping
- Identification and description of Impacts
- Full impact assessment (including Cumulative)
- Mitigation measures
- Impact Statement

Ensure that all reports fulfil the requirements of the relevant Protocols.

ASSESSMENT OF IMPACTS AND MITIGATION

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in **Table 0-5**.

Table 0-5: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes

[1] Impacts that arise directly from activities that form an integral part of the Project.
[2] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[3] Secondary or induced impacts caused by a change in the Project environment.
[4] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[5] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 1** below.

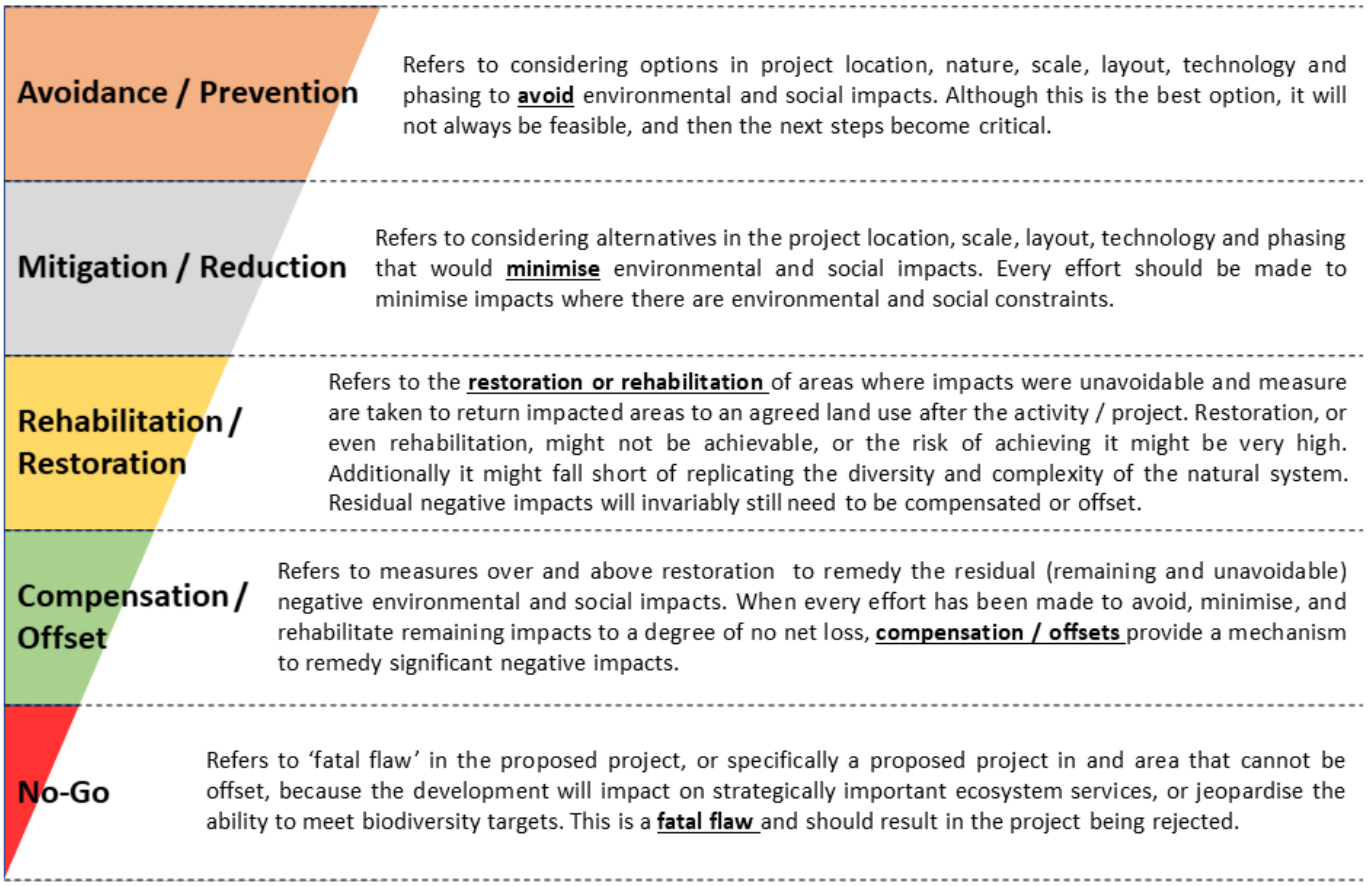

Figure 1: Mitigation Sequence/Hierarchy

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