CALODEX (PTY) LTD

CALODEX SOLAR PHOTOVOLTAIC FACILITY

FINAL BASIC ASSESSMENT

16 SEPTEMBER 2021

PUBLIC

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FINAL BASIC ASSESSMENT

CALODEX (PTY) LTD

TYPE OF DOCUMENT (VERSION)
PUBLIC

PROJECT NO.: 41102967
DATE: SEPTEMBER 2021

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Draft BAR for Public Review	Final BAR		
Date	June 2021	September 2021		
Prepared by	Babalwa Mqokeli	Babalwa Mqokeli		
Signature	-	 Mqokeli, Babalwa (ZABM04722) 2021.09.16 10:50:02 +02'00'		
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Project number	41102967	41102967		
Report number	01	01		
File reference	W:\000 NEW Projects\41102967 - Calodex Solar PV EIA			

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Purpose and basis of preparation of this Report.

This Final Basic Assessment Report has been prepared by WSP Group Africa (Pty) Ltd (WSP) on behalf and at the request of Calodex (Pty) Ltd, to provide the Client an understanding of the potential impacts associated with the proposed Solar PV facility.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report and except where otherwise indicated in the Report.

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TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 Background 1

1.2 The Purpose of the BA Process 1

1.3 Details of the Environmental Assessment Practitioner 1

1.4 Basic Assessment Report Structure 2

1.5 Project Location 5

1.6 Assumptions and Limitations 1

2 PROJECT DESCRIPTION 2

2.1 Project Overview 2

2.2 Project Development Phases 3

2.3 Service Provision 4

2.4 Project Justification (Need and Desirability) 4

3 GOVERNANCE FRAMEWORK 6

3.1 National Legislation 6

3.2 Provincial/Local Planning Legislation 13

4 ALTERNATIVES 15

4.1 Site Alternatives 15

4.2 Land Use Alternatives 15

4.3 Layout Alternatives 16

4.4 Technology Alternatives 16

4.5 No-Go Alternative 17

5 DESCRIPTION OF THE BASELINE ENVIRONMENT 19

5.1 Climate 19

5.2 Geology and Soils 20

5.3 Topography and Landscape 21

5.4 Surface Water 22

5.5 Biodiversity 23

5.6 Cultural Heritage 26
5.7 Socio-Economic Environment 28
5.8 Environmental Sensitivity Map 29
6 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT 31
6.1 Methodology 31
6.2 Construction Phase Impact Assessment 33
6.3 Operational Phase Impact Assessment 47
6.4 Cumulative Impact Assessment 55
7 STAKEHOLDER ENGAGEMENT PROCESS 56
7.1 Authority Consultation 56
7.2 Stakeholder Identification 56
8 ENVIRONMENTAL IMPACT STATEMENT 58
8.1 Specialist Conclusion 58
8.2 Summary of Impact Assessment 60
8.3 Impact Statement 63
9 CONCLUSION AND RECOMMENDATIONS 65

TABLES

TABLE 1-1: DETAILS AND EXPERTISE OF THE EAP 2
TABLE 1-2: LEGISLATION REQUIREMENTS AS DETAILED IN APPENDIX 1 OF GNR 326 2
TABLE 1-3: LOCATION OF THE PROPOSED DECOMMISSIONING SITE 5
TABLE 1-4: DEVELOPMENT SITE PERIMETER BEND POINTS COORDINATES ... 6
TABLE 2-1: PROJECT COMPONENTS AND RESPECTIVE SPECIFICATIONS . 2
TABLE 3-1: DETERMINATION OF APPLICABLE GNR 327 AND GNR 324 LISTED ACTIVITIES 7
TABLE 6-1: IMPACT ASSESSMENT CRITERIA AND SCORING SYSTEM 31
TABLE 8-1: IMPACT SUMMARY 60

FIGURES

FIGURE 1-1: LOCALITY MAP FOR THE PROPOSED CALODEX SOLAR PV (WSP, 2021) 7
FIGURE 3-1: PROJECT LOCATION IN RELATION TO THE CITY OF EKURHULENI METROPOLITAN MUNICIPALITY URBAN DEVELOPMENT BOUNDARY 9
FIGURE 4-1: PRELIMINARY LAYOUT OF THE SOLAR PV FACILITY 18
FIGURE 5-1: AVERAGE REGIONAL RAINFALL (SOURCE: EN.CLIMATE-DATA.ORG) 19
FIGURE 5-2: AVERAGE REGIONAL TEMPERATURE (SOURCE: EN.CLIMATE-DATA.ORG) 20
FIGURE 5-3: THE GEOLOGY ASSOCIATED WITH THE PROPOSED PROJECT AREA (WSP, 2021) 21
FIGURE 5-4: TOPOGRAPHIC MAP OF THE AREA (LOGIS, 2021) 22
FIGURE 5-5: AQUATIC ENVIRONMENT ASSOCIATED WITH THE PROPOSED PROJECT AREA (WSP, 2021) 23
FIGURE 5-6: VEGETATION TYPE ASSOCIATED WITH PROPOSED PROJECT SITE (WSP, 2021) 24

FIGURE 5-7: CBA AND ESA IN RELATION TO THE PROPOSED PROJECT SITE (WSP, 2021) 25
FIGURE 5-8: SAHRIS PALAEONTOLOGY SENSITIVITY MAP 28
FIGURE 5-9: SITE LAYOUT OVERLAIN ONTO AN ENVIRONMENTAL SENSITIVITY MAP 30
FIGURE 6-1: IMPACT ASSESSMENT MITIGATION HIERARCHY 32

APPENDICES

A EAP CURRICULUM VITAE

B COMMENTS AND RESPONSES REPORT

C BIODIVERSITY ASSESSMENT (INCLUDING WETLAND ASSESSMENT)

D AVIFAUNAL ASSESSMENT

E VISUAL IMPACT ASSESSMENT

F HERITAGE IMPACT ASSESSMENT

G PALAEONTOLOGICAL IMPACT ASSESMENT

H SOILS AND AGRICULTURAL STUDY

I HYDROPEDOLOGICAL ASSESSMENT

J DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

1 INTRODUCTION

Changes made from the Draft BAR have been underlined in this Final BAR for ease of reference to the updates made in the reporting.

1.1 BACKGROUND

Calodex (Pty) Ltd (Calodex) is proposing the development of a 115 megawatt (MW) Solar Photovoltaic (PV) Facility approximately 5km north of Springs in the Gauteng Province.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the Environmental Impact Assessment (EIA) Regulations promulgated in Government Notice (GNR) 326 of 7 April 2017, the proposed project requires a Basic Assessment (BA) process. In order for the proposed project to proceed, it will require an Environmental Authorisation (EA) from the Competent Authority (i.e. the National Department of Forestry, Fisheries and Environment, (DFFE)).

1.2 THE PURPOSE OF THE BA PROCESS

The BA process is a simplified version of what may broadly be referred to as the environmental and social impact assessment (ESIA) process. It applies to activities contained in Listing Notice 1 of the EIA Regulations that are considered to have a relatively lower environmental impact than those contained in Listing Notice 2 (requiring a full Scoping and EIA process).

The BA process is an interdisciplinary procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment. The process helps identify the possible environmental effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of the environmental consequences of the proposed project. This document (the BA report) is a technical tool that identifies, predicts, and analyses impacts on the physical environment, as well as social, cultural, and health impacts. The report identifies alternatives and mitigation measures to reduce the environmental impact of the proposed project; and it also serves an important procedural role in the overall decision-making process by promoting transparency and public involvement.

Section 7 of this report outlines the project's compliance with the public participation requirements of the EIA Regulations.

1.3 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP Group Africa (Pty) Ltd (WSP) has been appointed in the role of independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed project. **Table 1-1** outlines the details of the EAP and their expertise. The EAP Curriculum Vitae is attached in **Appendix A**.

Table 1-1: Details and Expertise of the EAP

NAME OF CONSULTANT	WSP ENVIRONMENTAL (PTY) LTD
Contact Person	Babalwa Mqokeli
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E-mail	Babalwa.mqokeli@wsp.com
EAP Expertise	Babalwa has more than 5 years of experience in environmental assessment and management, and 2 years of experience as an ecological scientist intern. She is a registered Professional Natural Scientist (Pr. Sci. Nat.) in Environmental Science (Reg. No: 009863) with the South African Council of Natural Scientific Professions. Babalwa has experience in the management and integration of various types of environmental assessments, including the mining, agricultural and renewable energy sector. Her experience includes environmental screening mapping using ArcGIS. She has also been part of the team undertaking the National Wind and Solar Strategic Environmental Assessment work.

1.4 BASIC ASSESSMENT REPORT STRUCTURE

For the purposes of demonstrating legal compliance, **Table 1-2** cross-references the sections within the BA Report with the requirements as per Appendix 1 of GNR 326 of 2017.

Table 1-2: Legislation Requirements as detailed in Appendix 1 of GNR 326

LEGISLATED REQUIREMENTS AS PER APPENDIX 1	SECTION IN BA REPORT
3. (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include: (a) details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Section 1.3
(b) the location of the activity, including: (i) the 21digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.5

LEGISLATED REQUIREMENTS AS PER APPENDIX 1	SECTION IN BA REPORT
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.5, Figure 1-1
(d) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the activities to be undertaken including associated structures and infrastructure;	Section 2
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 3
f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 2.4
(g) a motivation for the preferred site, activity and technology alternative;	Section 4
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including - (i) details of all the alternatives considered;	Section 4
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 7
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	N/A at this stage
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 5
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 6
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
(viii) the possible mitigation measures that could be applied and level of residual risk;	
(ix) the outcome of the site selection matrix;	
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	

LEGISLATED REQUIREMENTS AS PER APPENDIX 1	SECTION IN BA REPORT
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 6
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Section 6
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 6
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 8
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the Environmental Management programme (EMPr);	Appendix J
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	N/A
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.6
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 8
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(r) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and l&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix A and included in Application Form

LEGISLATED REQUIREMENTS AS PER APPENDIX 1	SECTION IN BA REPORT
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t) any specific information that may be required by the competent authority; and	N/A
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
2) Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	N/A

1.5 PROJECT LOCATION

The proposed Solar PV facility will be developed in an area of approximately 264 hectares north of Enstra Paper, near Springs in Gauteng. A locality map of the site is included in **Figure 1-1.** The details of the properties associated with the proposed project, including the 21-digit Surveyor General (SG) codes for the cadastral land parcels and coordinates are outlined in **Table 1-3**. The coordinates of the bend points of the perimeter of the proposed development site are provided in **Table 1-4** below as requested by DFFE in their comments.

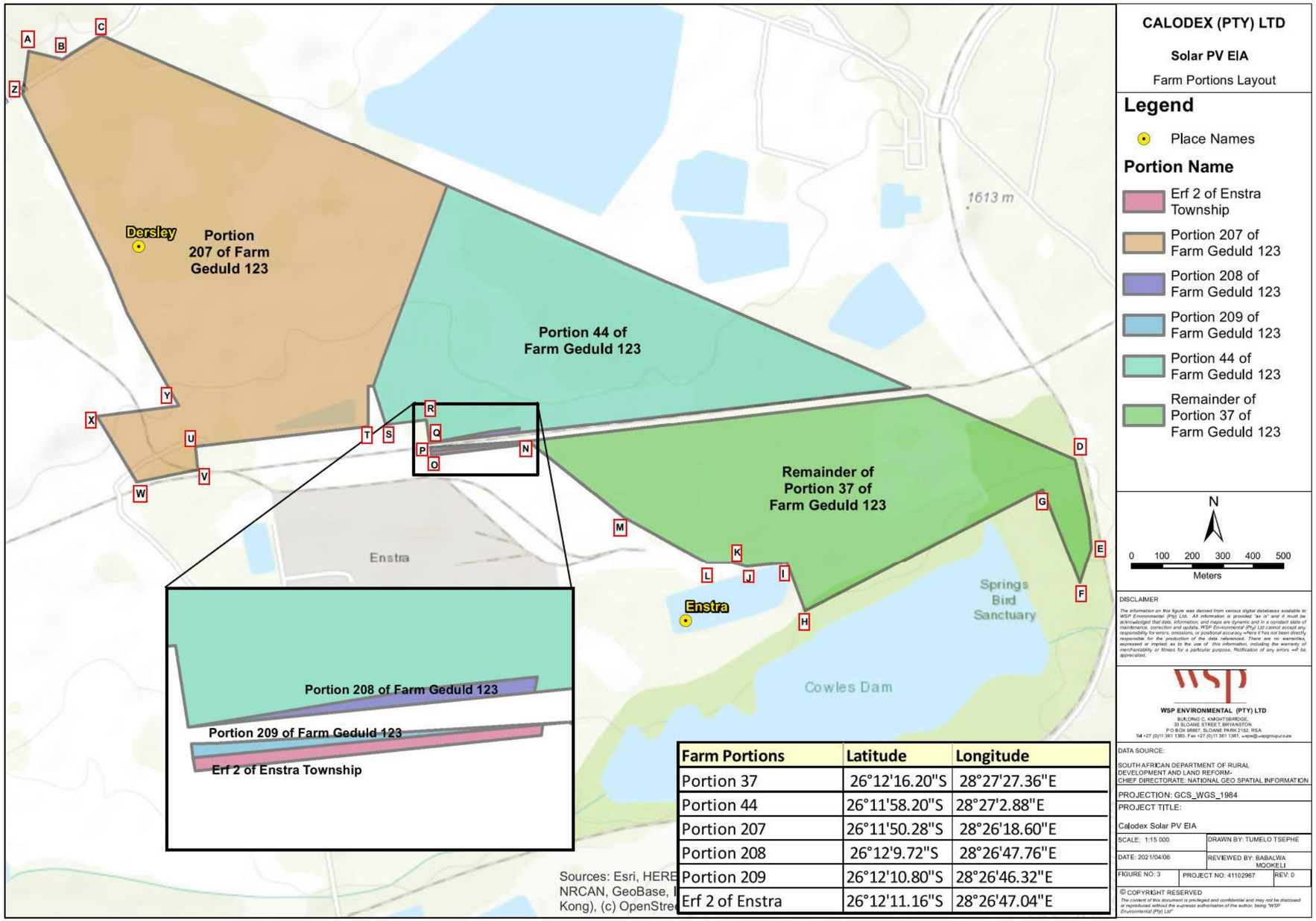
The site is located within Ward 72 of the City of Ekurhuleni (CoE) Municipality. In terms of the Municipality's Town Planning Scheme, the site is surrounded by areas zoned for commercial, industrial and agricultural land-use.

Table 1-3: Location of the Proposed Decommissioning Site

21DIGIT SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL	FARM NAME	APPROXIMATE CENTRAL COORDINATES
T0IR00000000012300207	Portion 207 of Farm Geduld 123	26°11'49.38" S 28°26'16.55"E
T0IR00000000012300208	Portion 208 of Farm Geduld 123	26°12'9.64"S 28°26'48.64"E
T0IR00000000012300209	Portion 209 of Farm Geduld 123	26°12'11.10"S 28°26'44.29"E
T0IR00000000012300044	Portion 44 of Farm Geduld 123	26°11'59.05"S 28°26'59.90"E
T0IR00000000012300037	Portion 37 of Farm Geduld 123	26°12'15.94"S 28°27'28.03"E
T0IR02310000000200000	ERF 2 of Enstra Township	26°12'11.16"S 28°26'47.04"E

Table 1-4: Development Site Perimeter Bend Points Coordinates

	COORDINATES	
SITE PERIMETER POINT	**Latitude**	**Longitude**
Point A	26°11'28.50"S	28°25'54.28"E
Point B	26°11'29.37"S	28°25'58.26"E
Point C	26°11'26.85"S	28°26'2.86"E
Point D	26°12'12.64"S	28°27'58.06"E
Point E	26°12'22.14"S	28°27'59.93"E
Point F	26°12'25.78"S	28°27'58.56"E
Point G	26°12'15.84"S	28°27'54.17"E
Point H	26°12'28.68"S	28°27'25.98"E
Point I	26°12'23.59"S	28°27'23.84"E
Point J	26°12'23.95"S	28°27'19.11"E
Point K	26°12'23.54"S	28°27'17.44"E
Point L	26°12'23.53"S	28°27'14.39"E
Point M	26°12'18.58"S	28°27'4.56"E
Point N	26°12'10.40"S	28°26'53.21"E
Point O	26°12'11.48"S	28°26'41.71"E
Point P	26°12'11.07"S	28°26'41.66"E
Point Q	26°12'10.55"S	28°26'41.56"E
Point R	26°12'8.51"S	28°26'41.26"E
Point S	26°12'8.78"S	28°26'36.15"E
Point T	26°12'8.78"S	28°26'34.34"E
Point U	26°12'10.87"S	28°26'13.83"E
Point V	26°12'13.33"S	28°26'14.07"E
Point W	26°12'14.64"S	28°26'6.86"E
Point X	26°12'7.56"S	28°26'2.15"E
Point Y	26°12'6.47"S	28°26'11.73"E
Point Z	26°11'33.15"S	28°25'53.50"E



Farm Portions	Latitude	Longitude
Portion 37	26°12'16.20"S	28°27'27.36"E
Portion 44	26°11'58.20"S	28°27'2.88"E
Portion 207	26°11'50.28"S	28°26'18.60"E
Portion 208	26°12'9.72"S	28°26'47.76"E
Portion 209	26°12'10.80"S	28°26'46.32"E
Erf 2 of Enstra	26°12'11.16"S	28°26'47.04"E

Figure 1-1: Locality map for the proposed Calodex Solar PV (WSP, 2021)

1.6 ASSUMPTIONS AND LIMITATIONS

General assumptions and limitations relating to the BA process are listed below:

- The EAP hereby confirms that they have undertaken to obtain project information from the client that is deemed to be accurate and representative of the project;
- A Site Visit has been undertaken by the EAP to better understand the project and ensure that the information provided by the client is correct, based on site conditions observed;
- The EAP hereby confirms their independence and understands the responsibility they hold in ensuring any comments received for the project will be accurately replicated and responded to within the BA documentation;
- The comments received in response to the public participation process, will be representative of comments from the broader community; and
- Based on the pre-application meeting and subsequent minutes, the competent authority would not require additional specialist input, in order to make a decision regarding the application.

Notwithstanding these assumptions, it is the view of WSP that this BA report provides a good description of the issues associated with the project and the resultant impacts.

2 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The proposed Solar PV facility will be developed with a possible installed capacity of 115 MW of electricity from PV solar energy. The proposed Solar PV facility will comprise the following key components:

SOLAR FIELD

- PV Modules, which convert the solar radiation into direct current (DC);
- Single-Axis Tracking Structures (north-south aligned), which support and orient the PV modules to minimize the angle of incidence between the incoming sun rays and the PV modules surface during the day;
- String Combiner Boxes, which consolidate the output of the strings of PV modules before reaching the inverter;
- Inverters, which convert DC from solar field to alternating current (AC); and
- Power Transformers, which raise the voltage level from low to medium.

ASSOCIATED INFRASTRUCTURE

- On-site substation to receive, convert and step up electricity from the PV facility to the end user;
- Medium voltage network connecting the power stations to the substation operating at around 33 kV;
- Voltage cables from string boxes to the sub-stations directly buried in trenches;
- Internal roads will be constructed within the project footprint;
- Stormwater channels will be constructed on site to allow for drainage;
- Temporary work area during construction;
- Office building (with ablution facilities); and
- Perimeter fencing.

The proposed development footprint is approximately 210 hectares, and the total size of the affected farms (project site) is approximately 264 hectares. The development footprint includes the solar field and all associated infrastructure. A detailed project layout and specifications of the project components will be formulated at final design phase, a preliminary site layout within the 264 hectare project site has been included in this report (**Figure 4-1**).

Table 2-1 provides a summary of the project components ad respective specifications.

Table 2-1: Project components and respective specifications

PROJECT COMPONENT	SPECIFICATIONS (AREA, HEIGHT AND LENGTH/WIDTH)
PV Modules on trackers	Full footprint of approximately 210 ha Maximum 3m height
Operations building (including offices and storeroom area)	Footprint of approximately 0.3 ha 5m height
On-site Substation	0.3 ha
Internal roads	Total area of approximately 6 ha Total length of 15 000m x 4m width

PROJECT COMPONENT	SPECIFICATIONS (AREA, HEIGHT AND LENGTH/WIDTH)
Voltage cable trenches	1m depth and 700mm width
Fence (concrete palisade)	Total perimeter of 9 119.7 m Approximately 2.4m height

The Solar PV Facility will highly likely connect to the Eskom's Nevis substation located on Portion 4 Farm 241 PALMIETKUILEN via existing 132kV grid (subject to Eskom's confirmation).

2.2 PROJECT DEVELOPMENT PHASES

2.2.1 CONSTRUCTION PHASE

The construction phase includes the preparatory works typically associated with solar PV developments, and will consist of the following key activities:

- Vegetation clearance in the areas required for building infrastructure and brush cutting in the areas of panel installation;
- Removal (including excavation) of old mine shaft building foundations;
- Establishment of a laydown area or construction camp;
- Transportation of equipment and material to the site;
- Stripping and levelling 50mm to 100mm of topsoil for 4m wide internal roads construction;
- Grading and closing-off of existing trenches;
- Excavation of 1m deep trenches for low voltage cabling;
- Erection of concrete palisade fence;
- Substation construction and associated earthworks and tracker foundations; and
- Installation of the solar PV panels and associated infrastructure (operations buildings).

2.2.2 OPERATIONAL PHASE

The operational phase includes the following activities:

- The generation of energy from the proposed Solar PV facility for electricity supply; and
- Periodic inspections and maintenance of the Solar PV facility.

2.2.3 DECOMMISSIONING PHASE

The proposed Solar facility is expected to be operational for approximately 25 – 30 years. Should it be decided not to extend beyond the 25 – 30 years lifespan, the facility will be decommissioned. The decommissioning phase includes the activities associated with the removal/dismantling of Solar PV facility and associated infrastructure when no longer necessary. This would entail returning the land to its pre-construction state.

2.3 SERVICE PROVISION

2.3.1 WATER

The proposed development will require water for use during the construction and operational phase. It is proposed that water will be delivered every two or three days using water trucks during construction. The water will be sourced from the municipality and stored in a water tank on site. During the operational phase water will be required for the cleaning of panels and for domestic purposes at the office building. The proposed project will require approximately 30 000 kilolitres per year during operations. Engagement with municipality and Rand Water is ongoing regarding the installation of water connection and appropriate water meter.

Alternative sources of water supply, such as groundwater supply will be investigated should the municipality not be able to provide water for the project. A groundwater assessment would need to be undertaken, and the applicable water use registered in terms of the WUL.

2.3.2 ELECTRICITY

The developer will request auxiliary supply from already existing Eskom infrastructure in the area for electricity requirements during the operational phase. The exact source for the supply and provision route will be determined during the final engineering phase. No electricity supply requirements will be required during construction phase. A small generator to power the construction site will be provided. Minimal electricity will be required during the operation stage for office use. Battery backup for alarm systems will be used during operations; however, these will not be at a scale of industrial use.

2.3.3 WASTE

Domestic waste, packaging material, building rubble, excess soil material and hazardous waste generated during the construction phase will be managed in line with the EMPr (**Appendix J** of this BA Report). Waste will be collected on a regular basis for disposal by a licensed contractor at an appropriate licensed facility. Designated waste skips will be available on site to place waste prior to collection for disposal. Limited waste generation is expected during operational phase.

2.3.4 SEWAGE AND EFFLUENT

The proposed development will require sewage services during the construction and operational phase. The project will make use of temporary ablution facilities (portable chemical toilets) during construction, and these will be serviced by a private contractor on regular basis. There is no sewage connection in close proximity to the site, and therefore a septic tank system connected to the office building will be used during the operational phase. This will be serviced by a private contractor.

2.4 PROJECT JUSTIFICATION (NEED AND DESIRABILITY)

South Africa is the seventh coal producer in the world, with approximately 77% of the country's electricity generated from coal. South Africa is also the highest emitter of greenhouse gases in Africa; attributed to the country's energy-intensive economy that largely relies on coal-based electricity generation. This large dependence on coal and its use has also resulted in a variety of negative impacts on the environment, including the contribution to climate change. Additionally, with the increased population and increased economic activity, South Africa is faced with significant increases in electricity demand.

The country, however, has a high potential for renewable energy generation to supplement the energy crisis or demand. In particular, South Africa has a good potential for solar energy generation due to the high amount of solar radiation received in most parts of the country. Average daily solar radiation varies between 4.5 to 6.6 kilowatt hours per square metre (kWh/m^2), which is some of the highest levels in the world.

On a provincial level, Gauteng, as the economic hub of South Africa, contributes significantly to the country's greenhouse gas emissions. Therefore, making it important for Gauteng to consider alternative energy supply that can reduce the reliance on fossil fuels. A move towards renewable energy as a source of energy is necessary to contribute to climate protection and improving energy efficiency for the major users of energy, such as the industrial sector. One of the key initiatives of the CoE Municipality is to protect the natural environment and promote resource sustainability; with the objective, amongst others, to increase the generation of renewable energy and reduce the reliance on electricity generated and supplied by Eskom.

The proposed project is located on the old Sappi land in the CoE Municipality; previously used for industrial purposes since 1938. Numerous large industrial companies are operating in the vicinity of the project area. The development of the proposed PV plant would strengthen the existing electricity grid for the area. The electricity generated from this development would be supplied to private off-takers, including commercial users. Long term off-take agreement with neighbouring businesses is envisaged with Calodex and the Partners developing and funding the project. Some of the industrial companies in the area have indicated their willingness to be the off-takers of the proposed energy supply. The use of this land for renewable energy has a considerable potential to improve the reliability of the supply of electricity to neighbouring commercial users, as well as generate the much-needed employment opportunities within the CoE Municipality.

3 GOVERNANCE FRAMEWORK

The scope of this BA Report has been informed by the following legislation, policy and/or guidelines. The Specialist studies undertaken as part of this BA process also include a description of the relevant applicable legislation.

3.1 NATIONAL LEGISLATION

3.1.1 THE CONSTITUTION OF SOUTH AFRICA (NO. 108 OF 1996)

Since 1994 South African legislation, including environmental legislation has undergone a large transformation and various laws and policies were promulgated with a strong emphasis on environmental concerns and the need for sustainable development. The Constitution of South Africa (No. 108 of 1996) (The Constitution) provides environmental rights (contained in the Bill of Rights, Chapter 2, Section 24) and includes implications for environmental management. Environmental rights are guaranteed in Section 24 of the Constitution, which states that:

"Everyone has the right –

- *To an environment that is not harmful to their health or well-being and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*

  (1) Prevent pollution and ecological degradation;
  (2) Promote conservation and
  (3) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.

The environmental management objectives of this BA Report is to protect the ecologically sensitive areas associated with the site and to support the sustainable use of natural resources, whilst promoting justifiable socio-economic development in the CoE Municipality.

3.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998)

The NEMA provides the environmental legislative framework for South Africa and requires that activities be investigated that may have a potential impact on the environment, socio-economic conditions, and cultural heritage. The results of such investigation must be reported to the relevant authority. Procedures for the investigation and communication of the potential impact of activities are contained in Section 24(7) of the Act.

The proposed development will require the consideration and implementation of environmental management practices in all stages of the project. An application for EA for the proposed project is submitted in terms of GNR 326 of the EIA Regulations promulgated under NEMA.

ENVIRONMENTAL IMAPCT ASSESSMENT REGULATIONS

The EIA Regulations, as amended, contain three listing notices (GNR 327, 325 and 324) which identify activities that are subject to either a BA or Scoping and Environmental Impact Assessment (S&EIA) in order to obtain an EA. **Table 3-1** outlines the listed activities that are triggered by the proposed project. Based on the

determination below, activities listed in GNR 327 and 324 are applicable. A BA must be completed if the proposed project triggers activities listed in GNR 327 (Listing Notice 1) or GNR 324 (Listing Notice 3).

Table 3-1: Determination of Applicable GNR 327 and GNR 324 Listed Activities

LISTED ACTIVITY	APPLICABILITY TO THE PROJECT
Basic Assessment Activities as set out in Listing Notice 1 (GNR 327)	
Activity 27 The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation…	The proposed project will entail the construction of a Solar PV Facility covering an area of approximately 210 hectares. Based on upfront Biodiversity Screening and Biodiversity Assessment undertaken, the project area has been altered extensively (as a result of historic industrial use and cultivation – Lucerne and soya), and small portions of indigenous vegetation exist. The extent of the grassland area measured approximately 62.5 ha, and comprises of degraded and highly degraded grassland. The area of indigenous vegetation that needs to be cleared is approximately 6.6 ha, and is therefore less than 20 ha, and will include the following: – Roads grading / compacting, is 15 km x 4 m wide = 60 000 m^2 (6 ha). Some roads are already present and thus less hectare for grassland clearance may be required, most of the new roads will be constructed over the current soya fields and the impact on grass land will be minimal; – Surface of Substation is +-3000 m^2 (0.3 ha); and – Offices, storeroom area, parking, water treatment etc will be +-3000 m^2 (0.3 ha)
Activity 28 Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: ii) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares	The proposed project site is located on several farm portions within an urban area, as indicated in the CoE Municipality Regional Spatial Development Framework (Region D) (see Urban Development Boundary map in **Figure 3-1**). The land is currently used for agricultural purposes. It is also noted that according to the CoE Municipality Town Planning Scheme, Portion 44 and Portion 208 of Farm Geduld 123 are zoned for Agriculture. Calodex has applied for the rezoning of the site to allow for the solar facility land use. The Ekurhuleni Municipality has advised that the consent use process must include the solar facility development application as well as maintain the existing land use. The development is therefore considered a mixed development.
Activity 67 Phased activities for all activities- (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices.	The proposed Solar PV Facility will be established as a phased development.
Basic Assessment Activities as set out in Listing Notice 3 (GNR 324)	

LISTED ACTIVITY	APPLICABILITY TO THE PROJECT
Activity 12 The clearance of an area of 300 square meters or more of indigenous vegetation… **c. Gauteng** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004" ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans.	The proposed project will entail the construction of a Solar PV Facility covering an area of approximately 210 hectares. Based on upfront Biodiversity Screening and Biodiversity Assessment undertaken, the project area has been altered extensively (as a result of historic industrial use and cultivation – Lucerne and soya), and small portions of indigenous vegetation exist. The extent of the grassland area measured approximately 62.5 ha, and comprises of degraded and highly degraded grassland. The area of indigenous vegetation that needs to be cleared is approximately 6.6 ha, and is therefore more than the listed threshold of 300 m^2. According to the Gauteng Conservation Plan (C-Plan) the site intersects portions of CBA: Important Area on the boundaries of Portion 207 and Portion 37 of farm Geduld 123. Additionally, Portion 207 and Portion 37 of farm Geduld 123 overlap with limited portions of an Ecological Support Area (ESA), as identified by the Gauteng C-Plan.
Activity 14 The development of: (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs: (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; **c. Gauteng** iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);	The proposed project will entail the construction of a Solar PV Facility covering an area of approximately 210 hectares. Based on the findings of the Wetland assessment a relic wetland[1] area was identified for the project, in the location of the historical lime dams. According to the Gauteng C-Plan the site intersects portions of CBA: Important Area on the boundaries of Portion 207 and Portion 37 of farm Geduld 123. Additionally, Portion 207 and Portion 37 of farm Geduld 123 overlap with limited portions of an Ecological Support Area (ESA), as identified by the Gauteng C-Plan. Additionally, the site falls within a threatened ecosystem (Vulnerable) identified by the Gauteng C-Plan.

[1] According to Jobs (2009) relic wetlands are systems that display indicators of soil wetness, but these systems are no longer a functioning wetland (e.g. relic / historical wetland). In the instance of the potential relic wetland area, the soil morphology appears to be inconsistent with the landscape, vegetation, or observable hydrology (Jobs, 2009). The wetland systems identified on-site are all characterised by high levels of modification, predominantly due to historic mining activities as well as altered surface flow dynamics. Only the natural wetland systems were considered by the Specialist for the Wetland assessment.

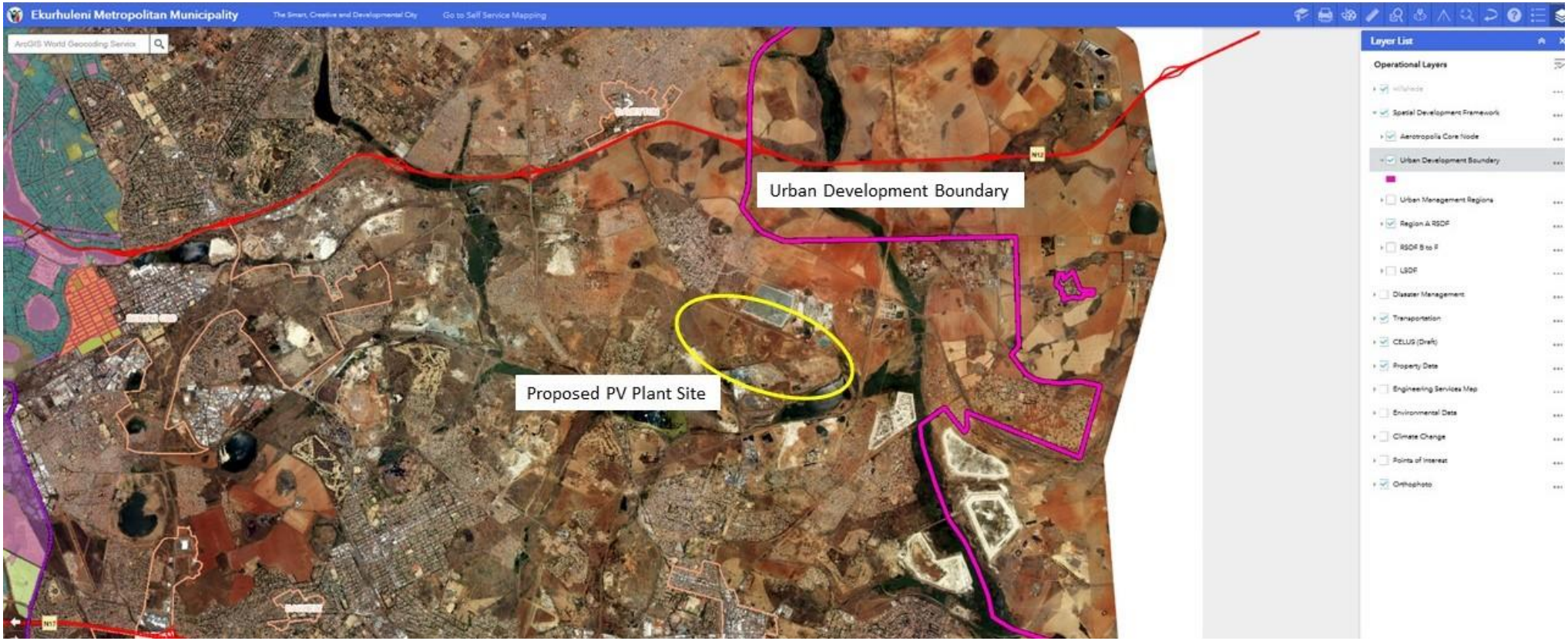


Figure 3-1: Project location in relation to the City of Ekurhuleni Metropolitan Municipality Urban Development Boundary

3.1.3 NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (NO. 59 OF 2008)

The National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEM:WA) is subsidiary and supporting legislation to the NEMA. The Act is a framework legislation that provides the basis for the regulation of waste management. The Act also contains policy elements and gives a mandate for further regulations to be promulgated.

On 29 November 2013 GNR 921 was promulgated (repealing GNR 718) which contains a list of waste management activities that if triggered require a Waste Management License (WML) and in turn a Basic Assessment (Category A activities) or Scoping and EIA (Category B activities) process to be undertaken in terms of the NEMA EIA Regulations. Category C activities are required to comply with the Norms and Standards for Storage of Waste 2013 (GN. 926) and do not require authorisation.

Waste handling, storage and disposal during the construction and operational phases of the project must be undertaken in accordance with the requirements of this Act and the Best Practicable Environmental Options which will be incorporated into the site specific Environmental Management Programme (EMPr) (**Appendix J**).

3.1.4 NATIONAL WATER ACT (NO.36 OF 1998)

The National Water Act (No. 36 of 1998) (NWA) governs the protection of water resources and water use. Section 21 of the Act identifies certain land uses, infrastructure developments, water supply or demand and waste disposal as water uses that require authorisation by the Department of Water and Sanitation (DWS). Water use is defined broadly in the NWA, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering the bed, banks, course or characteristics of a watercourse, removing water found underground for certain purposes, and recreation. In general, a water use must be licensed unless it is listed in Schedule 1, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence.

Based on the location of the project and the surrounding environment, as well as the Wetland Assessment undertaken for the project, the Section 21 water uses (as outlined in Chapter 4 of the NWA) that have been identified for the proposed project are:

- Section 21 (c) - Impeding or diverting the flow of water in a watercourse;
- Section 21 (i) - Altering the bed, banks, course or characteristics of a watercourse; and
- Section 21 (g) - Disposing of waste in a manner that may detrimentally impact a water resource.

In order to determine the authorisation requirements for the proposed Solar PV facility, a risk assessment has been undertaken as part of the Wetland Assessment (**Appendix C** of this BA Report) in line with the requirements as outlined in Government Notice 5091(August 2016). The risk assessment (The Biodiversity Company, 2021) concluded that in terms of Water Use Authorisation, owing to the expected post-mitigation Low risks, a General Authorisation (GA) is permissible for the development.

A pre-application Water Use Licence (WUL) enquiry and meeting was undertaken with DWS to confirm the WUL application process to be followed. Confirmation was received from DWS on 26 May 2021 that a GA process will be followed for the application (reference: WU19800). An application for the registration of water uses(s), authorized in terms of GA is currently underway for this project.

3.1.5 NATIONAL ENVIRONMNETAL MANAGEMENT BIODIVERSITY ACT (NO. 10 OF 2004)

The National Environmental Management: Biodiversity Framework Act, 2004 (No. 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI).

SANBI was established by the NEMBA with the primary purpose to report on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems.

The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) Regulations with regards to alien and invasive species have been superseded by the NEMBA – Alien and Invasive Species (AIS) Regulations which became law on 01 October 2014.

Specific management measures for the control of alien and invasive plants have been included in the EMPr (**Appendix J**).

3.1.6 NATIONAL HERITAGE RESOURCES ACT (NO. 25 OF 1999)

The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by SAHRA, and lists activities which require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.

Part 2 of the NHRA details specific activities that require a Heritage Impact Assessment (HIA) that will need to be approved by SAHRA. Parts of Section 35, 36 and 38 apply to the proposed project, principally:

- Section 35 (4) - No person may, without a permit issued by the responsible heritage resources authority-
- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite.
- Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-
- any development or other activity which will change the character of a site— (i) exceeding 5 000 m^2 in extent, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

A HIA and a Palaeontological Impact Assessment (PIA) were undertaken during this BA process for the proposed project. These specialist studies are included in **Appendix F** and **Appendix G** of this BA Report. According to the HIA no sites of heritage significance were identified. Known sites, including graves, in the vicinity are at least 3 km from the project site. A number of remains of old buildings and structures were however noted. These are merely ruins and floor levels remaining and thus have no heritage significance.

3.1.7 CIVIL AVIATION ACT (NO. 13 OF 2009)

Civil aviation in South Africa is governed by the Civil Aviation Act, 2009 (No. 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SA CAA) as an agency of the Department of Transport (DoT). The SA CAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All

proposed developments or activities in South Africa that potentially could affect civil aviation must thus be assessed by SACAA in terms of the SA CARs and South African Civil Aviation Technical Standards (SA CATS) in order to ensure aviation safety.

The Obstacle Evaluation Committee (OEC) which consists of members from both the SA CAA and South African Air Force (SAAF) fulfils the role of streamlining and coordinating the assessment and approvals of proposed developments or activities that have the potential to affect civil aviation, military aviation, or military areas of interest. With both being national and international priorities, the OEC is responsible for facilitating the coexistence of aviation and renewable energy development, without compromising aviation safety.

The details of the project will be provided to the SA CAA, which will be required to provide comment on the proposed location and development of the Solar PV facility. It is however noted that the proposed Solar PV facility is not located near any airports or airfields.

3.1.8 OCCUPATIONAL HEALTH AND SAFETY ACT (NO. 85 OF 1993)

The Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations, is essential. It is noted that adherence to the South African OHSA will also ensure adherence to the relevant occupational health and safety provisions contained within the International Finance Corporation (IFC) general Environmental, Health and Safety (EHS) Guidelines 2007, given that the South African standards either meet or exceed the relevant IFC guidelines.

3.1.9 NATIONAL ENERGY ACT (NO. 34 OF 2008)

The National Energy Act (No. 34 of 2008) was promulgated in 2008. The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors.

The main objectives of the act-

- Ensure uninterrupted supply of energy to the Republic;
- Promote diversity of supply of energy and its sources;
- Facilitate effective management of energy demand and its conservation;
- Promote energy research;
- Promote as appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy;
- Ensure collection of data and information relating to energy supply, transportation and demand;
- Provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development;
- Provide for certain safety, health and environment matters that pertain to energy;
- Facilitate energy access for improvement of the quality of life of the people of Republic;
- Commercialise energy-related technologies;
- Ensure effective planning for energy supply, transportation and consumption; and
- Contribute to sustainable development of South Africa's economy.

The Act provides the legal framework which supports the development of renewable energy facilities for the greater environmental and social good.

3.2 PROVINCIAL/LOCAL PLANNING LEGISLATION

3.2.1 GAUTENG ENVIRONMENTAL MANAGEMENT FRAMEWORK

The Gauteng Provincial Environmental Management Framework (GPEMF), 2015 is a legal instrument in terms of the Environmental Management Framework Regulations, 2010.

The objective of the GPEMF is to guide sustainable land use management within the Gauteng Province. The GPEMF, inter alia, serve the following purposes:

- To provide a strategic and overall framework for environmental management in Gauteng;
- Align sustainable development initiatives with the environmental resources, developmental pressures, as well as the growth imperatives of Gauteng;
- Determine geographical areas where certain activities can be excluded from an EIA process; and
- Identify appropriate, inappropriate and conditionally compatible activities in various Environmental Management Zones in a manner that promotes proactive decision-making.

In terms of the GPEMF, 2015 the proposed site falls within Environmental Management Zone 3 (special control zones) and Zone 4 (normal control zone). Special control zones are sensitive areas outside the urban development zone. These areas are sensitive to development activities and in several cases also have specific values that need to be protected. Areas in this zone include:

- Critical Biodiversity Areas (CBAs) (Irreplaceable and Important areas) and Ecological Support Areas (ESAs) outside the urban development zone as defined in the Gauteng Conservation Plan;
- Rivers (including a 32m buffer on each side) and currently undeveloped ridges that must be conserved;
- Areas that are sensitive (as determined in the sensitivity assessment); and
- Protected areas.

No listed activities may be excluded from environmental assessment requirements in this zone and further activities may be added where necessary to protect the environment in this zone.

Normal control zones are dominated by agricultural uses outside the urban development zone as defined in the Gauteng Spatial Development Framework. No listed activities may be excluded from environmental assessment requirements in this zone.

It is however noted that according to the CoE Municipality Regional Spatial Development Framework (Region D) the proposed project site is located within an urban area (as indicated in the Urban Development Boundary map in **Figure 3-1**).

3.2.2 EKURHULENI METROPOLITAN SPATIAL DEVELOPMENT FRAMEWORK

The CoE Municipality approved the Metropolitan Spatial Development Framework (MSDF) for Ekurhuleni in April 2011 in accordance with the provisions of Section 26(e) of the Municipal Systems Act 32 of 2000.

In terms of the above-mentioned act, a metropolitan municipality also needs to prepare Regional Spatial Development Frameworks (RSDFs), for its area of jurisdiction, to facilitate the development of the metropolitan municipality as envisaged in the MSDF.

The purpose of the MSDF is to indicate to members of the public and others with an interest in the city, the desired long-term proposals that will affect the spatial form of the Ekurhuleni metropolitan area and to:

- Provide a long-term vision of the desired spatial form and structure of the CoE Municipality;
- Align the CoE Municipality's spatial development goals, strategies and policies with relevant national and provincial spatial principles, strategies and policies;
- Spatially co-ordinate, prioritise and align public investment in the municipality;
- Direct private investment by identifying areas that are suitable for urban development, areas where the impacts of development need to be managed, and areas that are not suited for urban development;

- Identify strategies to prevent loss and degradation of critical biodiversity areas, and ensure the necessary level of protection for the remaining areas; and
- Provide policy guidance to direct decision-making on the nature, form, scale and location of urban development, land-use change, infrastructure development and environmental resource protection.

The Applicant is also currently engaging the CoE Municipality regarding the land rezoning process and a pre-application phase has been undertaken for the consent use of the site to allow for the solar facility land use.

4 ALTERNATIVES

Sections 24(4) (b) (i) and 24(4A) of the NEMA require that an environmental assessment include the investigation and assessment of impacts associated with alternatives to the proposed project. Additionally, Section 24O (1)(b)(iv) requires that the Competent Authority, when considering an application for EA, takes into account where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment

Key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". In other words, while a range of alternatives might exist, not all will be necessarily appropriate for the project under consideration.

This section discusses the alternatives that have been considered as part of this BA process.

4.1 SITE ALTERNATIVES

The proposed site is located on the old Sappi land and was previously used as a mining site and a landfill. This land was purchased by the Applicant (Calodex) from the landowner (Sappi Southern Africa Ltd) in 2019 for purposes of developing a solar farm. The land transfer process is currently underway. The Applicant considered the site suitable due to the land being; surrounded with good electrical transmission infrastructure (powerlines, substations), with good topological features (fairly flat), underutilised and somewhat neglected for a long time. The rejuvenation of the land and its utilisation for renewable energy was deemed to have substantial potential to improve the reliability of electricity supply as well as generate much needed employment in CoE Municipality.

The site is located in an industrial node north of Springs Town. Industrial activities in this area date as far back as 1938, with the establishment of Sappi's first formal paper mill. Currently numerous large industrial companies are operating in this area and could benefit from the renewable energy to be supplied by the proposed development.

The site is surrounded by Eskom's high voltage network that is used to supply large industrial users and the CoE Municipality grid. Numerous substations are on the property boundary and have capacity to evacuate the full capacity of the proposed solar plant.

Furthermore, the site can be accessed via existing roads and would not require road construction for site accessibility.

4.2 LAND USE ALTERNATIVES

In terms of the Municipality's Town Planning Scheme, the project site falls within areas zoned as agriculture and industrial. At present the site largely consists of vegetation and soya bean fields. According to the Soil and Agricultural Potential Study (**Appendix H** of this BA Report) undertaken for the site, majority of the site has a land capability classification II, indicating suitability for light and intensive cultivation.

Solar development is however the preferred alternative due to the significant potential of the project to be the largest solar generation project in Gauteng. Solar radiation in Gauteng is considered sufficient for the profitable operation of a plant of this magnitude. The location of the proposed project has a considerable potential to provide green energy in an area where most of the large energy consumers are located. Developing a renewable energy project close to the energy users represents a logical path with minimal transmission losses due to the proximity of electricity generators and users. Therefore, in terms of identified demand and location compatibility, the proposed Solar PV facility is deemed a more feasible land use alternative for this site. It is important to note that the solar PV facility use of the land doesn't automatically excludes the agricultural use. It only specifies that primary use of the land is for the production of solar generated electricity.

4.3 LAYOUT ALTERNATIVES

A preliminary design has been undertaken for this project to determine the suitable areas within the 264 ha hectare total project area. Additionally, studies to inform the environmental sensitivity of the site have been undertaken to indicate sensitivities within the 264 ha area. Based on the above, a preliminary layout which excludes environmental sensitive areas and restricted areas in terms of engineering constraints has been determined. These sensitive features and constraints include Eskom servitudes, railway reserves, wetland, as well as planned development areas for provincial roads. The preliminary layout is shown in (**Figure 4-1**) and avoids the wetland areas identified as having a high sensitivity in terms of the Wetland Study.

It is important to note that the larger 264 ha project area was assessed by the Specialists, and the final layout will be located within the boundary of this larger assessed area. Any revisions and/or updates of the layout within this 264 ha area would not be regarded as an alteration of project scope/description, or a change in the impact assessment findings of this BA and associated Specialist studies.

4.4 TECHNOLOGY ALTERNATIVES

4.4.1 SOLAR PANEL TYPES

The most commonly used solar generating technologies include PV and Concentrated Solar Power (CSP). The preferred technology identified for this project is PV solar panel technology. The advantages of this technology include the following:

- PV panels provide clean energy. During electricity generation there is no emission of harmful greenhouse gasses;
- PV cells have a very long lifespan and require minimum upkeep;
- PV is currently the lowest price solar technology;
- Minimal operations and maintenance support staff are required;
- A minimal amount of water is required;
- Solar energy does not deplete non-renewable resources such as coal, gas and oil used in conventional thermal power plants; and is therefore sustainable;
- Solar energy is a locally available and thus alleviates the greenhouse gas emissions associated with the transportation of fuel typically required in conventional power plants.

Concentrated Solar Power (CSP) technology is not considered feasible for this project location and size. CSP requires a large volume of water further. Furthermore, CPV (Concentrated Photovoltaic) technology requires a larger development footprint to obtain the same energy output as PV technology.

4.4.2 MOUNTING SYSTEM

Solar panels can be mounted in various ways to ensure maximum exposure of the PV panels to sunlight. The main mounting systems include single axis tracking systems, dual axis tracking system and fixed tilt mounting structure. In a fixed tilt mounting structure, the PV panels are installed at a set tilt facing north and cannot move, whereas in a single axis tracking system the panels follow the sun to ensure increased exposure to sunlight, this functionality comes at a higher monetary cost to that of fixed tilt. In a dual axis tracking system, the PV panels can follow the sun from east to west, as well as follow the suns altitude Dual axis tracking systems can therefore follow the sun throughout the day both horizontally and vertically, however this functionality comes at even higher monetary cost. The mounting system considered in the design of this project is the single axis tracking system. Single-axis trackers are designed to minimize the angle of incidence between the incoming sun rays and the photovoltaic panel plane of array. The tracking system consists of an electric motor, steel structures and electronic device capable of following the sun through the day.

4.5 NO-GO ALTERNATIVE

The no-go alternative is the option of not constructing the proposed Solar PV facility, and to continue as per current status quo or baseline. The no-go alternative also entails that the environmental impacts (as detailed in **Section 5.2**) associated with development of a Solar PV facility would not occur.

In the event that the proposed project is not constructed, the following implications have been identified:

- Additional power generation to improve the reliability of electricity supply at this location will not be realised;
- Electricity supply for the industrial area at this location will remain constant (i.e. no potential of additional renewable energy to supplement or strengthen the electricity grid connection for this area);
- The local socio-economic benefits associated with the proposed project, such as creation of employment opportunities, will not be realised; and
- Benefits from an additional land-use of underutilised land will not be achieved.

Conversely, the following impacts/current impacts could occur/continue should the proposed project not go ahead:

- Only the agricultural land use (Lucerne or soya bean crop fields) will remain;
- No change to the current landscape will occur;
- The current impacts that are having a negative impact (as identified in the Biodiversity Assessment, **Appendix C** of this BA Report) on the area will remain;
  - Litter and general waste;
  - Secondary roads and cleared areas;
  - Invasive plant species;
  - Livestock grazing;
  - Harvesting of wood;
- No loss of a portion of a Critical Biodiversity Area (CBA): important area, as well as a portion of an Ecological Support Area (ESA) will occur; and
- No destruction, further loss and fragmentation of the vegetation community, and consequent loss of faunal species will occur.

As indicated in the Biodiversity Assessment (**Appendix C** of this BA Report of this report), all negative environmental impacts identified as part of this assessment can be reduced to low significance with the implementation of mitigation measures.

It is noted that while the no-go alternative will not result in any negative environmental impacts, it will also not result in any positive socio-economic impacts. Should the project not go ahead, the use of this land for renewable energy to potentially improve the reliability of the supply of electricity to neighbouring commercial users, and reduce the reliance on fossil fuels, will not be realised. Therefore, the no-go alternative is not a preferred alternative.

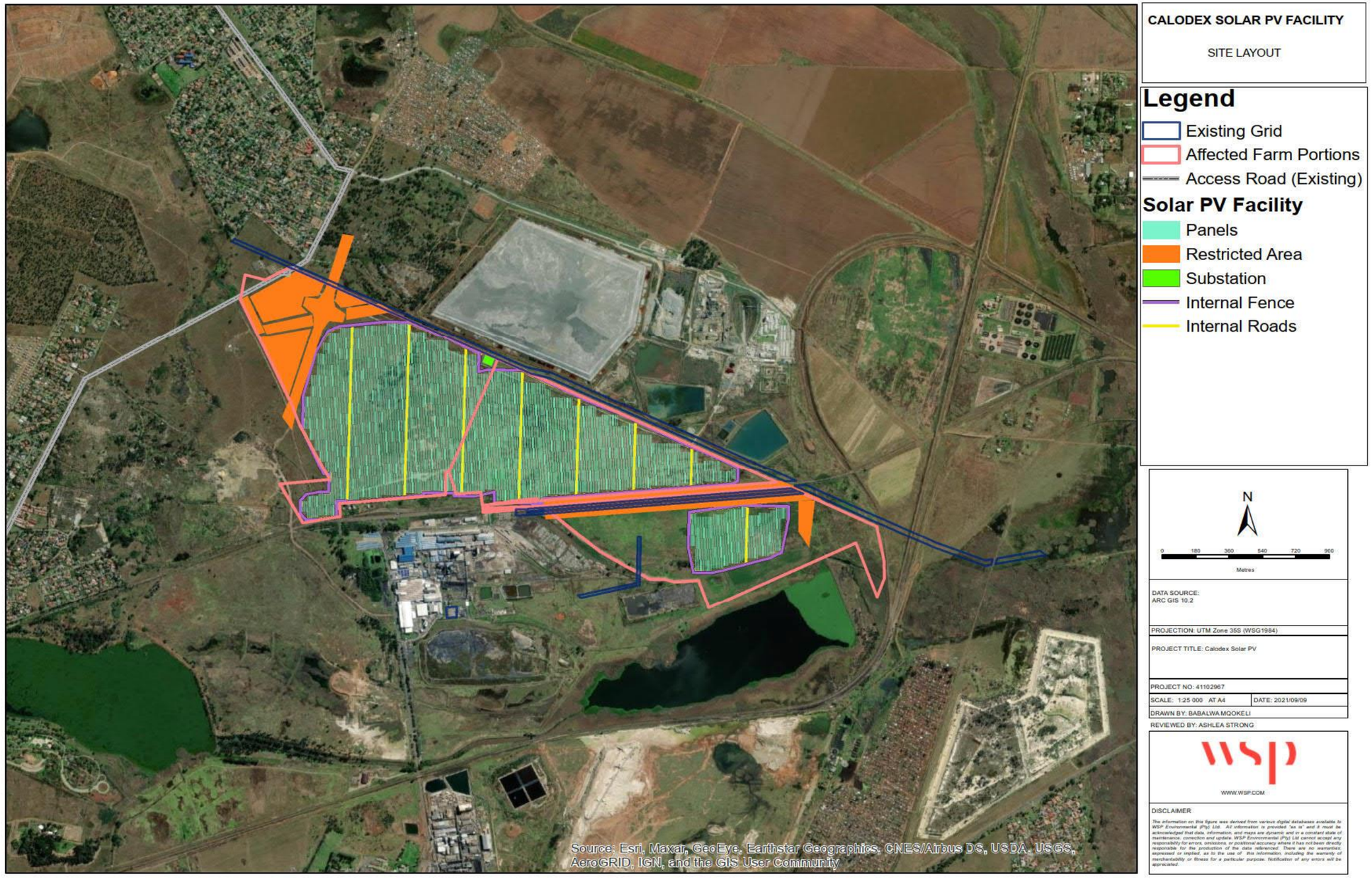


Figure 4-1: Preliminary Layout of the Solar PV Facility

5 DESCRIPTION OF THE BASELINE ENVIRONMENT

This section includes an overview of the biophysical and socio-economic receiving environment of the proposed project site and surrounding region.

5.1 CLIMATE

The regional climate is classified as mild, and generally warm and temperate. The area receives much less rainfall in winter than in summer. Average rainfall is approximately 755 mm per year, with most rainfall occurring in the summer months commonly associated with thunderstorms. The most rainfall occurs in December (136 mm) and the lowest average rainfall in July (4 mm) (**Figure 5-1**).

The average annual temperature is 16.1 °C, with January being the warmest month with an average of 19.8 °C. The lowest average temperature is in July at around 9.7 °C. (**Figure 5-2**).

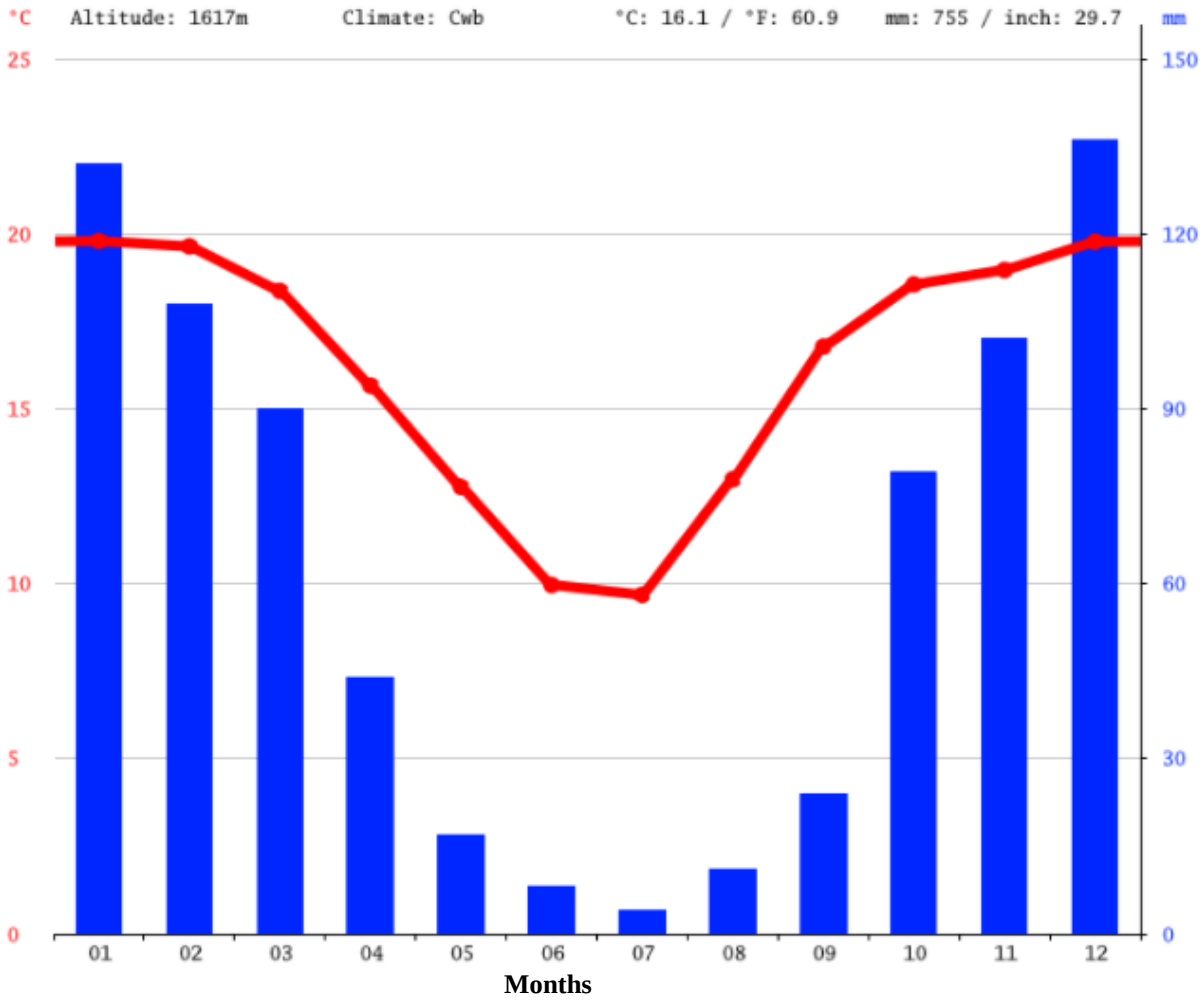


Figure 5-1: Average regional rainfall (Source: en.climate-data.org)

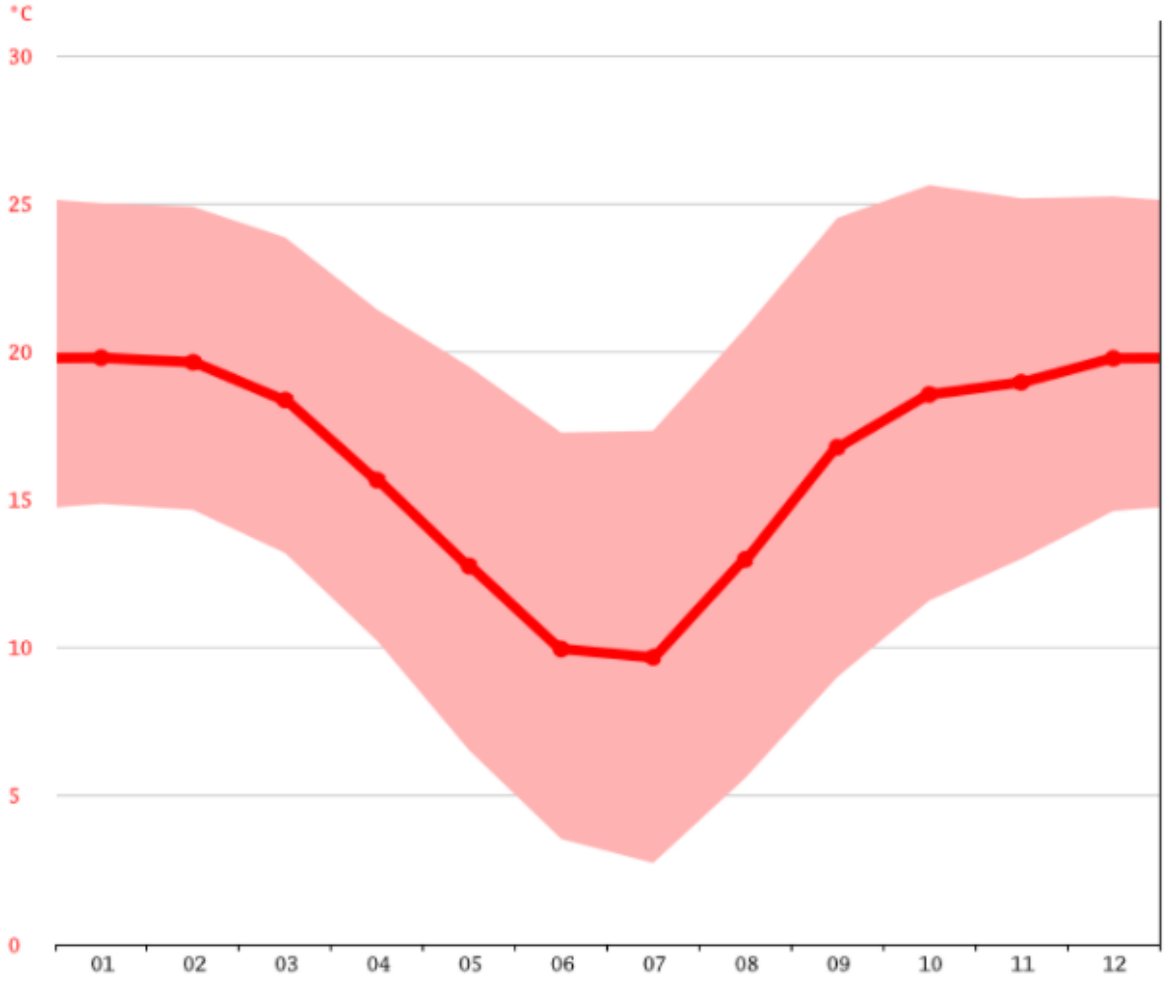


Figure 5-2: Average regional temperature (Source: en.climate-data.org)

5.2 GEOLOGY AND SOILS

According to the 1:250 000 geological map of the East Rand (2628), the area is underlain by the Dwyka Group Formation (CP-d) on the eastern side, and by Malmani dolomite (Vmd) of the Chuniespoort Group on the western side of the project area (**Figure 5-3**).

The Dwyka Group forms the lowest and oldest deposit of the Karoo Supergroup, overlain by the Ecca Group and underlain by the Witteberg Group, Bokkeveld or Table Mountain Groups and various other groups. It ranges in age from Late Carboniferous to early Permian. Clastic rocks containing diamictite, varved shale, conglomerate, pebbly sandstone and mudrock are present.

The Chuniespoort Group is made up of chemical and biochemical sediments such as dolomite, chert, limestone and banded iron formation, carbonaceous shale is also present. At the top of the Malmani Subgroup (Vmd) is the Duitschland Formation underlain by the Penge and Monte Christo Formations. Sandstone is mostly absent.

Soils within the area have been generally described as red, yellow and / or greyish soils with a low to medium base status. They are classified further as being freely drained soils devoid of macrostructure. According to the Soil and Agricultural Potential Study (**Appendix H**) undertaken as part of this BA process, the soil profiles at the study site generally indicated moderately deep soils at the points assessed (there were limited soil depths (500-700mm) at certain locations). Owing to the wide range of climatic conditions under which oxidic soils are found, there are limited generalisations that can be drawn about land use practices and potential problems. Some of the soil forms identified within the study area (Shortlands, Hutton and Clovelly) indicate suitability for

irrigated crop production. There may be insufficient moisture to sustain crop production in the dry months, therefore dryland production may not be suitable, depending on the crop choice(s).

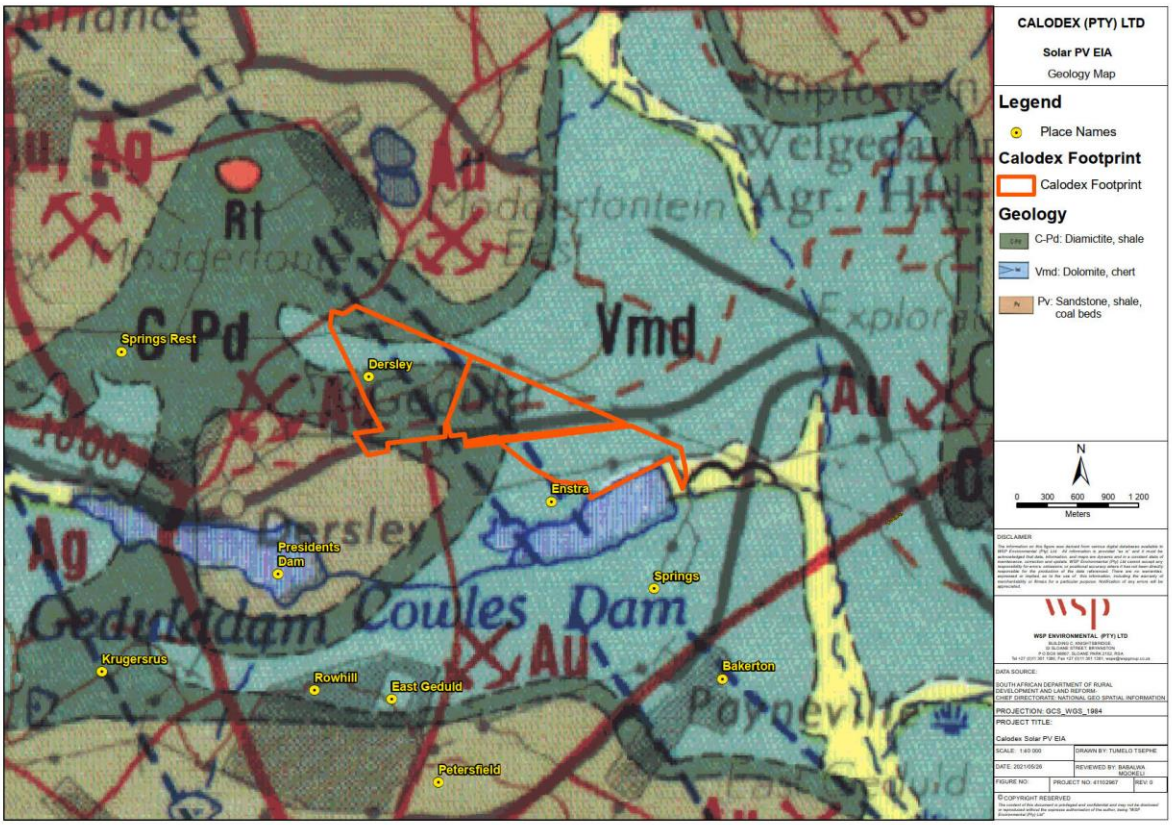


Figure 5-3: The geology associated with the proposed project area (WSP, 2021)

5.3 TOPOGRAPHY AND LANDSCAPE

The topography of the region surrounding the proposed Solar facility development is relatively flat and homogenous, consisting predominantly of plains. The elevation of the study area ranges from 1590m above sea level (a.s.l.) along the valley bottom of the Blesbokspruit River up to 1670m a.s.l. to the north-west of Daveyton.

The proposed development site slopes gently in a south easterly direction, with the highest point around 1620m, the lowest point at approximately 1575m.

There are no prominent hills within the study area and the most prominent topographical features are the slimes dams (tailings dams) and mine dumps associated with the mining activity in the area. In fact, the highest topographical feature is a mine dump west-north-west of the Alexander Dam, standing at almost 60m above average ground level. A topographic map of the study area is included in **Figure 5-4**.

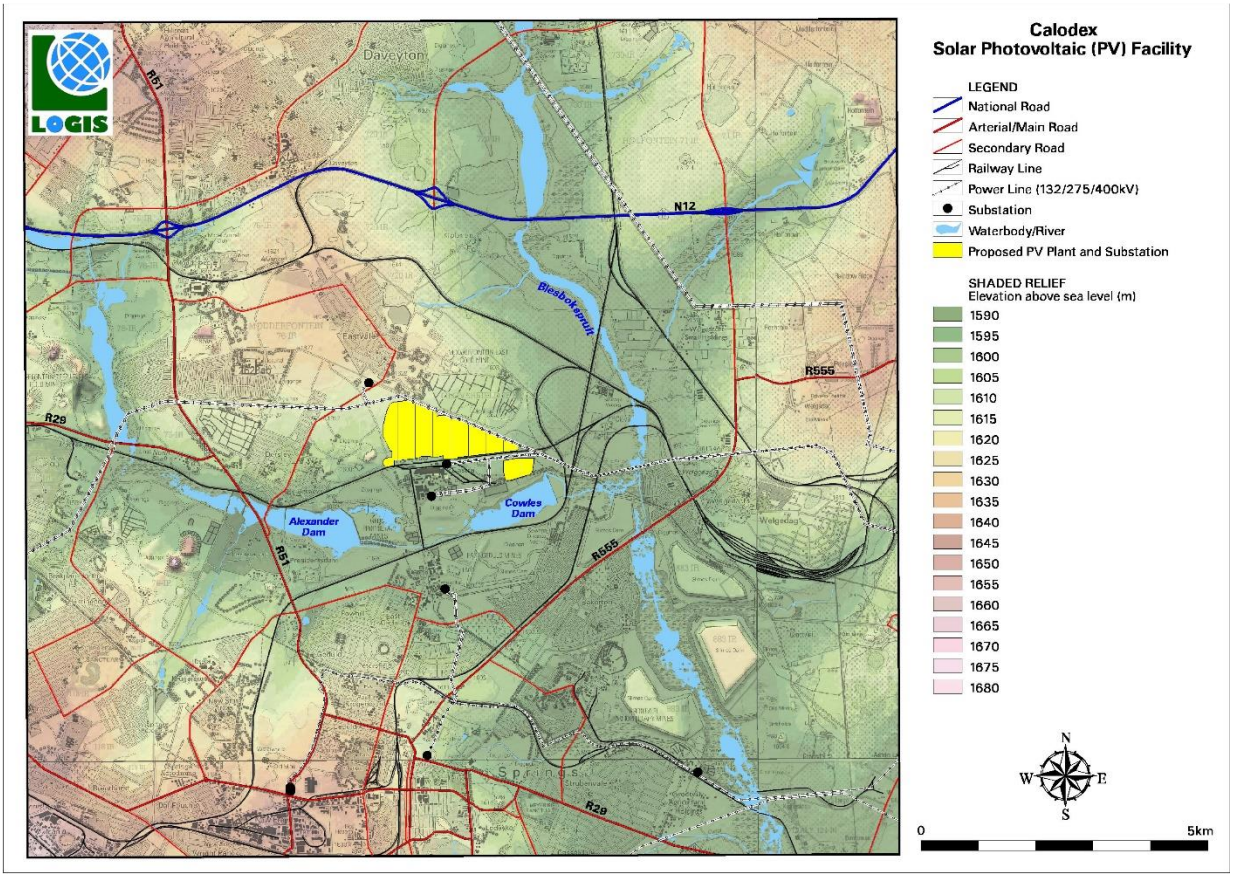


Figure 5-4: Topographic map of the area (LOGIS, 2021)

5.4 SURFACE WATER

In terms of surface water, the site is located within the Upper Vaal Water Management Area (WMA) (coded: 8). Major rivers in this WMA include the Wilge River, Liebenbergsvlei River, Mooi River and Vaal River. The project site is falls within C21D quaternary catchment.

The most prominent hydrological features in the project area are the Blesbokspruit perennial river, and the dams and wetlands traversing east and south of the proposed development site (**Figure 5-5**). Other than these features there are a number of mine and farm dams located within the region. The largest dams are the Alexander and Cowles Dams, both located south of the proposed development site. The southern part of the site intersect with a tributary to the Blesbokspruit river and the wetland system associated with the Cowles dam.

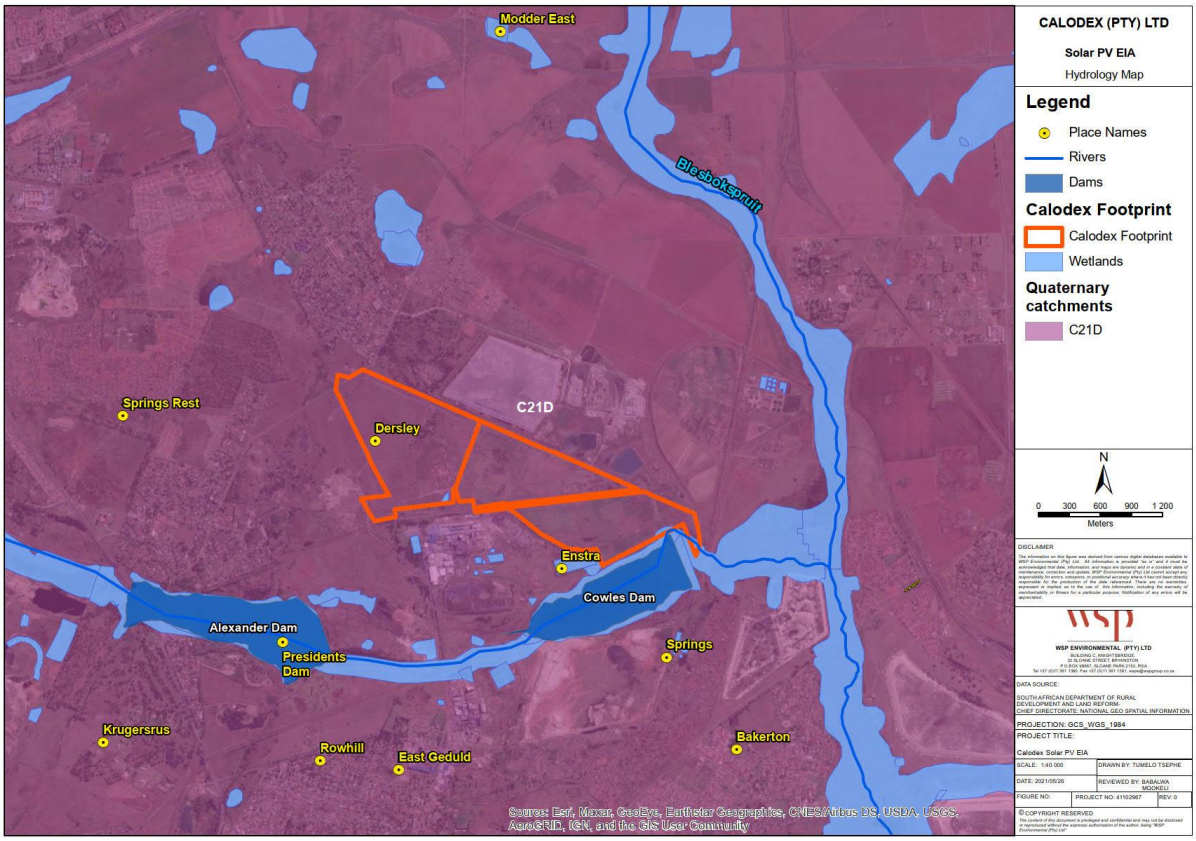


Figure 5-5: Aquatic environment associated with the proposed project area (WSP, 2021)

5.5 BIODIVERSITY

The biodiversity overview is based on desktop evaluations as well as field assessments (undertaken by the Biodiversity Specialist, **Appendix C**) of the site and surrounding area. According to the Biodiversity Assessment Report and Avifauna Report, no flora or fauna species of conservation concern (SCC) were found at the proposed development site.

5.5.1 TERRESTRIAL ENVIRONMENT

The proposed project site is located within the Grassland Biome of South Africa, mainly the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape (Mucina and Rutherford 2006). The Grassland Biome comprises of many different vegetation types. The proposed project site falls within the Soweto Highveld Grassland (Gm 8) vegetation type (**Figure 5-6**).

The Soweto Highveld Grassland vegetation type is found in Mpumalanga, Gauteng and to a very small extent also in Free State and North-West Provinces. This vegetation type typically comprises of an undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. Scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover (Mucina & Rutherford, 2006).

According to Mucina and Rutherford (2006), the Soweto Highveld Grassland vegetation type is classified as Endangered. The national target for conservation protection for this vegetation type is 24%, and only a handful of patches are statutorily conserved in Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, Rolfe's Pan Nature Reserves or privately conserved in Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves and the Heidelberg Natural Heritage Site.

According to the Gauteng Conservation Plan the site intersects portions of CBA: Important Area on the boundary of Portion 207 of farm Geduld 123. Additionally, Portion 207 and Portiond 37 farm Geduld 123 overlap with limited portions of an Ecological Support Area (ESA), as identified by the Gauteng Conservation Plan.

Furthermore, the site falls within a threatened ecosystem (Vulnerable), in terms of the terrestrial ecosystem threat status, as identified by the Gauteng Conservation Plan.

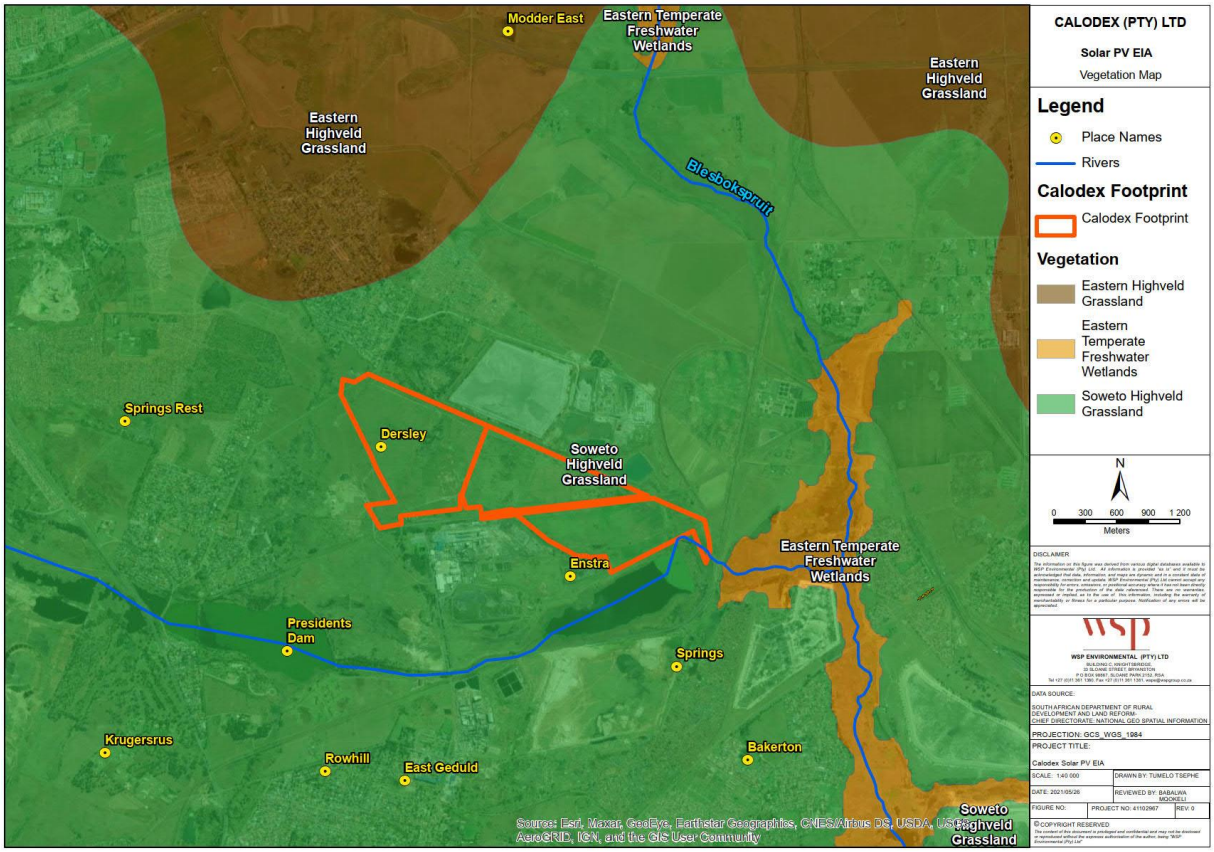


Figure 5-6: Vegetation type associated with proposed project site (WSP, 2021)

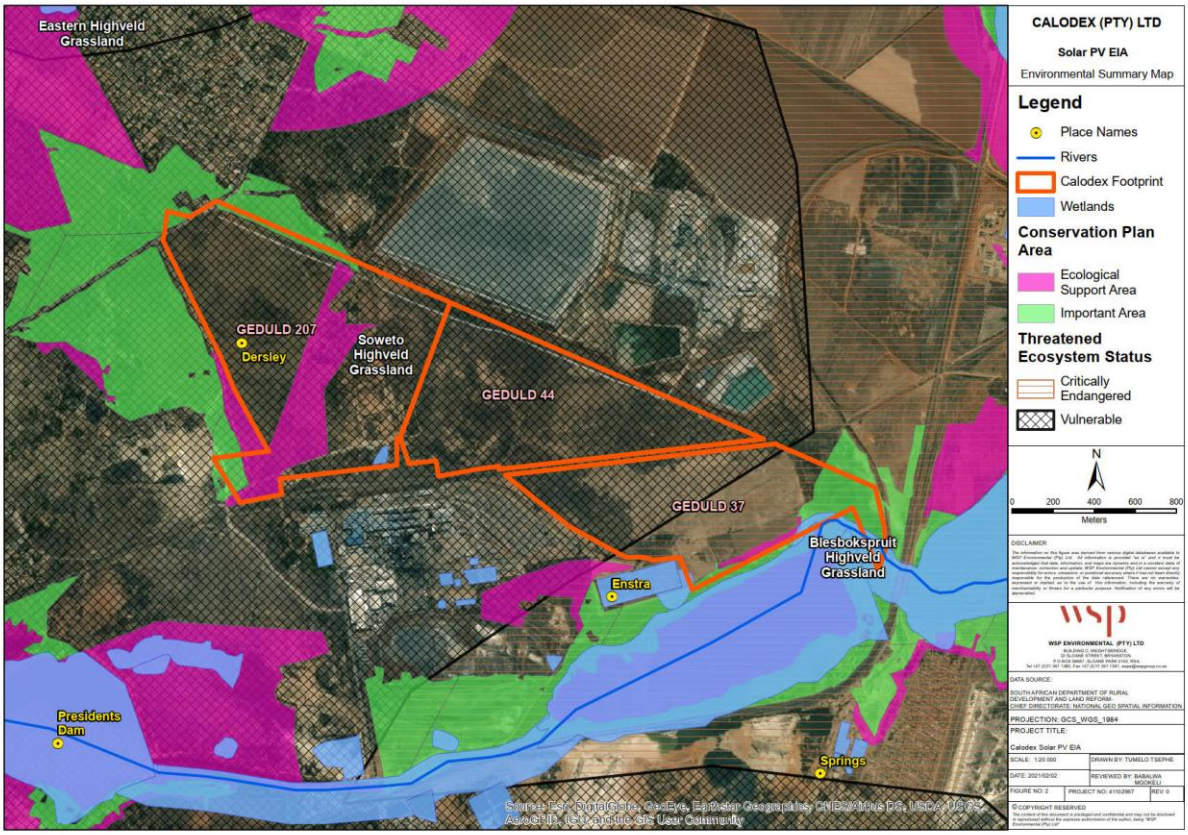


Figure 5-7: CBA and ESA in relation to the proposed project site (WSP, 2021)

5.5.2 AQUATIC ENVIRONMENT

According to the Biodiversity Impact Assessment (including Wetland Assessment) (**Appendix C**) undertaken for this project, the wetland and river intersecting with the site are categorised as Critically Endangered in terms of ecosystem type. The wetland is Not Protected while the tributary to the Blesbokspruit is Poorly Protected. Additionally, various National Freshwater Ecosystem Priority Areas (NFEPA) wetlands were identified within the 500 m regulated area, which have been classified as "Natural" and "Artificial". A relic wetland area was also identified within the project site (Portion 207 of farm Geduld 123), in the location of the historical lime dams. Signs of wetness were encountered in this area, but due to the closure of the operation only relic signs of wetness were recorded. In this area, very little if any natural vegetation remains while infilling and other soil disturbances have greatly altered the soil profile precluding its reliable identification as wetland.

5.5.3 AVIFAUNA

The information provided below has been extracted from the Avifaunal Assessment (**Appendix D** of this Report) undertaken for this project.

Thirty-seven (37) bird species were recorded in the summer survey, and seventy-six species (76) bird species were recorded in the winter survey. The Avifaunal Assessment identified four avifaunal habitat types that overlap with the assessed area; Wetlands (wetlands, artificial drainage lines, river, dams), Degraded Grassland, Highly Degraded Grassland (this includes the area where old buildings were demolished and areas with alien invasive trees that were cut down) and Croplands (soyabeans). These are described in detail below.

WETLAND HABITAT

The wetland habitat on site comprised of wetlands, artificial wetlands (dams) and the Cowles Dam with its associated river system. The areas surrounding these systems contained vegetation such as sedges and reeds.

Avifauna species found here were species that are adapted to aquatic habitats such as Yellow-billed duck, Red-billed Teal, Southern Red Bishop, Goliath Heron, African Reed-warbler and Reed Cormorant. The state of the system is highly disturbed as such species like Sacred Ibis and Grey headed Gulls were also found in high numbers in the systems.

DEGRADED GRASSLAND

The degraded grassland was not in a pristine condition, it does however still have a number of grass species normally found in the Soweto Highveld grassland vegetation type. Species found here include: Lavailants Cisticola, Zitting Cisticola, Helmeted Guineafowl, Natal Spurfowl, Common Waxbill and Blue Waxbill. Both granivorous and insectivorous species occurred in high numbers in this vegetation type.

HIGHLY DEGRADED GRASSLAND

The highly degraded grassland contained areas of dumping, areas where old buildings were broken down and alien invasive patches. Three locations of Southern Masked Weaver nest colonies were identified in the summer survey. During the winter survey these nests could not be located as the trees were felled. A Long-crested Eagle was also found in the Eucalyptus trees, it was also absent during the winter survey. Other species observed here includes the Common Fiscal and Dark-capped Bulbul.

CROPLAND HABITAT

The cropland habitat consisted of extensive areas of soyabean crops. African Stone Chats were very prevalent in this habitat type, it is likely that they were drawn to the insects found on the soyabeans. A number of dove species namely, Laughing Dove, Cape Turtle Dove, Rock Dove and Red-eyed Doves were also observed in this habitat type. It is assumed that once the Soyabeans are harvested the species composition will change with species such as herons and egrets moving into the area.

5.6 CULTURAL HERITAGE

A HIA and a PIA were undertaken during this BA process for the proposed project. The information provided below has been extracted from the Heritage Impact Assessment and Palaeontological Impact Assessment.

5.6.1 HERITAGE PROFILE

No sites of cultural heritage significance were located during the Heritage Impact survey. Some background information is however provided in order to place the surveyed area in a broad historical and geographical context and to contextualize possible finds that could be unearthed during construction activities.

A number of heritage reports have been done in the wider CoE Municipality area. Out of the three reports only two of the reports recorded sites of significance, a cemetery with no fencing (Huffman 2009: 4), and a stone structure (Coetzee 2015: 18-19). The third report identified no heritage sites (Van Schalkwyk 2011: 11). These relate to the historical age and gives an indication of what could be expected during the current survey. One grave site was also identified in the Brakpan-Vlakplaats area (Van Vollenhoven et al 2020: 26-29).

According to the heritage reports done in the wider CoE Municipality area, no Stone Age sites were identified or recorded in the area.

A few Stone Age sites were identified in the larger geographical area of the surveyed site by other scholars. This includes Middle and Late Stone Age sites in and around Johannesburg (Bergh 1999:4). Rock art is usually also associated with LSA people. The closest to the surveyed area are rock engravings that have been found around Krugersdorp on the West Rand (Bergh 1999: 5).

Although no natural shelter was identified during the survey, the close proximity to a wetland/river makes the area very suitable for human habitation. The area probably provided good grazing and therefore it is possible that Stone Age people may have utilized the site for hunting purposes. One may therefore find Stone Age material lying around in the area.

Previous research indicates 794 Iron Age sites in an area to the south of Johannesburg and the East Rand (Bergh 1999: 7). These date to the Late Iron Age. These would however be closer to hills and areas where building material is found.

No Iron Age sites were identified out of the of heritage reports that have been done in the wider Ekurhuleni area. Again, the presence of water and natural grass cover may have contributed to people settling in the surveyed area during the Iron Age. It is indicated that a Tswana group, the Khudu, inhabited the area to the south of the surveyed area previously as well as during the 19th century. It does not seem as if someone settled closer to the surveyed area, but one has to take into consideration that the entire area may not have been researched yet (Bergh 1999: 10).

The subterranean presence of archaeological material is something that should however always be kept in mind. It also should be realized that the area may not have been surveyed before and therefore the possibility of finding new sites, or at least features, is always a reality.

The historical age began with the first recorded oral histories in the area. It includes the moving into the area of people that were literate. This era is often referred to as the Colonial era or the recent past. Due to factors such as population growth and a decrease in mortality rates, more people inhabited the country during the recent historical past. Therefore, much more cultural heritage resources from this era have been left on the landscape.

It however is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are required in order to determine whether these indeed have cultural significance. Factors to be considered include aesthetic, scientific, cultural and religious value of such resources.

During the Difaquane, in this case ca. 1827, the Ndebele of Mzilikazi did move through the larger geographical are where the study area is locateda (Bergh 1999: 11). The first white people to move through this area were the travellers Moffat and Archbell in 1829 (Bergh 1999: 12). Later other travellers also visited the area, being Harris in 1836 and Livingstone in 1847 (Bergh 1999: 13). The first white people to settle here were Voortrekkers during the 1839 and 1840 (Bergh 1999: 14-15).

Some historical sites are also known from the surveys done in the surrounding area. Two grave sites are known from the surveys done in the surrounding area indicated in green (Huffman 2009: 4; Van Vollenhoven et al 2020: 26-29). One historical site is known and is associated with farming activities, e.g., historical house remains indicated in yellow (Coetzee 2015: 18-19). These are not to be impacted on as it lies at least 3 km from the project site.

As stated previously, a number of remains of old buildings and structures were noted in the proposed project site. These are, however, merely ruins and floor levels remaining and thus have no heritage significance.

5.6.2 PALAEONTOLOGY

The South African Heritage Resources Information System (SAHRIS) PalaeoSensitivity Map (**Figure 5-8**) shows the proposed development area to be within moderate (Green) and very high (Red) palaeontological sensitivity (as demarcated by SAHRA).

Based on the findings of the PIA fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity is generally low to very high. The western section of the development is identified as moderate palaeontological sensitivity for the Dwyka Group and high for the Malmani Subgroup (eastern section of the development).

Trace fossils are relatively abundant in the shales occurring near the top of the Dwyka Group. Lycopods (*Leptophloem australe*) have been described from the northern Free State (Mac Rae 1999). Spores and acritarchs have been reported from the interglacial mudrocks of the Dwyka Group, also pollen, wood, and plant remains in the interbedded mudrocks as well as the diamictite itself, while anthropod trackways and fish trails are present in places on bedding planes (Visser *et al.* 1990).

Chemical sediments such as fine-grained limestone and dolomite of the Malmani Subgroup is made up of deposits of organically derived carbonate shells, particles or precipitate. Dolomite is magnesium-rich limestone formed from algal beds and stromatolites. These Early Proterozoic Transvaal stromatolitic dolomites formed and released free oxygen at around 2900 – 2400 Ma. Stromatolites are common in the Malmani dolomites, accepted to be the fossil remnants of the simplest single-celled organisms. They are finely layered, concentric,

mound-like structures formed by microscopic algal organisms (Norman and Whitfield 2006). These can range in size from 3.5 - 17 mm in height and up to 10 mm in diameter and can be present in the development area.

Field observations of the development site indicated that there are no visible outcrops and therefore no fossils on the surface.

Figure 5-8: SAHRIS Palaeontology Sensitivity Map

5.7 SOCIO-ECONOMIC ENVIRONMENT

5.7.1 REGIONAL CONTEXT

According to the 2016/2021 CoE Municipality's Integrated Development Plan (IDP), the municipality was regarded as one of the five largest cities playing a dominant role in the national economy. The structure of the CoE Municipality's economy is dominated by four sectors; namely manufacturing, finance and business services, community services and general government and to a lesser extent the trade and hospitality sector.

The Municipal Gross Domestic Product (GDP) was recorded at R301 billion in 2015, contributing 21.43% to the Gauteng Province GDP of R 1.41 trillion and ranking third relative to all the regional economies to total Gauteng GDP. The Municipality's GDP was forecasted at an estimate of R251 billion for 2020.

In CoE Municipality the economic sectors that recorded the largest number of employments in 2015 were the finance sector with a total of 261 000 employed people or 22.0% of total employment in the City. The trade sector with a total of 259 000 (21.8%) employs the second highest number of people relative to the rest of the sectors. The mining sector with 7 190 (0.6%) is the sector that employs the least number of people in Ekurhuleni, followed by the electricity sector with 8 160 (0.7%) people employed.

Unemployment in CoE Municipality has consistently been higher than the provincial and national figures; highlighting much needed employment opportunities within the CoE Municipality.

Furthermore, the Municipality has experienced challenges in the provision of electricity services that impacted negatively on the achievement of all targeted deliverables for the Municipality. Renewable or alternative energy is one of the key initiatives or interventions of the CoE Municipality planned for roll out to limit dependence on the national grid.

5.7.2 LOCAL CONTEXT

The proposed project site is located within ward 72, Region D of the Ekurhuleni Municipal area. Due to a lack of available data from Statistics SA the 2015 Regional Spatial Development Framework (RSDF): Region D was used as the primary data source.

The RSDF (2015) indicates that much of Region D is largely allocated to future urban development, industrial and mixed use. Region D is located favourably in terms of the Economic Activity and Employment Area of Gauteng Province. This has the potential to impact negatively on the region should a desirable growth and development strategy not be in place. Benoni, Brakpan and Springs CBDs all fall within the growth path of Gauteng and should therefore be considered as important growth nodes.

Region D can be described as a multi-centred region as it has multiple locations of economic activity (business and industrial) and human settlements. The main contributors to the economy in Region D are manufacturing (22 %), trade (15 %), finance (23 %), and community services (20 %).

In Region D, the economic sector that recorded the largest number of employment in 2012 was the trade sector, with a total of 31 600 or 24.6% of the total employment. The manufacturing sector, with a total of 25 100 (19.5%) employed the second highest relative to the rest of the sectors. The electricity sector with 511 (0.4%) employed the least number of people in Region D, just less than the agricultural sector with 981 (0.8%) people employed.

5.8 ENVIRONMENTAL SENSITIVITY MAP

According to the Biodiversity Assessment, three natural wetlands were identified within the 500 m regulated area, classified as a seep, unchanneled valley bottom and a floodplain. Additionally, various artificial wetlands were identified including a series of drainage channels. The Cowles dam is also regarded as an artificial system. A relic wetland was also identified in the location of the historical lime dams.

An environmental sensitivity map (**Figure 5-9)** has been compiled based on the sensitivities identified on site, as outlined in the relevant Specialist studies for this project, as well as desktop evaluation in terms of the Gauteng Conservation Plan. According to the Gauteng Conservation Plan the site intersects portions of CBA: Important Area on the boundary of Portion 207 of farm Geduld 123. Additionally, Portion 207 and Portion 37 farm Geduld 123 overlap with limited portions of an Ecological Support Area (ESA), also indicated in **Figure 5-7.**

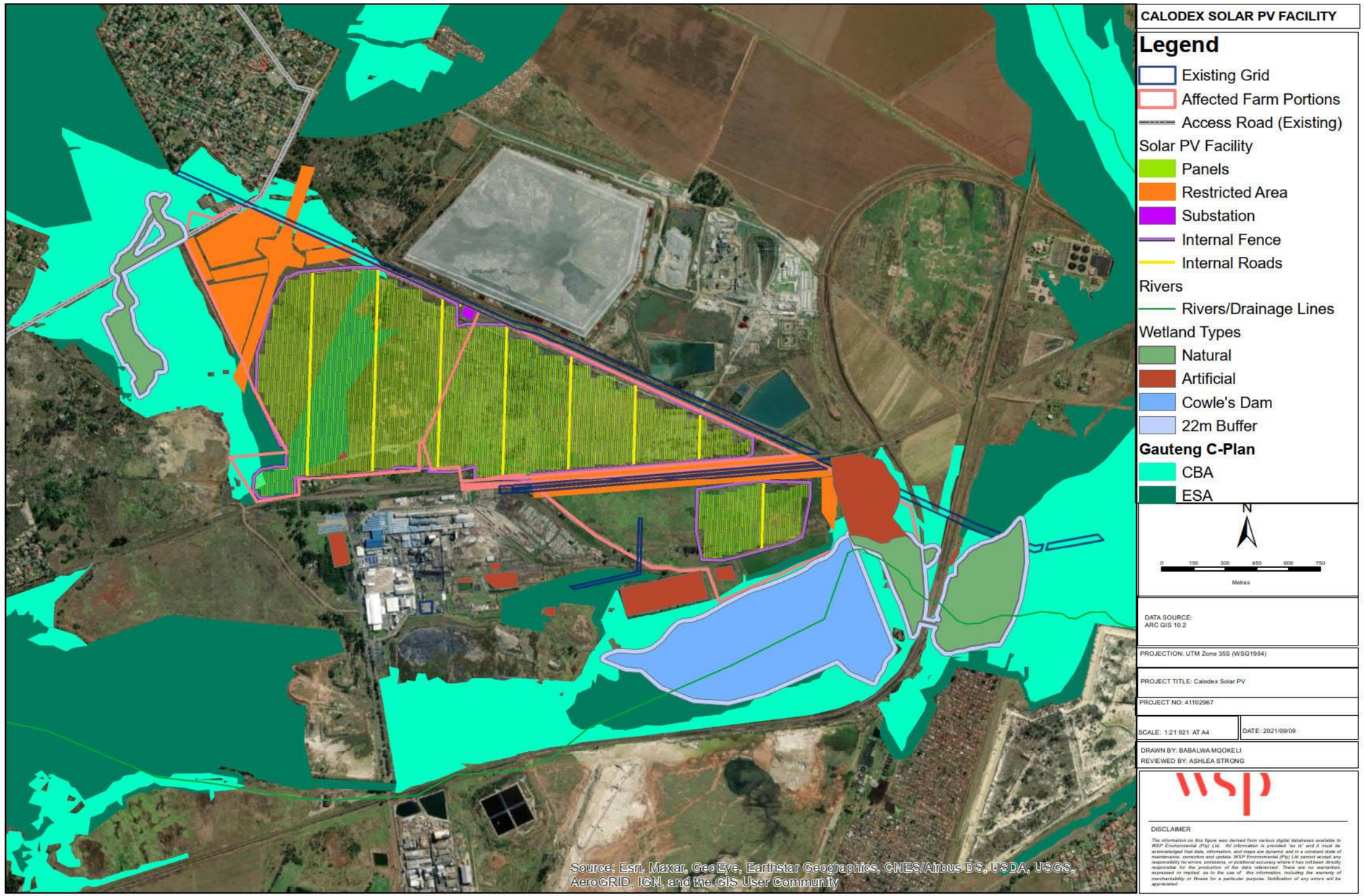


Figure 5-9: Site Layout overlain onto an Environmental Sensitivity Map

6 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

In this section the potential impacts of the project on the physical, biological and socio-economic environmental components has been assessed. The assessment is limited to the environmental components where potential interactions are present.

6.1 METHODOLOGY

6.1.1 ASSESSMENT OF SIGNIFICANCE

The assessment of impacts and mitigation evaluated 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 validate impacts identified through a matrix, 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.

A standard risk assessment methodology was used for the ranking of the identified environmental impacts pre- and post-mitigation. The significance of environmental aspects was determined and ranked by considering the criteria presented in **Table 6-1**.

Table 6-1: 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	Low	Medium	High	Very high
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 Probably	Definite

ENVIRONMENTAL SIGNIFICANCE = (MAGNITUDE + EXTENT + REVERSIBILITY + DURATION) x PROBABILITY					
TOTAL SCORE	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
ENVIRONMENTAL SIGNIFICANCE RATING (-)	Very low	Low	Moderate	High	Very High
ENVIRONMENTAL SIGNIFICANCE RATING (+)	Very low	Low	Moderate	High	Very High

6.1.2 IMPACT MITIGATION

The following mitigation hierarchy (illustrated in **Figure 6-1**) was applied when proposing prevention, compensation and mitigation measures:

- **Avoid / Prevent**: Avoidance or prevention refers to the consideration of options in project location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services, and people. This is referred to as 'the best option', but it is acknowledged that avoidance or prevention is not always possible.
- **Minimise**: Minimisation refers to the consideration of alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity, ecosystem services and people. Acceptable options to minimise will vary and include: abate, rectify, repair, and/or restore impacts, as appropriate.
- **Rehabilitate / Restore**: Rehabilitation refers to the consideration of the rehabilitation of areas where impacts are unavoidable and measures are provided to return impacted areas to a near-natural state or an agreed land use.
- **Offset**: Offsetting refers to the consideration of measures over and above rehabilitation to compensate for the residual negative effects on biodiversity ecosystem services and people, after every effort has been made to minimise and then rehabilitate impacts.

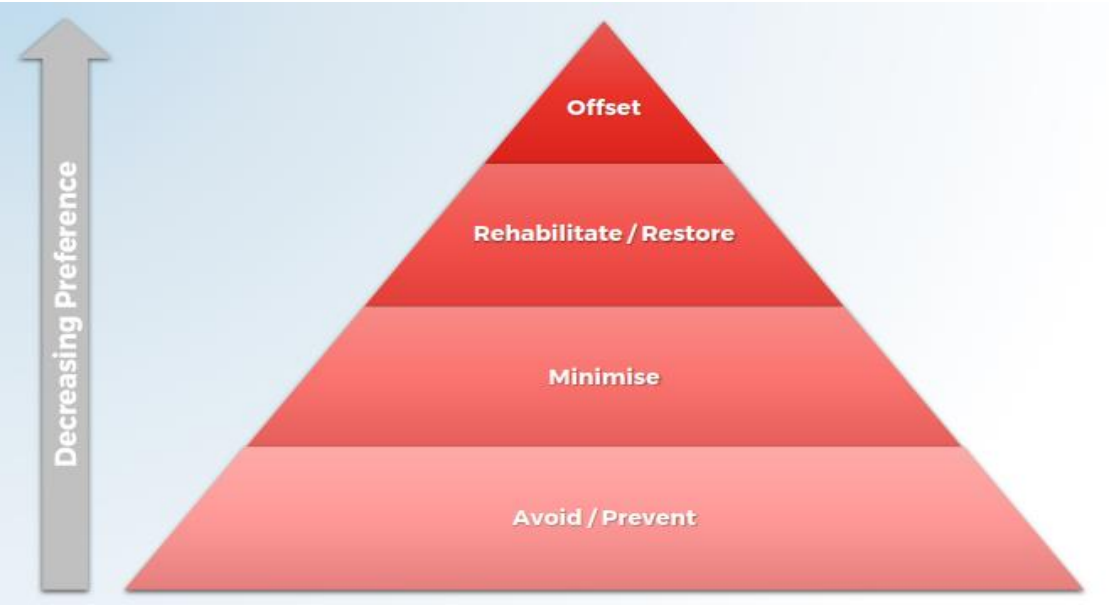


Figure 6-1: Impact Assessment Mitigation Hierarchy

6.2 CONSTRUCTION PHASE IMPACT ASSESSMENT

6.2.1 AIR EMMISSIONS

FINDINGS AND IMPACT DESCRIPTION

Construction work may cause dust emissions which will decrease local air quality. This may cause a nuisance to the surrounding environment and residents. Construction traffic may also cause a temporary increase in dust generated if using gravel roads and travelling with uncovered truck loads.

IMPACT ASSESSMENT

Impact Description:	Impact on air quality due to dust generation and the release of air pollutants from vehicles and construction equipment.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	2	2	1	4	**32**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	2	1	3	**21**	**N2**
N2 - Low						

MITIGATION MEASURES

- Dust must be monitored and the ground wetted if a nuisance factor is identified;
- Apply dust suppressant on exposed areas and stockpiles;
- Limit vehicle speeds in un-surfaced areas;
- Avoid dust-generating activities (i.e. grading and moving of soil) during windy periods;
- Cover and/or maintain appropriate freeboard on trucks hauling any loose material that could produce dust when travelling;
- Re-vegetate disturbed areas as soon as possible to prevent excessive dust from occurring; and
- Dampen exposed soil to suppress dust if required.

6.2.2 NOISE EMISSIONS

FINDINGS AND IMPACT DESCRIPTION

The construction of a Solar PV facility will result in a significant amount of movement and noise. The operation of construction machinery on site will generate noise resulting in a potential nuisance factor to nearby receptors. Owing to the transient nature of this impact, the industrial nature of the area, this impact is considered to be of low significance.

IMPACT ASSESSMENT

Impact Description:	Potential noise impacts

Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	2	1	1	3	**18**	**N2**
	N2 - Low						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	1	1	2	**10**	**N1**
	N1 – Very Low						

MITIGATION MEASURES

- Maintain vehicles and machinery in good working order;
- Equipment fitted with noise reduction facilities will be used as per operating instructions and maintained properly during operations;
- Equipment with a lower noise output should be selected where practical (e.g. electronic powered equipment typically has lower noise levels than equivalent diesel equipment);
- Investigate all complaints or observations of excessive noise and assess possibilities for mitigation;
- Non-tonal reverse alarms for site based equipment should be used where practical;
- Avoid noisy activities at night-time and outside of normal weekend working hours where possible; and
- Employees / contractors are to be provided with appropriate hearing protection when undertaking noisy activities.

6.2.3 SOILS AND LAND CAPABILITY

FINDINGS AND IMPACT DESCRIPTION

The anticipated impacts during the construction phase are associated with the site preparation and construction of the Solar PV facility and associated infrastructure, including:

- Land conversion from soya farming to the cultivation of grazing grass, thereby becoming “less” productive as a result of the reduced area available for agriculture;
- Soil degradation resulting from erosion and topsoil loss. Erosion may be by wind or water. It can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including PV panels and roads. Loss of topsoil can result from poor topsoil management during construction related soil profile disturbance; and
- The storage and handling of hazardous substances (such as diesel and oil) for use during construction and related activities would present a potential contamination risk from accidental spillage or leakage of hazardous substances.

IMPACT ASSESSMENT

Impact Description:	The land will be converted from soya farming to the cultivation of grazing grass, thereby becoming “less” productive in terms of agriculture.						
Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	1	1	1	4	**24**	**N2**
	N2 - Low						
Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	1	1	1	4	**24**	**N2**
	N2 - Low						

Impact Description:	Soil degradation resulting from erosion and topsoil loss.
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
3	2	3	3	3	**33**	**N3**
N3 - Moderate						

Mitigation:	_
Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
2	2	2	3	3	**27**	**N2**
N2 - Low						

Impact Description:	Potential contamination risk from accidental spillage or leakage of hazardous substances.
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
4	3	3	2	3	**36**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
3	3	2	2	2	**20**	**N2**
N2 - Low						

MITIGATION MEASURES

- Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint;
- Access roads should have gradients or surface treatment to limit erosion, and road drainage systems should be accounted for;
- Implement an effective system of storm water run-off control.
- Unnecessary land clearance must be avoided;
- Limit construction activities near (< 50m) of HGM 2 to winter (as much as possible).
- Ensure soil stockpiles (from road construction) and concrete / building sand are sufficiently safeguarded against rain wash;
- No activities are permitted within the wetland and associated buffer areas;
- Maintain, where possible, all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion;
- Measures should be taken to avoid any spills and infiltration of petroleum fuels or any chemical pollutants into the soil during construction phase;
- Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility;
- A spill response kit must be available at all times;
- In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree of contamination, excavation and removal to a hazardous waste disposal site might be necessary. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations;

- Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary;
- All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers; and
- Provide secure storage for fuel, oil, chemicals and other waste materials to prevent contamination of stormwater runoff

6.2.4 WASTE GENERATION

FINDINGS AND IMPACT DESCRIPTION

The construction of the proposed Solar PV facility has the potential to generate both solid waste including general waste (building rubble, domestic waste, packaging etc.) and potentially small amounts of hazardous wastes (oils, greases, cement bags etc.). Accidental spillage of small quantities of hazardous substances and various construction materials has the potential to result in surface and/or groundwater contamination on site and the surrounding environment.

IMPACT ASSESSMENT

Impact Description:	Improper handling, storage and disposal of general and hazardous waste resulting in pollution on site and the surrounding environment.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	3	3	2	3	**33**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	2	2	2	**16**	**N2**
N2 - Low						

MITIGATION MEASURES

- General waste (i.e. construction waste, building rubble, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) generated during the construction phase should be stored in a designated area within suitable waste collection bins and skips (or similar);
- There must be adequate waste receptacles on site for general and hazardous waste;
- Bins/skips must be emptied regularly and collected by a licensed contractor for disposal at an appropriate, licensed facility;
- Bins/skips must not be allowed to overflow;
- Solid waste must be managed to avoid risk to local fauna and to avoid attracting animals to the site and to ensure containment and regular collection for disposal at a licenced landfill site;
- Contractors must be instructed not to litter and to place all waste in the appropriate waste bins provided on site ; and
- Maintain good housekeeping on site and minimise the generation of waste.

6.2.5 ECOLOGICAL DISTURBANCE

FINDINGS AND IMPACT DESCRIPTION

The activities associated with the development of a solar PV facility will most likely lead to the loss and destruction of certain habitats, direct mortalities and displacement of fauna and flora.

However, better controlled access of the area will also remove poaching and hunting from the area, which is likely to benefit the local faunal population. Controlled access will also result in the discontinuation of illegal dumping and disturbances to local habitats and species.

The development of the Solar PV facility will potentially impact on the following:

- Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles;
- Destruction, further loss and fragmentation of the vegetation community;
- Displacement, direct mortalities and disturbance of faunal community due to habitat loss and disturbances (such as site clearance, dust, vibrations, poaching and noise); and
- Spread and/or establishment of alien and/or invasive species, especially in areas that are cleared.

IMPACT ASSESSMENT

Impact Description:	Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	3	3	2	3	**33**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	1	1	2	**14**	**N2**
N2 - Low						

Impact Description:	Destruction, further loss and fragmentation of the vegetation community.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
5	3	4	3	4	**60**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
1	1	3	2	3	**21**	**N2**
N2 - Low						

Impact Description:	Displacement, direct mortalities and disturbance of faunal community due to habitat loss and disturbances (such as site clearance, dust, vibrations, poaching and noise).

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	2	2	4	**32**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
1	1	2	1	2	**10**	**N2**
N2 - Low						

Impact Description:	Spread and/or establishment of alien and/or invasive species, especially in areas that are cleared.

Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	2	2	4	4	40	N3
	N3 - Moderate						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	1	1	2	2	2	12	N2
	N2 - Low						

MITIGATION MEASURES

- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further;
- All activities must be restricted to within the low/medium sensitivity areas as identified in the Biodiversity Assessment;
- The development footprint must be demarcated to ensure that only the demarcated areas are impacted upon (including fencing off the defined project area);
- Construction vehicles and machinery must make use of existing access roads;
- Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas;
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species;
- All disturbed areas outside the direct footprint to be rehabilitated and landscaped after the development is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;
- Progressive rehabilitation of construction areas or cleared areas will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank;
- A qualified environmental control officer must be on site when construction begins. The area must be walked though prior to construction to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated;
- No trapping, killing, or poisoning of any wildlife is to be allowed, signs must be put up to enforce this;
- The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna;
- Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible;
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife;
- Speed limits must still be enforced to ensure that road killings and erosion is limited;
- Any holes/excavations need to be sealed to ensure that no fauna species can fall in;
- Implementation of the alien vegetation management plan (included in the EMPr of this BAR);
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the possible presence of SCCs; and
- All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof.

6.2.6 DISTURBANCE TO WETLANDS

FINDINGS AND IMPACT DESCRIPTION

Direct and indirect disturbance to wetland areas due to the construction of the Solar PV facility, including the following:

- Direct disturbance/degradation to wetland soils or vegetation due to construction;
- Increased erosion and sedimentation; and
- Potential contamination of wetlands with machine oils and construction materials.

Of concern is the potential impact on the natural wetland units identified as having a high sensitivity, as well as their associated buffers (22m) assigned a medium sensitivity. This would remain a risk until the construction phase is completed and the site rehabilitated.

IMPACT ASSESSMENT

Impact Description:	Direct disturbance/degradation to wetland soils or vegetation due to construction.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
5	2	4	3	4	**56**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	2	2	3	3	**30**	**N2**
N2 - Low						

Impact Description:	Increased erosion and sedimentation.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
4	2	4	3	4	**52**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	2	2	2	3	**27**	**N2**
N2 - Low						

Impact Description:	Potential contamination of wetlands with machine oils and construction materials.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	2	4	2	2	**22**	**N2**
N2 - Low						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	1	4	2	2	**18**	**N2**
N2 - Low						

MITIGATION MEASURES

- All high sensitivity areas (wetlands) and the associated buffers should be considered as No-Go areas for any activity. The infrastructure should be realigned to prioritise development favouring medium and low sensitivity areas (as identified in the Wetland Assessment);
- No activities are permitted within the wetland and associated buffer areas;
- Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of the development area;
- No clearing of vegetation will be undertaken in the wetland habitat;
- Use the wetland shapefiles to signpost the edge of the wetlands closest to site. Place the sign 25 m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out;
- Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the overall master plan;
- All activities (including driving) must adhere to the 22 m buffer area;
- All laydown, chemical toilets etc. should be restricted to low/medium sensitivity areas;
- Promptly remove / control all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed;
- All alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control;
- Landscape and re-vegetate all denuded areas as soon as possible;
- Limit construction activities near (< 50m) of HGM 2 to winter (as much as possible);
- Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash;
- Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility;
- Appropriately stockpile topsoil cleared from the project area; and
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetlands.

6.2.7 IMPACTS ON AVIFAUNA

FINDINGS AND IMPACT DESCRIPTION

During the construction phase vegetation clearing and brush cutting of vegetation for the associated infrastructure will lead to direct habitat loss. Vegetation clearing will create a disturbance and will therefore potentially lead to the displacement of avifaunal species. Additionally, the construction of the Solar PV facility and associated infrastructure (roads, cables and buildings) will result in a significant amount of movement and noise, which will lead to displacement of avifauna from the site.

IMPACT ASSESSMENT

Impact Description:	Temporary disturbance of avifauna due to increased human presence and possible use of machinery and/or vehicles.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	1	1	2	2	**12**	**N1**
N1 – Very Low						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	1	1	1	**5**	**N1**
	N1 – Very Low						

Impact Description:	Habitat loss (habitat destruction, fragmentation and degradation) ultimately displacing avifauna.						
Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	5	4	3	4	4	**64**	**N4**
	N4 - High						
Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	4	3	3	3	4	**52**	**N3**
	N3 - Moderate						

Impact Description:	Sensory disturbances (e.g. noise, dust, vibrations).						
Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	3	3	2	4	**44**	**N3**
	N3 - Moderate						
Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	3	1	2	**14**	**N1**
	N1 – Very Low						

Impact Description:	Collection of eggs and poaching.						
Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	3	3	2	4	**44**	**N3**
	N3 - Moderate						
Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	3	1	2	**14**	**N1**
	N1 – Very Low						

Impact Description:	Road kill.						
Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	2	3	3	3	**33**	**N3**
	N3 - Moderate						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	1	1	2	**10**	**N1**
	N1 – Very Low						

Impact Description:	Chemical pollution associated with dust suppressants.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	3	3	3	4	4	**52**	**N3**
	N3 - Moderate						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	1	1	1	2	**10**	**N1**
	N1 – Very Low						

MITIGATION MEASURES

- All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any SCC be found and not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken;
- Special care must be taken to ensure nests and in particular that of the Marsh Owl is not destroyed;
- Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible;
- Natural wetland areas and the respective buffer must be managed as no-go areas;
- Where possible, existing access routes and walking paths must be made use of;
- All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution;
- As far as possible power cables within the project area should be thoroughly insulated and preferably buried;
- Any exposed parts must be covered (insulated) to reduce electrocution risk;
- All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this;
- The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on avifauna;
- All construction motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited; and
- Schedule or limit (where feasible) activities during least sensitive periods, to avoid migration, nesting and breeding seasons (June – August).

6.2.8 VISUAL

FINDINGS AND IMPACT DESCRIPTION

During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in the area. The

construction activities may also visually impact the residents of the four dwellings immediately south of the development site.

IMPACT ASSESSMENT

Impact Description:	Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed PV facility and ancillary infrastructure.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
5	2	3	2	4	**48**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	2	2	3	**24**	**N2**
N2 - Low						

MITIGATION MEASURES

- Retain and maintain natural vegetation immediately adjacent to the development footprint;
- Construct temporary screens along the perimeter of the PV plant construction site to shield construction activities from observers;
- Ensure that vegetation is not unnecessarily removed during the construction phase;
- Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible;
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads;
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities;
- Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent);
- Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts; and
- Rehabilitate all disturbed areas immediately after the completion of construction works.

6.2.9 HERITAGE

FINDINGS AND IMPACT DESCRIPTION

The proposed Solar PV facility may result in the destruction of heritage sites/resources during construction. However, the project area is largely disturbed by past and present agricultural activities that which would have resulted in the destruction of any heritage resources in the area (if any). No sites of cultural heritage significance were located during the Heritage Impact Assessment survey.

IMPACT ASSESSMENT

Impact Description:	Destruction of heritage resources.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	1	4	5	2	**26**	**N2**
N2 - Low						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	4	2	1	**9**	**N1**
	N1 – Very Low						

MITIGATION MEASURES

- Operating controls and monitoring should be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence;
- Upon finding any archaeological or historical material all work at the affected area must cease;
- The area should be demarcated in order to prevent any further work there until an investigation has been completed;
- An archaeologist should be contacted immediately to provide advice on the matter;
- Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit;
- SAHRA's Archaeology Palaeontology and Meteoritis Unit may also be notified;
- If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist;
- The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter; and
- Work on site will only continue after removal of the archaeological/ historical material was done

6.2.10 PALAEONTOLOGY

FINDINGS AND IMPACT DESCRIPTION

Construction activities for the proposed Solar PV facility may impact upon the fossil heritage if preserved in the development footprint. According to the Palaeontological Assessment (**Appendix G**) there are no visible outcrops and therefore no fossils on the surface in the development area.

IMPACT ASSESSMENT

Impact Description:	Impact on fossil heritage.						
Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	1	4	5	2	**26**	**N2**
	N2 - Low						
Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	4	2	1	**9**	**N1**
	N1 – Very Low						

MITIGATION MEASURES

- An Environmental Control Officer must survey for fossils before and or after clearing, blasting, drilling or excavating;
- Special care must be taken during any digging, drilling and excavating of foundations, trenches, channels and footings and removal of overburden;

- If any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves;
- If fossils are found, they must be placed in a safe area for further investigation;
- The ECO should familiarise him- or herself with the fossiliferous formations and its fossils; and
- A site visit is recommended after drilling and excavations and the keeping of a photographic record. A regular monitoring presence over the period during which excavations are made, by a palaeontologist, is generally not practical, but can be done during ground breaking.

6.2.11 SOCIO-ECONOMIC

FINDINGS AND IMPACT DESCRIPTION

It is estimated that the construction phase for the Solar PV facility will span over a 6-month period, and will generate approximately 200 direct employment opportunities; consisting of approximately 110 skilled opportunities and 90 unskilled opportunities. Skills development and training strategy will be implemented for members of the local community to benefit from the low skilled employment opportunities.

The proposed project has the potential to stimulate economic development within the local area if local social and economic development opportunities are prioritised. The local service industry and local suppliers are most likely to benefit from the proposed project.

The construction phase may also lead to the influx of skilled and unskilled employment seekers from outside the immediate area. This could lead to social conflict over the resources and employment opportunities.

There is the potential for increased risk to neighbouring land users, as the presence of labour force could result in criminal behaviour.

IMPACT ASSESSMENT

Impact Description:	Temporary employment opportunities.
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
2	3	-	2	4	**28**	**P2**
P2 - Low						

Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
3	3	-	2	4	**44**	**P3**
P3 – Moderate						

Impact Description:	Economic development opportunities for locally owned support industries and suppliers to respond to construction related activities.
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
2	3	-	2	4	**28**	**P2**
P2 - Low						

Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
4	4	-	2	5	**50**	**P3**
P3 – Moderate						

Impact Description:	Disruption of local social structures as a result of the construction work force and in-migration of job seekers for the construction period.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	3	3	2	5	**55**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	2	2	2	4	**36**	**N3**
N3 – Moderate						

Impact Description:	Increased risk to neighbouring land users.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	2	4	2	3	**33**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	4	2	3	**30**	**N2**
N2 – Low						

MITIGATION MEASURES

- Establish and implement a Workforce Recruitment Plan;
- Establish and implement a Stakeholder Engagement Plan;
- Reserve employment, where practical, for local residents;
- Appointment of local contractors and use of local suppliers and manufacturers where possible
- Source regularly required goods and services from as large a selection of local service providers as possible;
- Communication with CoE Municipality and community representatives in respect of employment opportunities to manage employment expectations as far as possible and to allow these parties to manage potential issues associated with influx of people;
- Engage the local community (within the immediate project area) on the nature, duration, number and availability of employment opportunities well in advance of any construction activities taking place. Utilise existing social structures for such interaction, and ensure that the process be commenced once environmental authorisations has been granted;
- Engage with the CoE Municipality in respect of accommodation of labour brought into the area by contractors / developers;
- Development of a code of conduct for workers, signed by the contractor, and communicated to work force; and
- Contractor to be held liable for compensating neighbouring land use losses / damage that can be linked to workers.

6.2.12 TRAFFIC

FINDINGS AND IMPACT DESCRIPTION

An increase in localised traffic associated with the transport of construction material, as well as transporting employees to and from the site, is expected during construction.

IMPACT ASSESSMENT

Impact Description:	Increase in traffic generation.

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	3	3	2	4	**44**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	3	2	2	3	**27**	**N2**
N2 – Low						

MITIGATION MEASURES

- Abnormal vehicle routes and management plans may be required dependant on the type and route of the abnormal vehicle loads. Abnormal vehicles may require special permits and route plans from the relevant road authority such Gauteng Department of Roads and Transport. These permits are the responsibility of the developer and its logistics/freight companies
- The movement of vehicles into and out of the site must be managed such as ensuring that abnormal loads are moved outside of peak traffic hours;
- A permit should be obtained from the Gauteng Department of Roads and Transport for any abnormal loads transported;
- Provide clear and visible temporary construction signage at the access to the site from the R51, and along Orpiment Avenue and Cloverfield Road. The planning and approval of this signage must be obtained from the South African National Roads Agency;
- Effective signage and traffic control measures must be implemented along the access route to ensure that public and staff safety is managed adequately;
- Adhere to all speed limits applicable to the roads used;
- Ensure that all construction vehicles are roadworthy and adhere to vehicle safety standards implemented by the Developer; and
- Develop a Road Maintenance Plan to address any road quality impacts along the gravel access roads to/along the site.

6.3 OPERATIONAL PHASE IMPACT ASSESSMENT

6.3.1 SOILS AND LAND CAPABILITY

FINDINGS AND IMPACT DESCRIPTION

The anticipated impacts for the Solar PV facility during the operational phase of the project are associated with the day-to-day operational activities during the normal functioning of the facility, including maintenance. These impacts include:

- Potential of soil erosion due to vegetation maintenance and more run-off from harden surfaces (i.e. roads); and
- Potential land contamination from hazardous substances. This includes spillage of oils, fuel, grease (from site operational and maintenance vehicles) and permanent onsite sewage systems.

Additionally, the land will be converted from soya farming to the cultivation of grazing grass, thereby becoming “less” productive in terms of agriculture and resulting in a loss of high agricultural potential land. Cultivation of

grazing grass, like Lucerne is anticipated as such activity will ensure consistent ground cover, consistent O&M procedures and minimise equipment movement around the site. The leasing of the land to sheep farmers is envisaged as a way to utilise and maintain ground cover. The intention is to maintain the topsoil cover and not interfere with vegetation that is growing under the natural rainfall.

IMPACT ASSESSMENT

Impact Description:	Loss of agricultural land use.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	2	4	4	4	**48**	**N3**
	N3 - Moderate						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	2	4	4	4	**48**	**N3**
	N3 - Moderate						

Impact Description:	Potential of soil erosion due to the lack of vegetation maintenance and more run-off from harden surfaces (i.e. roads and array of solar panels).						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	2	2	4	3	**30**	**N2**
	N2 - Low						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	1	1	2	4	2	**16**	**N2**
	N2 – Low						

Impact Description:	Potential land contamination from hazardous substances. This includes spillage of oils, fuel, grease (from site operational and maintenance vehicles) and permanent onsite sewage systems.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	1	2	2	4	2	**18**	**N2**
	N2 - Low						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	1	1	2	4	1	**8**	**N1**
	N2 – Very Low						

MITIGATION MEASURES

- Maintain vegetative surfaces;
- Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion; and
- The proper handling and storage of hazardous materials, the use of hardstanding in storage areas of hazardous substances and where spillages are possible. The use of bunding around storage of hazardous materials and proper upkeep of machinery and vehicles. A complete spill kit must be onsite at all times

6.3.2 BIODIVERSITY

FINDINGS AND IMPACT DESCRIPTION

The following potential impacts were considered on biodiversity (fauna and flora) during the operational phase. This phase refers to when construction has been completed and the proposed infrastructure has been built and is functional:

- Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, light, traffic, dust, pollution and vibrations);
- Continued loss of faunal species (road mortalities and/or poaching); and
- Continued habitat degradation (litter and alien vegetation encroachment).

IMPACT ASSESSMENT

Impact Description:	Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, light, traffic, dust, pollution and vibrations).

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	2	4	4	4	**48**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	1	3	1	2	**14**	**N1**
N1 – Very Low						

Impact Description:	Continued loss of faunal species (road mortalities and/or poaching).

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
3	3	3	4	3	**39**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	1	3	1	2	**14**	**N1**
N1 – Very Low						

Impact Description:	Continued habitat degradation (litter and alien vegetation encroachment).

Significance Rating Pre-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
4	3	4	4	4	**60**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:

(M+	E+	R+	D)x	P=	S	Rating
2	1	3	2	2	**16**	**N2**
N2 - Low						

MITIGATION MEASURES

- All operational and access must make use of the existing roads;
- Implement a monitoring and rehabilitation plan for vegetation at the site to ensure indigenous vegetation recovery where possible;
- Ensure continued monitoring and eradication of alien invasive plant species;
- A rehabilitation and management plan needs to implement for the remaining wetland area and no future development of the associated buffer area should be allowed;
- No trapping, killing, or poisoning of any wildlife is to be allowed;
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the possible presence of SCCs;
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.
  - Refuse bins will be emptied and secured;
  - Temporary storage of domestic waste shall be in covered waste skips; and
  - Maximum domestic waste storage period will be 10 days; and
- Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible.

6.3.3 AVIFAUNA

FINDINGS AND IMPACT DESCRIPTION

The typical impacts associated with such a project for the operational phase are electrocution, collisions, fencing, chemical pollution due to chemical for the cleaning of the PV panels and habitat loss. Electrocution is a possible risk at the substation and high voltage lines. A study completed by Visser et al. (2019) found no avifauna collision or electrocution mortalities under the transmission line linking the facility to the national grid. Further to this, all trackers, solar panels and inverters are insulated and there is no possibility of electrocution. No chemicals will be used in washing of the panels, only clean water or possibly waterless robots. Solar panels have been implicated as a potential risk for bird collisions. Collisions are thought to arise when birds (particularly waterbirds) mistake the panels for waterbodies, known as the “lake effect” (Lovich & Ennen, 2011), or when migrating or dispersing birds become disorientated by the polarised light reflected by the panels. This “lake-effect” hypothesis has not been substantiated or refuted to date (Visser et al., 2019). It can however be said that the combination of powerlines, fencing and large infrastructure will influence avifauna species. The principle impacts on avifauna of the operational phase are electrocution, collisions , fencing, chemical pollution due to chemical for the cleaning of the PV panels and habitat loss.

IMPACT ASSESSMENT

Impact Description:	Displacement due to habitat transformation caused by the solar panels and associated; infrastructure.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	5	4	3	4	4	**64**	**N4**
	N4 - High						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	4	3	3	3	4	**52**	**N3**
	N3 - Moderate						

Impact Description:	Collisions with PV and associated infrastructure.

Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	5	4	3	4	4	**64**	**N4**
	N4 - High						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	2	3	3	3	**33**	**N3**
	N3 - Moderate						

Impact Description:	Electrocution by infrastructure and connections to PV.

Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	5	4	3	4	4	**64**	**N4**
	N4 - High						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	2	2	2	2	**16**	**N2**
	N2 - Low						

Impact Description:	Chemical pollution associated with measures to keep PV clean.

Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	3	3	4	4	**52**	**N3**
	N3 - Moderate						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	2	1	1	1	2	**10**	**N1**
	N1 – Very Low						

Impact Description:	Fencing of PV site, especially a risk for larger birds such as herons.

Significance Rating Pre-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	4	4	3	4	4	**60**	**N3**
	N3 - Moderate						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	3	2	3	2	2	**20**	**N2**
	N2 - Low						

MITIGATION MEASURES

— Where possible, existing access routes and walking paths must be made use of;

- Natural wetland areas and the respective buffer must be managed as no-go areas;
- All maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited;
- Use environmentally friendly cleaning and dust suppressant products;
- Fencing mitigations:
  - Include a 2.4 m high palisade
- Internal powerlines (between 22 - 33kV) must be placed underground, excluding sections where there may be geotechnical or other physical obstacles;
- All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this;
- Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) lights should be used wherever possible; and
- Schedule or limit (where feasible) operations during least sensitive periods, to avoid migration, nesting and breeding seasons (June – August).

6.3.4 VISUAL

FINDINGS AND IMPACT DESCRIPTION

The proposed Solar PV facility may lead to visual intrusion impacting on the views of potential sensitive visual receptors, especially within (but potentially not restricted to) a 1km radius of the proposed facility. The visual impact will differ amongst places, depending on the distance from the facility. This includes the visual impact on residents of dwellings within the study area, with specific reference to the residential areas or small holdings in closer proximity to the proposed development.

According to the Visual Impact Assessment (**Appendix E**), the PV facility is expected to have the following visual impacts:

- Visual impact on residents of the four houses located immediately;
- Visual impact on observers travelling along the roads and residents at homesteads within the region (within a 1 – 3km radius of the PV facility structures);
- Visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed PV facility;
- The visual impact of solar glint and glare as a visual distraction and possible air travel hazard;
- Visual impact of the ancillary infrastructure during the operation phase on observers in close proximity to the structures;
- The potential impact on the sense of place of the region.

According to the Visual Impact Assessment (**Appendix E**), the PV facility is expected to have a high visual impact on the residents of the four houses located immediately south of the proposed PV facility. Other than these receptors there is a very limited probability of high visual impacts on observers residing along the outskirts of Dersley, Eastvale and observers travelling along the Cloverfield Road.

In terms of the Visual Impact Assessment (**Appendix E**), the proposed Solar PV facility is not located near any airports or airfields and is located north and west of potentially sensitive visual receptors at the four residences. As such, the potential visual impact related to solar glint and glare is expected to be of low significance

The greater environment surrounding the site is not considered to have a high visual quality or specific sense of place due to the disturbed, altered and developed nature of the study area.

Mitigation of the primary visual impact of the operational PV facility on residents of the four residences is unlikely to succeed, as the PV facility structures will be within 30m north and west of the houses. Even though mitigation of this impact (e.g. screening of the PV facility structures from the four residences) is unlikely to succeed, general “best practice” measures are recommended.

Impact Description:	Potential visual impact on sensitive visual receptors located within a 1km radius of the PV facility structures
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
5	2	4	4	4	**64**	**N4**
N4 - High						

Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
5	2	4	4	4	**64**	**N4**
N4 - High						

Impact Description:	Visual impact on observers travelling along the roads and residents at homesteads within the region (within a 1 – 3km radius of the PV facility structures).
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
4	3	3	4	3	**42**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
4	3	3	4	3	**42**	**N3**
N3 - Moderate						

Impact Description:	Visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed PV facility.
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
4	2	3	4	3	**39**	**N3**
N3 - Moderate						

Significance Rating Post-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
3	2	3	4	2	**24**	**N2**
N2 - Low						

Impact Description:	The visual impact of solar glint and glare as a visual distraction and possible air travel hazard.
Significance Rating Pre-Mitigation:	

(M+	E+	R+	D)x	P=	S	Rating
2	2	-	4	2	**16**	**N2**
N2 - Low						

Significance Rating Post-Mitigation:	N/A

Impact Description:	Visual impact of the ancillary infrastructure during the operation phase on observers in close proximity to the structures.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	2	3	4	2	**22**	**N2**
	N2 - Low						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	2	3	4	2	**22**	**N2**
	N2 - Low						

Impact Description:	The potential visual impact of the proposed PV facility on the sense of place of the region.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	3	3	4	2	**24**	**N2**
	N2 - Low						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	3	3	4	2	**24**	**N2**
	N2 - Low						

MITIGATION MEASURES

- Maintain the general appearance of the facility/servitude as a whole;
- The maintenance of the PV arrays and ancillary structures and infrastructure will ensure that the facility does not degrade, therefore avoiding aggravating the visual impact;
- A lighting plan that documents the design, layout and technology used for lighting purposes should be prepared, indicating how nightscape impacts will be minimised;
- Secondary impacts anticipated as a result of the proposed PV facility (i.e. visual character and sense of place) are not possible to mitigate;

6.3.5 SOCIO-ECONOMIC

FINDINGS AND IMPACT DESCRIPTION

It is anticipated that the operational phase for the Solar PV facility will generate a total of 20 new employment opportunities over the minimum operational period of 25 years, as well as the opportunity for locally owned support industries and service providers to respond to operational activities.

IMPACT ASSESSMENT

Impact Description:	Employment opportunities.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	3	-	2	4	**28**	**P2**
	P2 - Low						

Significance Rating Post-Mitigation:	(M+	E+	R+	D)x	P=	S	Rating
	4	3	-	2	5	**45**	**P3**
	P3 - Moderate						

Impact Description:	Economic development opportunities for locally owned support industries and service providers to respond to operational activities.						
Significance Rating Pre-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	2	3	-	4	3	**27**	**P2**
	P2 - Low						
Significance Rating Post-Mitigation:	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
	4	3	-	4	4	**44**	**P3**
	P3 – Moderate						

MITIGATION MEASURES

- Maximise local employment;
- Ongoing engagement with the CoE Municipality in respect of anticipated community investment and upliftment projects;
- Review of Department of Labour skills audits and undertake relevant skills development programmes targeted at local community members;
- Make use of local services as far as possible;
- Development of a database of local companies for service provision; and
- Procure goods and services from variety of providers as far as possible and available to promote a wide distribution of project associated benefits.

6.4 CUMULATIVE IMPACT ASSESSMENT

There are no authorised solar PV facilities of similar magnitude within the larger region, consequently the significance of cumulative impacts associated with the proposed development, against the background of the establishment of other similar PV projects within the region, is expected to be very low for all biophysical aspects.

Currently the project site and surrounding area is characterised by mixed land use that includes mining, industrial areas, residential areas and farmland. It is noted that portion 37, 44 and 207 of the farm Geduld 123 IR, fall within New Kleifontein Goldmine (Proprietary) Limited's (NKGM) mining area. NKGM is an underground mining operation, with existing operations that include the aforementioned farm portions. Consequently, a consideration of the cumulative impacts on the receiving environment associated with the proposed Solar PV facility, if conducted simultaneously with NKGM's operation, was undertaken. Cumulative impacts associated with this type of development, occurring simultaneously with NKGM operations, are limited to dust and noise. NKGM's slime dams (tailings dams) dams are located on the boundary of the proposed Solar PV facility and therefore cumulative impacts in terms of dust are expected. Cumulative impacts are most prevalent in the event that continuous and long-term impacts are occurring. However, the nature of the proposed development is such that these impacts are only anticipated during the construction phase of the Solar PV facility and of a temporary nature, and are thus considered to be of low significance, with the implementation of mitigation measures, on a local or regional scale. No cumulative impacts are expected during operational phase.

7 STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement is a fundamental part of the BA process and aims to include potential Interested and Affected Parties (I&APs) in the process by notifying them of the proposed project. The objectives of the stakeholder engagement process are to:

- Ensure an open and transparent BA and consultation process;
- Enable stakeholders to register their interest and provide input into the BA process and share information; and,
- Ensure that all relevant issues are addressed as part of the BA process.

7.1 AUTHORITY CONSULTATION

A pre-application meeting was held on 25 February 2021 with the DFFE in order to discuss the proposed project. The minutes of this meeting are included in **Appendix B-1** of the Comments and Responses Report (CRR), which is **Appendix B** of this Final BAR.

The application form was submitted to DFFE on 23 June 2021. In addition, WSP notified the CoE Municipality, DFFE, as well as the DWS of the proposed project via a notification letter.

7.2 STAKEHOLDER IDENTIFICATION

Stakeholders were identified and will continue to be identified through several mechanisms. These include:

- Utilising existing databases from other projects in the area;
- Advertising in a local newspaper; and
- Placement of community notices (posters).

All Stakeholders identified to date have been registered on the project stakeholder database. The EAP will continue to ensure that individuals/organisations from referrals and networking are notified of the proposed project. A list of stakeholders captured in the project database is included in the CRR (**Appendix A)**.

7.2.1 SITE NOTICES

The official site notices will be erected as per GNR 326, as follows:

- Four site notices, in English and one additional local language (such as isiZulu or SeSotho), will be placed at appropriate locations on site and nearby.
- This will include the boundary/access road to the site, as well as additional public places within a 5km radius of the project area, such as grocery stores, municipality and local library.

Proof of placement of the site notices is included in **Appendix B-5** of the CRR.

7.2.2 WRITTEN NOTICES

Written notification of the proposed development and availability of the BA Report was sent to owners and occupiers on or adjacent to the proposed project site; municipality ward councillor, district municipality, and relevant state departments.

General communication (written notification) with identified stakeholders (public and other government departments/authorities, such as DWS, SAHRA, CoE Municipality and GDARD) will continue throughout the project.

Proof of emails sent and proof of delivery is included in **Appendix B-3** and **Appendix B-6** of the CRR, respectively.

7.2.3 NEWSPAPER ADVERT

An advert will be published in a local newspaper (in English), formally announcing the commencement of the Environmental Authorisation (EA) application process, requesting stakeholders to register their interest in the project, and to announce the release of the Draft BAR for public review and comment.

It is noted that advertising in provincial and national newspapers is not required as the impact of the activities does not extend beyond the boundaries of the district municipality in which they will be undertaken.

Proof of placement of the advertisement is included in **Appendix B-2** of the CRR.

7.2.4 AVAILABILITY OF DRAFT BA REPORT:

In terms of Directions Regarding Measures to Address, Prevent and Combat the Spread of Covid -19 Relating to National Environmental Management Permits and Licences, published on 05 June 2020, reports may not be made available at any public places or premises closed to the public, as contemplated in the regulations. As a result, the Draft BA report was made available to stakeholders as follows:

- From WSP on request
- Online on the WSP website
- Enstra Paper Mill Security office (East Geduld Road, Spring, 1559)

The Draft BA report was made available to all stakeholders for a 30-day comment period from **25 June 2021** to **26 July 2021**.

7.2.5 COMMENTS RECEIVED

Comments received from registered stakeholders have been captured and responded to within the Comments and Response Report included in **Appendix B** of this Final BAR.

8 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that "development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…". NEMA also imposes a duty of care, which places a positive obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA's preventative principle, potentially negative impacts on the environment and on people's environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be altogether prevented, they must be minimised and remedied in terms of "reasonable measures".

In assessing the environmental feasibility of the proposed Solar PV facility, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience and the relevant legislation (where applicable).

The conclusions of this BA are the result of comprehensive assessments.

8.1 SPECIALIST CONCLUSION

8.1.1 SOIL AND AGRICULTURE

At the site currently the predominant land use is agriculture. The soils identified (Shortlands, Hutton, Clovelly, Rensburg and Westleigh) had different characteristics and land capabilities. However, the predominant land capability of the site was deemed to be Class II Arable. This is due to the site primarily consisting of the Shortlands soil form and the overall topography of the site. The soil analysis of the site (from the past Agrisol study (2020)), indicated that the soil contains the necessary nutrients to support agriculture.

The more easily mitigatable risks identified to the soils at the site include loss of topsoil, dust creation, and contamination. Erosion, sedimentation and soil compaction can be avoided to some extent but to a degree cannot be mitigated against. The inevitable changes in the surface profile, land use and land capability as a result of the development cannot be mitigated against. Mitigation measures to be implemented will be most important during the construction phase.

8.1.2 BIODIVERSITY

The project area has been/is affected negatively by current and historical land use. Infringement, littering and dumping has proliferated over time. The neighbouring industrial area (paper recycling plant to the south) and the ash dump (to the north) has also had an impact on both the fauna and the flora in the area, which is evident in the disturbed and transformed habitats. The habitat associated with Cowles Dam is polluted, causing unpleasant odours from the water. However, the system can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by urban development. The habitat sensitivity of the wetlands is regarded as High, due to the role of this intact habitat to biodiversity within a very fragmented local landscape, as well as a water resource not to mention the sensitivity according to various ecological datasets. This wetland is situated up stream of the Blesbokspruit IBA. The very high sensitivity areas:

- Serve as and represent CBA: Important, as per the Gauteng Conservation Plan; and
- May support various species and may play an important role in the ecosystem if left to recover from the superficial impacts.

The Medium sensitivity areas were classified as such because of the intactness of the these as well as they serve as:

— Ecological Support Areas.

The development will lead to the destruction and loss of portions of functional CBA: Important, in the areas where the wetlands delineated overlap with the Gauteng Conservation Plan CBA: Important areas. The faunal species that are expected to utilise this habitat will also be lost. Furthermore, ESA areas rated as medium sensitivity will be lost prior to mitigation, these areas are crucial for the remaining fauna and flora species as far as foraging is considered.

Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

8.1.3 WETLAND ASSESSMENT

A wetland risk assessment was conducted to investigate the level of risk posed by proposed project. Three levels of risk have been identified and determined for the overall risk assessment, these include low, medium and high risk. High risks are not applicable based on the fact that wetlands will not be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure and at an indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. The medium risks were the priority for the risk assessment, focussing on the expected potential for these indirect risks. The significance of all post-mitigation risks was determined to be low, including implementing the 22m wetland buffer.

8.1.4 VISUAL

The construction and operation of the proposed Solar PV facility and its associated infrastructure, may have a visual impact on the study area, especially within (but potentially not restricted to) a 1km radius of the proposed facility. The visual impact will differ amongst places, depending on the distance from the facility.

The proposed development site is located on mining land within relative close proximity to existing mining and industrial infrastructure, activities and other visual disturbances. The PV plant will primarily be visible to the residents of the four houses immediately south of the proposed development site. It would be advisable for the project proponent to engage with these residents in order to inform them about the proposed development, to address potential concerns that may arise, and to negotiate an amicable solution should it be required. This may include the potential screening of the houses from the PV plant (if deemed feasible), or potential relocation of the residents (if mutually agreed).

The greater environment surrounding the site is not considered to have a high visual quality or specific sense of place due to the relatively disturbed, altered and developed nature of the study area. The visual impacts associated with the PV plant is therefore considered to be within acceptable limits (other than for the residents mentioned above) and do not constitute an irreplaceable loss of visual resources.

8.1.5 AVIFAUNA

The project area has been altered both currently and historically. Historical mining activities and now current agriculture land uses have had an extensive impact on the avifauna and their habitats. The extent of the water pollution in the Cowles Dam is of concern and would have both a short- and long-term negative effect on the bird populations in the area.

The only remaining natural habitats, i.e. degraded grassland and natural wetland habitats, even though somewhat degraded are the most sensitive habitats within the project area. The ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and an important habitat for various avifauna species. The preservation of these habitats is the most important aspect to consider for the proposed project, even more so due to the sensitivity of the area according to the various ecological datasets. Two migratory species, the Amur Falcon and the Common Buzzard were found in the project area, this shows that

this area is still of importance. It is also home to four Marsh Owls that are most likely breeding in the area, it is pertinent that nests of avifauna species are not destroyed during construction and that construction is to take place outside of the breeding season (June- August).

The area is home or feeding grounds for 90 bird species, although most of them are adaptable species, the development will have an impact on them mainly in the form of habitat loss. It is recommended that the development take place on mainly Geduld 207 and Geduld 44 and as much of Geduld 37 be preserved as possible. If the area surrounding the Cowles Dam and the water of the system are rehabilitated this area can again provide suitable habitat for a number of avifauna species including species of conservation concern.

8.1.6 HERITAGE AND PALAEONTOLOGY

A Heritage Impact Assessment and a Palaeontological Impact Assessment were undertaken. No sites of cultural heritage significance were located during the Heritage Impact survey. It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.

The Palaeontological Impact Assessment concludes that all the land involved in the development was assessed and none of the property is unsuitable for development. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves. It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

8.2 SUMMARY OF IMPACT ASSESSMENT

A summary of the identified impacts and corresponding significance ratings for the proposed Solar PV facility is provided in **Table 1-1**.

Table 8-1: Impact Summary

ASPECT	IMPACT DESCRIPTION	STATUS	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
CONSTRUCTION				
Air Emissions	Impact on air quality	Negative	Moderate	Low
Noise Emissions	Potential noise impacts	Negative	Low	Very Low
Soils and Land Capability	Loss of agricultural land	Negative	Low	Low
	Soil degradation	Negative	Moderate	Low
	Soil contamination	Negative	Moderate	Low
Waste	Improper handling and disposal of waste	Negative	Moderate	Low

ASPECT	IMPACT DESCRIPTION	STATUS	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Ecology	Temporary disturbance of wildlife	Negative	Moderate	Low
	Habitat loss	Negative	Moderate	Low
	Displacement, direct mortalities of fauna	Negative	Moderate	Low
	Spread of alien invasive species	Negative	Moderate	Low
Wetlands	Degradation/disturbance of wetlands	Negative	Moderate	Low
	Increased erosion and sedimentation of wetlands	Negative	Moderate	Low
	Contamination of wetlands	Negative	Low	Low
Avifauna	Temporary disturbance of avifauna	Negative	Very Low	Very Low
	Displacement of avifauna due to habitat loss	Negative	High	Moderate
	Sensory disturbance of avifauna	Negative	Moderate	Very Low
	Collection of eggs and poaching (avifauna)	Negative	Moderate	Very Low
	Roadkill (avifauna)	Negative	Moderate	Very Low
	Chemical pollution (avifauna)	Negative	Moderate	Very Low
Visual	Visual impact on sensitive receptors	Negative	Moderate	Low
Heritage	Destruction of heritage resources	Negative	Low	Very Low
Palaeontology	Impact on fossil heritage	Negative	Low	Very Low
Socio-economic	Temporary employment opportunities	Positive	Low	Moderate

ASPECT	IMPACT DESCRIPTION	STATUS	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
	Economic development opportunities	Positive	Low	Moderate
	Disruption of social structures	Negative	Moderate	Low
	Increased risk to neighbouring land users	Negative	Moderate	Low
Traffic	Increase in traffic generation	Negative	Moderate	Low
OPERATION				
Soils and Land Capability	Loss of agricultural land use	Negative	Moderate	Moderate
	Potential of soil erosion	Negative	Low	Low
	Potential land contamination	Negative	Low	Very Low
Biodiversity	Continued displacement and fragmentation of faunal community (anthropogenic disturbances)	Negative	Moderate	Very Low
	Continued loss of faunal species (road mortalities and/or poaching)	Negative	Moderate	Very Low
	Continued habitat degradation (litter and alien vegetation encroachment)	Negative	Moderate	Low
Avifauna	Displacement due to habitat transformation	Negative	High	Moderate
	Collisions with PV and associated infrastructure	Negative	High	Moderate
	Electrocution by infrastructure and connections to PV	Negative	High	Low
	Chemical pollution associated with measures to keep PV clean	Negative	Moderate	Very Low
	Fencing of PV site, especially a risk for larger birds such as herons	Negative	Moderate	Low

ASPECT	IMPACT DESCRIPTION	STATUS	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Visual	visual impact on sensitive visual receptors located within a 1km radius	Negative	High	High
	Visual impact on observers travelling along the roads and residents at homesteads (within 1-3km radius)	Negative	Moderate	Moderate
	Visual impact of lighting at night on sensitive visual receptors in close proximity	Negative	Moderate	Low
	visual impact of solar glint and glare as a visual distraction and possible air travel hazard	Negative	Low	N/A
	Visual impact of the ancillary infrastructure on observers in close proximity to the structures	Negative	Low	Low
	visual impact of the proposed PV facility on the sense of place of the region	Negative	Low	Low
Socio-economic	Employment opportunities	Positive	Low	Moderate
	Economic development opportunities	Positive	Low	Moderate

8.3 IMPACT STATEMENT

The overall objective of the BA process was to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

In assessing the environmental feasibility of the Solar PV facility, the requirements of all relevant legislation have been considered. The identification and development of appropriate management and mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience and the relevant legislation (where applicable).

The BA process has found that the proposed project will involve activities which will lead to a number of direct and indirect negative impacts on the biophysical and socio-economic environment. These impacts were found to vary in terms of their consequence and probability. Positive impacts are limited to employment opportunities and other socio-economic benefits as a result of the multiplier effect.

Mitigation measures have been developed where applicable for the above aspects and/or impacts and are presented within the EMPr (**Appendix J**). The mitigation measures are necessary to ensure that the project is planned, constructed and operated in an environmentally responsible manner. It is imperative that all impact

mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Furthermore, the following conditions are recommended for inclusion in the EA;

- Future construction of building, civil, electrical, water and sewerage services plans must be presented to Eskom for perusal and approval prior to any work proceeding in the vicinity of Eskom services.
- The Applicant is required to obtain the relevant approval from DWS for water uses associated with the project.
- All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.
- All High sensitivity areas (wetlands) and the associated buffers should be considered as No Go areas for any activity.
- A suitably qualified palaeontological specialist must survey for fossils before and or after clearing, blasting, drilling or excavating.
- A Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 must be signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.
- If any evidence of archaeological sites, heritage sites or palaeontological remains are found during the proposed activities, SAHRA must be alerted immediately, and a professional archaeologist or palaeontologist, based on the nature of the finds, must be contacted as soon as possible to inspect the findings.
- A formal Stormwater Management Plan must be compiled once the designs of the Solar PV facility are final and implemented.

The findings of this BA process and associated Specialist studies conclude that there are no fatal flaws associated with the proposed development. It is therefore the opinion of the EAP that the project can proceed, and that all the listed mitigation measures and recommendations are considered by the Competent Authority.

The Applicant requires a 10-year validity period to be included in the Environmental Authorisation, within which construction must commence from the date of the authorisation.

9 CONCLUSION AND RECOMMENDATIONS

Calodex is proposing the development of a 115 MW Solar PV facility approximately 5km north of Springs in the Gauteng Province. The proposed project is located in the industrial node of Springs, with a considerable potential to provide green energy in an area where most of the large energy consumers are located.

This BA process also considered the biophysical location of the proposed development, as well as the considerable potential use of this land. As discussed previously, the purpose of the proposed Solar PV facility is to strengthen the existing electricity grid for the area. The electricity generated from this development would be supplied to private off-takers, including commercial users. Other socio-economic benefits would result from the proposed project, including the increase of energy supply, employment opportunities and local economic development.

A larger 264 hectare area was considered and assessed by the Specialists to ensure any development constraints and environmental sensitivities can be avoided in the final siting and location of the facility. The proposed project footprint will be approximately 210 hectares and will take place within the larger assessed area. The final layout of the Solar PV facility will avoid the sensitive ecological features as identified in the relevant specialist studies for this project.

Based on the findings of the impact assessment and specialist studies, the proposed project is considered to have an overall ***low*** to ***moderate*** negative environmental impact and an overall ***low*** to ***moderate*** positive socio-economic impact, with the implementation of the relative mitigation measures. All of the specialists have recommended that the proposed project receive EA if the recommended mitigation measures are implemented.

In consideration of the findings of the BA Process, as well as the national, provincial and local strategic requirements to support sustainable development whilst promoting socio-economic development, it is the opinion of the EAP that the proposed project will make a positive contribution towards socio-economic development in the City of Ekurhuleni Municipality. It is recommended that the project receive EA in terms of the EIA Regulations (as amended on 7 April 2017), provided that the outlined mitigation measures of this BA process are implemented effectively.

APPENDIX

A EAP CURRICULUM VITAE

APPENDIX

B COMMENTS AND RESPONSES REPORT

APPENDIX

C BIODIVERSITY ASSESSMENT (INCLUDING WETLAND ASSESSMENT)

APPENDIX

D AVIFAUNAL ASSESSMENT

APPENDIX

E VISUAL IMPACT ASSESSMENT

APPENDIX

F HERITAGE IMPACT ASSESSMENT

APPENDIX

G PALAEONTOLOGICAL IMPACT ASSESMENT

APPENDIX

H SOILS AND AGRICULTURAL STUDY

APPENDIX

I HYDROPEDOLOGICAL ASSESSMENT

APPENDIX

J DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME