

REPORT

Environmental Scoping Report: The Development of a 60MWp Photovoltaic (PV) Plant associated with the Tubatse Ferrochrome (TFC) Smelter, Fetakgomo Tubatse Local Municipality

Draft Consultation Environmental Scoping Report

Client: Samancor Chrome Pty Ltd

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Appendix B: Pre-application Minutes and Approval of Public Participation Plan

Appendix C: Peer Review of the Environmental Scoping Report

Appendix D: EAPs CV

Appendix E: Public Participation Report

Executive Summary

The rising electricity tariffs in South Africa, combined with the increasingly severe load shedding patterns experienced across the country, has a negative impact on the production and revenue of Samancor Chrome business. This has motivated Samancor Chrome to consider renewable energy generation at their smelter plants. Implementing solar Photovoltaic (PV) generation will result in improved availability of supply and reduced utility bills as well as going 'green' in terms of environmental considerations.

Samancor Chrome is therefore proposing the development of a 60 Megawatt peak Photovoltaic Plant over five potential sites adjacent to the TFC Smelter in Steelpoort, Fetakgomo Tubatse Local Municipality.

Samancor Chrome invited Independent Power Producers to respond to a Request for Proposal in March 2021, to finance, develop, construct, own, operate and maintain the PV plant, in order to supply electricity to Samancor Chrome's TFC Smelter. It is Samancor Chrome's intent to sign a Power Purchase Agreement with the successful IPP for a minimum of 20 years with an option to extend to 25 years.

Scope of the Study

The subject of this Environmental Scoping Study includes the following key components:

- Development of a PV plant over the selected potential sites including mounting structures, inverters, on-site transformers and substations, instrumentation and control;
- New 33kV overhead powerlines (within a 50m assessment corridor) between the various sites linking up to either the Tubatse East and –Tubatse West substations;
- Battery Energy Storage System (BESS) either lead-acid or lithium-ion; and
- Ancillary infrastructure such as construction laydown area/ s, water pipelines and storage tanks, internal access roads, fencing, gates and access control.

Approach to the Environmental Scoping Study (ESS)

The EIA study is being undertaken in two phases that will ultimately allow the Department of Forestry, Fisheries and Environment, the Competent Authority to make an informed decision:

- Phase 1 – Environmental Scoping Study including Plan of Study for Environmental Impact Assessment; and
- Phase 2 – Environmental Impact Assessment and Environmental Management Programme.

Project Alternatives

The following alternatives were identified in the ESS and will be assessed further in the EIA study:

- Site alternatives – subsequent to the Environmental Screening Investigation, five sites were selected for further assessment in the EIA study. It is proposed that the PV plant be developed over these 5 potential sites, therefore, these sites are not considered alternatives.
- Fixed and tracking system alternatives.
- Monofacial and bifacial solar panel alternatives.
- Grid infrastructure (overhead powerline) alternatives.
- BESS – either lead-acid or lithium-ion.

Key Findings of the Environmental Scoping Study (ESS)

The ESS for the proposed 60MWp PV plant, has been undertaken in accordance with the EIA Regulations 2014 (as amended in 2021). The ESS aimed to identify and provide:

- A description of the proposed activity;
- A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, and economic aspects of the environment may be affected by the proposed activity;

- The identification of all legislation and guidelines applicable to the development;
- A description of environmental issues and potential impacts, including cumulative impacts, that have been identified;
- Details of the public participation process conducted to date; and
- A Plan of Study for EIA including the methodology that will be adopted in assessing the potential impacts that have been identified, including specialist studies or specialised processes that will be undertaken.

A summary of the key findings as indicated in this ESS is presented in Table I.

Table I: Summary of the key findings in the ESS

Discipline	Key Findings
Hydrology	<p>The sites were observed to be undeveloped; gently sloping towards the Steelpoort River; densely vegetated with loose, sandy soil and no flowing water or natural permanent surface water features. The floodline analysis identified two major drainage lines and three minor ones. The hydrology affecting each proposed site is summarized below:</p> <ul style="list-style-type: none"> ▪ There are no drainage lines affecting Site 1 and the entire area is suitable for development in terms of hydrology. ▪ There is a major drainage line with a large upstream contributing catchment adjacent to Site 2 and passing under the existing railway line. Floodline analysis indicated that flows from this channel will not affect the site or influence development thereof. ▪ Site 3 has a minor drainage line originating on it. There is no evidence of scour or a defined channel on the site and development of the entire site may go ahead with the stormwater management plan (SWMP) making provision for this natural drainage of the topography. ▪ Site 4 is adjacent to a major drainage line with an extremely large contributing catchment. During flood events, the flows will encroach on the south-east corner of the site. It is therefore recommended that a flood protection berm be designed for the south-east corner of Site 4 where the floodline encroaches. The floodline is too large to be diverted as a whole. Otherwise, there are no local drainage lines on the site and the entire area is suitable for development. ▪ Site 5 has one major drainage line running through it and three minor drainage lines. The major drainage line is a deep valley in the topography and divides the site. Flooding in this zone will be significant and it will not be possible to develop the area within the floodlines. Two of the minor floodlines had small contributing catchments with negligible peak flows predicted for them. It is recommended that these drainage lines be formalized and managed by the SWMP. No floodlines were carried out for these drainage lines due to the Digital Elevation Model not having sufficient elevation data of the transects. <p>The hydrological impacts for the proposed development are small and can be mitigated with an effective SWMP to handle increased runoff emanating from the sites and surface water as it flows through the areas.</p>
Freshwater	<p>According to the National Freshwater Ecosystem Priority Areas (NFEPA) database, the Steelpoort River is located approximately 150m north of the study area and the Tubatsane River confluences with the Steelpoort River approximately 150m west of the study area. The Steelpoort River is considered moderately modified (Class C) and a fish support area by the</p>

Discipline	Key Findings
	<p>NFEPA¹. The National Biodiversity Assessment (NBA) dataset² however indicates that the Steelpoort River is largely modified (Class D). The Present Ecological State (1999) classification indicates that the Tubatsane River is moderated modified (Class C), however the NFEPA database indicates the Tubatsane River as not intact (Class Z). Furthermore, according to the NBA dataset the Tubatsane River is seriously modified (Class E). These low PES scores may be mainly attributed to the mining activities and urban development, present within the catchment.</p> <p>The Steelpoort River is host to numerous fish and macro-invertebrate species all of which may potentially be affected should any further disturbance occur within the Steelpoort River or in the surrounding area.</p> <p>No wetlands were identified on site or within 500m of the planned infrastructure with the systems best defined as watercourses with associated riparian zones of varying degrees of development. These systems are associated with the proposed Site 3,4 and 5 as such these watercourses may potentially be impacted upon, should the PV plant be approved.</p>
Agriculture	<p>The proposed development is not expected to have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable as the proposed development will occupy land that cannot currently be utilised for agriculture and poses a low risk in terms of causing soil degradation.</p>
Biodiversity	<p>Impacts on the floristic environment is likely to be significant, with specific reference to the loss of protected and conservation important plant species. However, these impacts, when placed in context of the continued pressure on the remaining natural environment in proximity to peri-urban and industrial land use activities, as well as pressures from persistent and intensive use of natural resources by local communities, are inevitable. The application of a dedicated conservation and mitigation approach will likely ameliorate anticipated impacts to a more acceptable level. Despite the significant nature of anticipated impacts, no immediate 'red flag' is identified for the development.</p> <p>Drainage lines, including the nearby Steelpoort River and natural woodland provides for habitat of moderate sensitivity pertaining to the terrestrial faunal component of the sites. As a result of severe and unrelenting impacts from surrounding land use activities, the existing faunal component is anticipated to be of low to moderate diversity, despite the comparatively natural status of much of the natural woodland that characterise the respective sites. No immediate 'red flags' pertaining to the proposed activity is therefore identified at this stage of the assessment. None of the sites represents an immediate concern in terms of potential impacts on the faunal environment.</p>
Avifauna	<p>The habitat-based sensitivity assessment has identified certain areas of high-sensitivity avifaunal habitat located on, or in close proximity to certain of the development sites. This relates particularly to the presence of riparian habitat associated with certain rivers and watercourses, in particular the watercourse that drains from the hilly area to the east of the south-east of the development sites and which drains between Sites 3 and 4 and</p>

¹ The National Freshwater Ecosystem Priority Areas (NFEPA) project is a multi-partner project between CSIR, SANBI, WRC, DWS, DEA, WWF, SAIAB and SANParks. The NFEPA project aims to: 1. Identify Freshwater Ecosystem Priority Areas (FEPAs) to meet national biodiversity goals for freshwater ecosystems; and 2. Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers. The project further aims to maximize synergies and alignment with other national level initiatives such as the National Biodiversity Assessment (NBA) and the Cross-Sector Policy Objectives for Inland Water Conservation.

² The National Biodiversity Assessment (NBA) is a tool for monitoring and reporting on the state of biodiversity in South Africa. It is used to inform policies, strategies and actions in a range of sectors for managing and conserving biodiversity more effectively. The NBA is a summary of the state of South Africa's biodiversity and is prepared as part of the SANBI mandate under the Biodiversity Act (NEMBA, Act 10 of 2004). While the NBA is considered the latest (with the current version updated in 2018 and released in 2019) primary tool in monitoring, both projects are considered invaluable and should be considered in tandem as each database supplements the other.

Discipline	Key Findings
	<p>subsequently bisects Site 5. In a landscape setting of large-scale fragmentation of woody vegetation habitat (especially within the Steelpoort Valley), this watercourse is likely to represent an important landscape and altitudinal corridor linking the valley floor (and the Steelpoort riparian corridor) with the hilly areas to the east and south-east. The presence of a reach of this watercourse on Site 5 poses the risk that riparian vegetation along the watercourse could be cleared and that the watercourse could be transformed into an effective large-scale stormwater channel. The potential impacts of such clearing and the effects on ecological connectivity in an avifaunal context will need to be further investigated and appropriate mitigation measures (e.g. exclusion of the watercourse from development and creation of a buffer along the watercourse) identified.</p> <p>The riparian vegetation along the larger watercourse should be retained to preserve sensitive habitat and to retain ecological connectivity. The smaller watercourses on Site 5 are not characterised by such distinctive riparian habitat and are much less sensitive from an avifaunal habitat connectivity and bird movement perspective. Clearing of the vegetation within these watercourses would be associated with less significant impact than the clearing of vegetation along the larger watercourse.</p> <p>Similarly, to the larger watercourse on Site 5, the riparian corridor of the Steelpoort River is located directly adjacent to the northern boundary of Site 5. The riparian vegetation on the southern bank of the river located close to the Site 5 boundary is in a much more intact state than that on the northern bank, from which the larger trees have largely been removed. The southern part of the riparian corridor is thus likely to constitute the most important residual part of this locally important movement corridor for birds, with direct linkages to the woodland and thicket that remains in the northern parts of Site 5. The impacts of the proposed transformation of Site 5 will need to be further investigated and mitigation measures identified in this context.</p> <p>Both the riparian corridors of the Steelpoort River and larger watercourse on Site 5 must be considered as highly sensitive habitats that would likely comprise development exclusion areas for solar panel arrays, which will thus affect the micro-siting of PV panels on Site 5 in particular. The stipulation of development exclusion areas, including buffers beyond the outer boundaries of the riparian corridor will be based on the investigation and analysis that will be undertaken in the EIA study.</p>
Heritage Palaeontology	<p>Several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of 5 burial grounds (Site 1 and 2) with a High heritage significance and a heritage grading of IIIA. A buffer of at least 30m, must be demarcated immediately around the burial grounds and graves and marked as a No-Go area.</p> <p>The archaeological finds consisting of 9 archaeological sites (Sites 3, 4 and 5) has in most cases a rating of Medium significance and a grading varying between IIIC and IIIA at the highest. Sites 2, 3 and 5 will have the least impact on identified archaeological sites, although mitigation work will be required for Sites 3 and 5. The archaeological sites identified on Site 4 will require extensive mitigation work to mitigate the impact before any development. If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations, a Chance Find Protocol must be implemented by the responsible person in charge of the development.</p>
Visual Landscape	<p>The portion of the Steelpoort Valley in which the proposed development is located has a strong industrial component to the visual environment but is also characterised by rural settlement and natural visual landscape influences. The proposed solar development would thus occur in a context of the strong industrial visual influences of the TFC Smelter, especially if developed on sites located in close proximity to the smelter.</p>

Discipline	Key Findings
	There are however a number of visual receptor locations in close proximity to certain of the development sites, in particular Site 1. The development of a solar plant on the sites would result in a degree of overall landscape change and could potentially be perceived as a visual impact by receptors that are located close to certain of the development sites. The strong industrial influences are however likely to strongly ameliorate perceptions of visual impact by receptors in the project location, with potential mitigating factors (such as retention of natural vegetation buffers for vegetative screening) being a further ameliorating factor.

Conclusion and Recommendations

The ESR further provides an assessment of both the benefits and potential negative impacts and risks anticipated as a result of the project. As a point of departure, it should be stressed that whilst there are some unavoidable impacts to the receiving environment as with any development of this nature, the option to proceed with the proposed PV plant and associated infrastructure outweighs the No-Go option and there are no ‘red flags’ prohibiting the proposed project from progressing to the next phase of assessment i.e. EIA study where all potential impacts as well as the No-Go option will be assessed in detail. A graphical representation of the preliminary environmental sensitivities is provided in Figure 1.

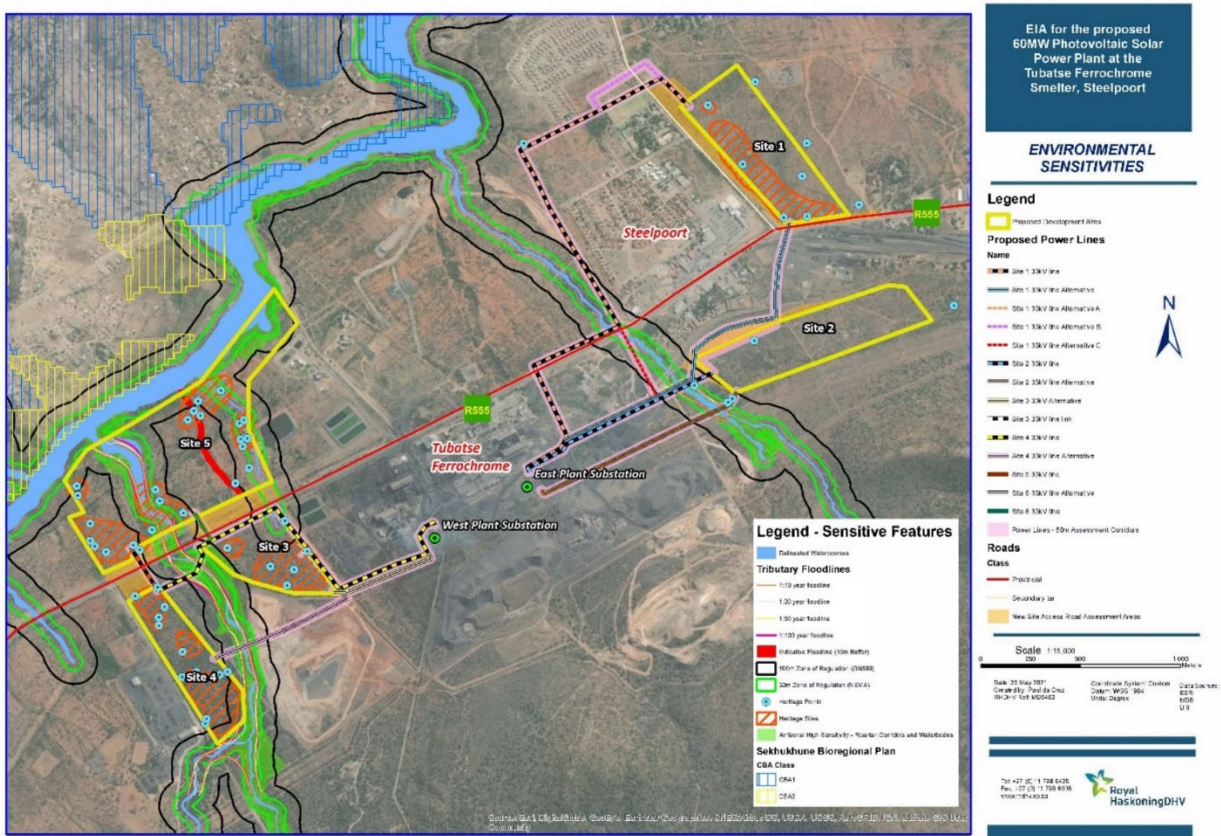


Figure 1: Preliminary sensitivity map

The draft consultation Environmental Scoping Report will be available for public review and comment from Friday, 25 June 2021 to 26 July 2021. After the review and commenting period, the final report will be submitted to the Department of Forestry, Fisheries and the Environment for decision-making.

Acronyms

Acronym	Acronym description
AC	Alternating Current
BESS	Battery Energy Storage System
BID	Background Information Document
BLSA	BirdLife South Africa
BRP	Bioregional Plan
CA	Competent Authority
CBA	Critical Biodiversity Area
C-PLAN	Conservation Plan
CRR	Comments and Responses Report
CSP	Concentrated Solar Power
CV	Curriculum Vitae
DC	Direct Current
DEM	Digital Elevation Model
DFFE	Department of Forestry, Fisheries and the Environment
DHSW&S	Department of Human Settlements, Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioner Association of South Africa
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
EPL	Ecosystem Protection Level
ERPR	Emergency Preparedness and Response Plan
ESA	Ecological Support Area
ESI	Environmental Screening Investigation
ESR	Environmental Scoping Report
ETS	Ecosystem Threat Status
FGTM	Fetakgomo Tubatse Local Municipality
FRAI	Fish Response Assessment Index
GG	Government Gazette
GHG	Greenhouse Gas
GIS	Geographic Information System
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IBA	Important Bird and Biodiversity Area
IHAS	Invertebrate Habitat Assessment System
IHI	Instream Habitat Integrity
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resources Plan
IUCN	International Union for Conservation of Nature
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
LEMA	Limpopo Environmental Management Act (Act No. 07 of 2003)

MAMSL	Meters Above Mean Sea Level
MAP	Mean Annual Precipitation
MIRAI	Macro-Invertebrate Response Assessment Index
MWp	Megawatt Peak
NBA	National Biodiversity Assessment (2018)
NCW	Not Conservation Worthy
NDP	National Development Plan
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NNHR	No Natural Habitat Remaining
NWA	National Water Act (Act No. 36 of 1998)
ONA	Other Natural Areas
PA	Protected Areas
PES	Present Ecological State
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PPP	Public Participation Process
PV	Photovoltaic
RFP	Request for Proposal
RWQO	Resource Water Quality Objective
SABAP2	South African Bird Atlas Project Version 2
SACNASP	South African Council of Natural Science Professionals
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resource Information System
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SASS5	South African Scoring System Version 5
SAWS	South African Weather Services
SCC	Species of Conservation Concern
SCPE	Sekhukhune Centre of Plant Endemism
SDG	Sustainable Development Goals
SDM	Sekhukhune District Municipality
SEZ	Special Economic Zone
SIP	Strategic Infrastructure Project
SWMP	Stormwater Management Plan
TFC	Tubatse Ferrochrome Smelter
UNFCC	United Nations Framework Convention on Climate Change
VEGRAI	Vegetation Response Assessment Index
WUL	Water Use Licence
ZOR	Zone of Regulation

Glossary

Glossary Term	Glossary Text
Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms 'activity' and 'development' are freely interchanged.
Albedo	Ground reflectance.
Alternatives	Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.
Applicant	The project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.
Biodiversity	The diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.
Buffer	A buffer is seen as an area that protects adjacent communities from unfavourable conditions. A buffer is usually an artificially imposed zone included in a management plan.
Construction	The building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.
Cumulative Impact	The impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decommissioning	Decommissioning means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned.
Direct Impact	Impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.
Ecosystem	A dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.
Environment	In terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) (as amended), "Environment" means the surroundings within which humans exist and that are made up of: <ul style="list-style-type: none"> i. the land, water and atmosphere of the earth; ii. micro-organisms, plants and animal life; iii. any part or combination of (i) and (ii), and the interrelationships among and between them; and

- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Assessment	The generic term for all forms of environmental assessment for projects, plans, programmes, or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.
Environmental Authorisation	An authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.
Environmental Assessment Practitioner (EAP)	The individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.
Environmental Impact	Change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly, or partially, resulting from an organisation's activities, products or services.
Environmental Management	Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project.
Groundwater	Water in the ground that is in the zone of saturation from which wells, springs, and groundwater runoff are supplied.
Hazardous Waste	Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles as outlined in the National Environmental Management: Waste Amendment Act (No 26 of 2014). Schedule 3: Category A – Hazardous Waste.
Hornfels	Hornfels is a metamorphic rock formed by the contact between mudstone/ shale, or other clay-rich rock, and a hot igneous body, and represents a heat-altered equivalent of the original rock.
Hydrology	The science encompassing the behaviour of water as it occurs in the atmosphere, on the surface of the ground, and underground.
Indirect Impacts	Indirect or induced changes that may occur as a result of the activity. These types of impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity

Integrated Environmental Management	A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level – that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing, and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).
Interested and Affected Party (I&AP)	Any person, group of persons or organisation interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.
Method Statement	A method statement is a written submission by the Contractor to the Engineer in response to the specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting a Method Statement. It contains sufficient detail to enable the Engineer to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.
Mitigate	The implementation of practical measures designed to avoid, reduce, or remedy adverse impacts or enhance beneficial impacts of an action.
No-Go Option	In this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.
Physiognomy	Physiognomy refers to overall structure or physical appearance - what the community and its dominant species look like, their height and spacing (height and canopy cover), and shape.
Pollution	The National Environmental Management Act, No. 107 of 1998 (as amended) defines pollution to mean any change in the environment caused by – substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Public Participation Process	A process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.
Re-use	To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.
Rehabilitation	A measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

Scour	The removal of sediment or materials from the bed or banks of a watercourse occur when the forces imposed by the flow on a sediment particle exceed the stabilising forces.
Sensitive Environments Significance	Any environment identified as being sensitive to the impacts of the development. Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).
Stakeholder Engagement	The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.
Sustainable Development Vadose Zone	Development which meets the needs of current generations without hindering future generations from meeting their own needs. The vadose zone is the Earth's terrestrial subsurface that extends from the surface to the regional groundwater table.
Watercourse	Defined as: <ol style="list-style-type: none"> i. a river or spring; ii. a natural channel or depression in which water flows regularly or intermittently; iii. a wetland, lake or dam into which, or from which, water flows; and iv. any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.
Water Pollution	The National Water Act, 36 of 1998 (as amended) defines water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it – less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (aa) to the welfare, health or safety of human beings; (bb) to any aquatic or non-aquatic organisms; (cc) to the resource quality; or (dd) to property”.
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

1 INTRODUCTION

1.1 Background

Samancor Chrome Ltd's core business is the mining and smelting of chrome ore. With an annual production capacity of 2.4 million tons of ferrochrome, Samancor Chrome is one of the largest integrated ferrochrome producers in the world. The ferrochrome produced is used in areas of the stainless-steel smelting process. Samancor Chrome has been, and continues to be, a major player in ferrochromium production. The company's total chromite resources exceed 900 million tons and are expected to support current mining activity for well over 100 years at the current rate of extraction. Some ores and concentrates are exported, but main allotments are destined for conversion into ferrochrome at the alloy plants.

The Tubatse Ferrochrome (TFC) Smelter was initially built as a three-furnace operation in 1975 as a joint venture between Gencor Ltd and Union Carbide Inc. (USA). In the same year, the Union Carbide Inc. shareholding was taken over by Samancor Chrome, and in 1989, Samancor Chrome acquired the Gencor Ltd shareholding. During the years 1989 – 1990, the plant was expanded to five furnaces with the sixth furnace being built in 1996. The plant is situated in Steelpoort, Limpopo Province and is in close proximity to the Eastern Chrome Mines. The core business of the operation is the production of charge chrome using six Submerged-Arc Furnaces, one metal recovery plant, and a Pellet and Sintering Plant.

1.2 Project Need and Justification

The rising electricity tariffs in South Africa, combined with the increasingly severe load shedding patterns experienced across the country, has a negative impact on the production and revenue of Samancor Chrome's business. This together with the recent announcement by the President of South Africa to allow for an increase to 100MW embedded generation threshold has motivated Samancor Chrome to consider renewable energy generation at their smelter plants. Implementing solar Photovoltaic (PV) generation will result in improved availability of supply and reduced utility bills as well as going 'green' in terms of environmental considerations.

Samancor Chrome is therefore proposing the development of a 60 Megawatt peak (MWp) Photovoltaic (PV) Plant over 5 potential sites adjacent to the TFC Smelter in Steelpoort, Fetakgomo Tubatse Local Municipality (FGTM) (Figure 1-1 and **Appendix A**).

Samancor Chrome invited Independent Power Producers (IPPs) to respond to a Request for Proposal (RFP) in March 2021, to finance, develop, construct, own, operate and maintain the PV plant, in order to supply electricity to Samancor Chrome's TFC Smelter. It is Samancor Chrome's intent to sign a Power Purchase Agreement (PPA) with the successful IPP for a minimum of 20 years with an option to extend to 25 years.

1.3 Scope of the Environmental Scoping Study

The subject of this Environmental Scoping Study (ESS) includes the following key components:

- Development of a PV plant over the selected potential sites including mounting structures, inverters, on-site transformers and substations, instrumentation and control;
- New 33kV overhead powerlines (within a 50m assessment corridor) between the various sites linking up to either the Tubatse East and Tubatse West substations;
- Battery Energy Storage System (BESS) either lead-acid or lithium-ion; and
- Ancillary infrastructure such as construction laydown area/s, water pipelines and storage tanks, internal access roads, fencing, gates and access control.

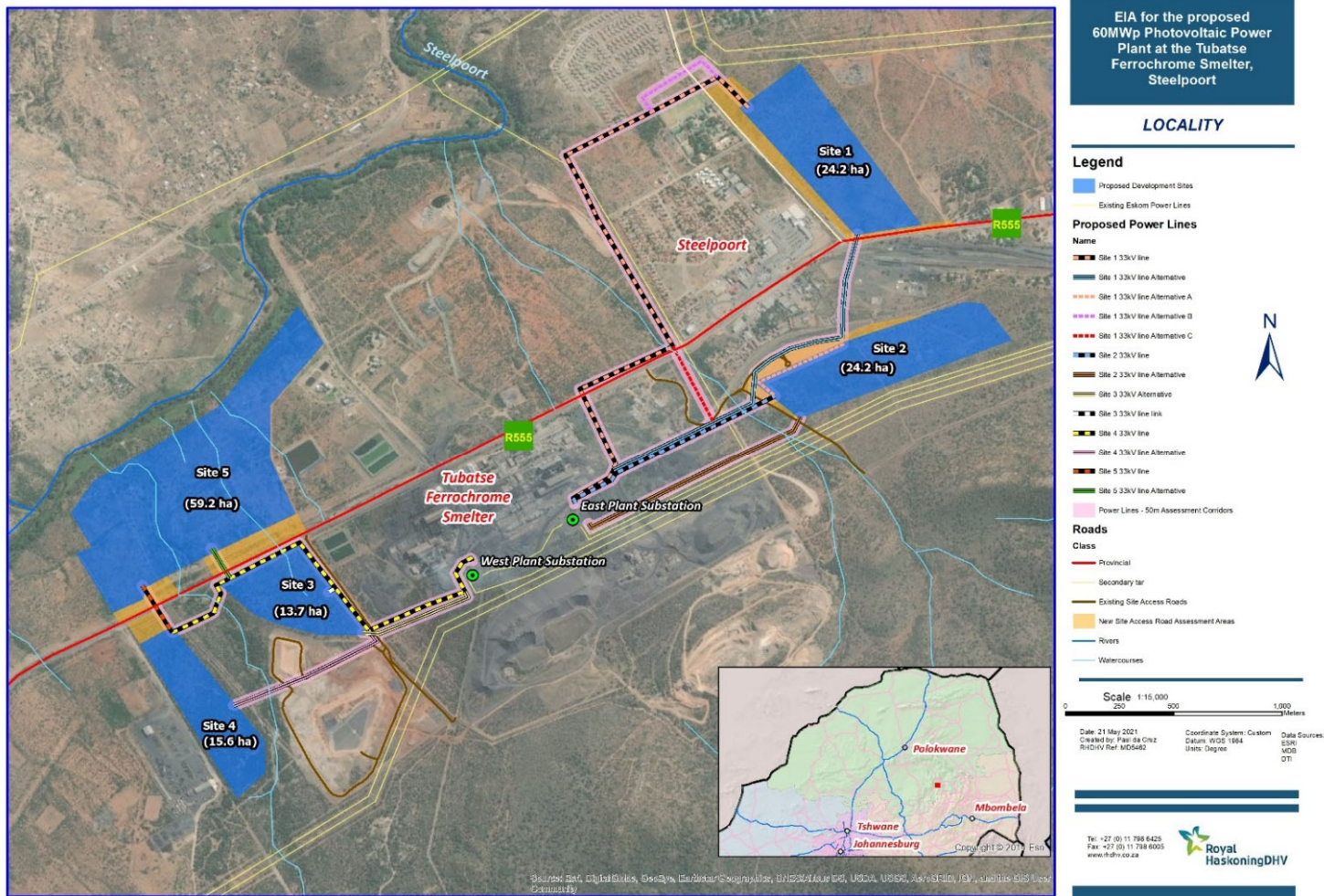


Figure 1-1: Locality map

1.4 Approach to the Environmental Scoping Study

The EIA study is being undertaken in two phases (Figure 1-2) that will ultimately allow the Department of Forestry, Fisheries and the Environment (DFFE) – the Competent Authority to make an informed decision:

- Phase 1 – ESS including and Plan of Study for Environmental Impact Assessment (EIA); and
- Phase 2 – EIA and Environmental Management Programme (EMPr).

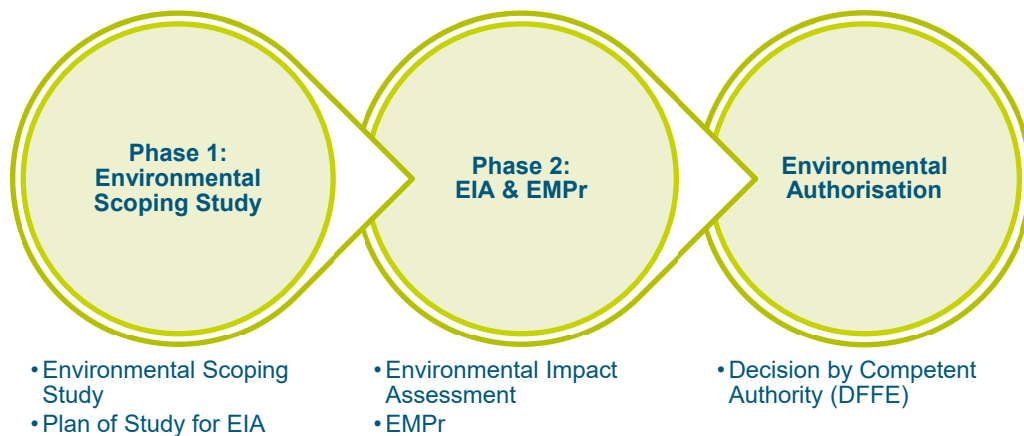


Figure 1-2: Environmental studies flowchart

Scoping and EIA is a detailed assessment applied to activities contained in Listing Notice 2 (Government Notice Regulation - GNR 325) of the EIA Regulations 2014 (as amended in 2021). The activities contained in Listing Notice 2 are activities that due to their nature and/ or extent are likely to have significant impacts. These activities are therefore higher risk activities that could potentially cause higher levels of pollution, waste and environmental degradation.

The Environmental Scoping Report (ESR) requires a description of the proposed activity and any feasible and reasonable alternatives, a description of the property and the environment that may be affected and the manner in which the biological, social, economic and cultural aspects of the environment may be impacted by the proposed activity; description of environmental issues and potential impacts, including cumulative impacts that have been identified, and details of the public participation process undertaken. The ESR further incorporates the findings and recommendations of the specialist studies conducted for the project to inform the next phase of the assessment i.e. EIA study.

In addition, the ESR must contain a Terms of Reference for the EIA, referred to as the Plan of Study for the EIA, specifying the methodology to be used to assess the potential impacts and the specialist assessments that are required. The Scoping and EIA study culminates in the development and submission of the Environmental Impact Assessment Report (EIR) and the EMPr to the Competent Authority i.e. the DFFE for decision-making.

1.5 Pre-application with Department of Forestry, Fisheries and the Environment

A pre-application meeting was held with the DFFE on 11 June 2021. The following was resolved/ clarified:

- The PV plant will be developed over the 5 potential sites.
- The Biodiversity Offset Plan/ Strategy must be developed prior to submission of the final EIR for decision-making.
- As the Sekhukhune Bioregional Plan (BRP) supersedes the Limpopo Conservation Plan (C-Plan), the BRP should be used for the identification of Listing Notice 3 activities. This has been confirmed by the DFFE.
- Specialist assessments may be mentioned but does not have to be appended to the ESR.

Refer to **Appendix B** for the pre-application minutes and the approval of the public participation plan.

1.6 Specialist Input into the ESS

To ensure the scientific rigour of the EIA process as well as a robust assessment of impacts, Royal HaskoningDHV was assisted by various specialists in order to comprehensively identify both potentially positive and negative environmental impacts (social and biophysical) associated with the project and where possible mitigate the potentially negative impacts and enhance the positive impacts (Table 1-1).

Table 1-1: Specialist inputs into the ESS

Specialist Study	Organisation
Hydrology	GCS Water and Environmental Consultants
Freshwater	Scientific Aquatic Services
Agriculture	Johann Lanz (private)
Biodiversity	Bathusi Environmental Consultants
Avifauna	Royal HaskoningDHV
Heritage and Palaeontology	PGS Heritage


1.7 Peer Review

In addition to the above, the EIA Regulations 2014 (as amended in 2021) requires the Environmental Assessment Practitioner (EAP) to be independent, objective and have expertise in conducting EIAs. Such expertise should include knowledge of all relevant legislation and of any guidelines that have relevance to the proposed activity. To ensure a lack of bias and to ensure transparency an external technical peer review has been undertaken by W&L Consultants (**Appendix C**).

1.8 Details of the Project Applicant

The Applicant for the project is Samancor Chrome and the details of the responsible person are listed in Table 1-2 below.

Table 1-2: Applicant details

Applicant	Samancor Chrome Pty Ltd	
Representative	Willem den Heijer	
Physical Address	Block A, Cullinan Place Cullinan Close Morningside, Sandton, 2196	
Telephone	011 245 1000	
E-mail	Willem.denheijer@samancorcr.com	

1.9 Details of the Environmental Assessment Practitioner

The environmental team of Royal HaskoningDHV have been appointed as the EAPs by Samancor Chrome to undertake the appropriate environmental studies for this proposed project (Table 1-3).

The professional team of Royal HaskoningDHV has considerable experience in the environmental management field. Royal HaskoningDHV been involved in and/ or managed several of the largest EIAs undertaken in South Africa to date. A specialist area of focus is on the assessment of multi-faceted projects, including the establishment of linear developments (national and provincial roads, and powerlines), mixed-use developments, bulk infrastructure and supply (e.g. wastewater treatment works, pipelines, landfills), electricity generation (renewable as well as non-renewable) and transmission, urban, rural and township developments, environmental aspects of Local Integrated Development Plans, as well as general environmental planning, development and management.

EAP CVs are attached as **Appendix D**.

Table 1-3: EAP details

Consultant	Royal HaskoningDHV	
Contact Persons	Prashika Reddy	Seshni Govender
Postal Address	PO Box 867, Gallo Manor, 2191	PO Box 867, Gallo Manor, 2191
Telephone	087 352 1577	087 352 1592
E-mail	prashika.reddy@rhdhv.com	Seshni.govender@rhdhv.com
Qualification	BSc (Hons) Geography BSc (Hons) Botany	BSc (Hons) Environmental Science
Expertise	Prashika Reddy is a Senior Environmental Scientist with 19 years' experience in various environmental fields including: EIAs, EMPs, PPP and environmental monitoring and audits. She is/ has been part of numerous multi-faceted large-scale projects, including the establishment of linear developments (roads and powerlines), industrial plants, electricity generation plants, mixed-use developments and mining projects. She is a Professional Natural Scientist (400133/10) with the South African Council for	Seshni Govender is an Environmental Consultant with 8 years' Environmental Consultant with eight (8) years working on compliance and strategic planning projects across South Africa. I have been involved in numerous Screening Studies, Basic Assessment, Water Use License projects, including complex integrated licensing that requires understanding cumulative environmental impacts. She is a Professional Natural Scientist (132741) with the SACNASP.

Consultant	Royal HaskoningDHV
	Natural Scientific Professions (SACNASP) as well as a Registered EAP with EAPASA (2019/917).

1.10 Structure of the Report

This ESR has been compiled in accordance with the stipulated requirements in GNR 326, Appendix 2 of the EIA Regulations 2014 (as amended in 2021) - Table 1-4.

Table 1-4: Compliance with Appendix 2 of GNR 326

ESR Requirements	Section / Comment
Details of (i) the EAP who prepared the report; and (ii) the expertise of the EAP including a curriculum vitae.	Section 1.9
The location of the activity, including <ul style="list-style-type: none"> ▪ the 21-digit Surveyor General code of each cadastral land parcel ▪ physical address and farm name, where available where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property.	Section 2.1
A plan which locates the proposed activity or activities applied for at an appropriate scale.	Figure 1-1
A description of the scope of the proposed activity, including – <ul style="list-style-type: none"> ▪ all listed activities triggered; and ▪ a description of the activities to be undertaken, including associated structures and infrastructure. 	Chapter 2 and 3
A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Chapter 3
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 1.2 and 2.7
A full description of the process followed to reach the proposed preferred activity, site and location, including – <ul style="list-style-type: none"> ▪ details of all the alternatives considered; ▪ details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; ▪ 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; ▪ the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; ▪ the impacts and risks identified for each alternative; ▪ the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impact and risks associated with alternatives; ▪ positive and negative impacts that the proposed activity and alternatives will have on the environment; ▪ the possible mitigation measures that could be applied; ▪ outcome of the site selection matrix; ▪ if no alternatives were investigated, the motivation for not considering such; and ▪ a concluding statement indicating the preferred alternatives. 	Chapter 4, 5 and 7

ESR Requirements	Section / Comment
<p>A plan of study for undertaking the environmental impact assessment process to be undertaken, including –</p> <ul style="list-style-type: none"> ▪ a description of the alternatives; ▪ a description of the aspects to be assessed; ▪ aspects to be assessed by specialists; ▪ a description of the proposed method of assessing the environmental aspects; ▪ a description of the proposed method of assessing duration and significance; ▪ an indication of the stages at which the competent authority will be consulted; ▪ particulars of the public participation process that will be conducted during the environmental impact assessment process; ▪ a description of the tasks that will be undertaken as part of the environmental impact assessment process; and ▪ identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored. 	Chapter 8
<p>An undertaking under oath or affirmation by the EAP in relation to</p> <ul style="list-style-type: none"> ▪ the correctness of the information provided in the report; ▪ the inclusion of comments and inputs from stakeholders and interested and affected parties; and ▪ 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. 	Section 9.2
<p>An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the EIA.</p>	Section 9.2
<p>Where applicable, any specific information required by the competent authority.</p>	Not applicable
<p>Any other matter required in terms of section 24(4)(a) and (b) of the Act.</p>	Not applicable

2 PROJECT DESCRIPTION

2.1 Property Details

The project area is located on opposite sides of the R555 and to the south of the Steelpoort River, Limpopo Province. The project area falls within the Sekhukhune District Municipality (SDM) and the FGTM within Ward 31. Small settlements of Pelaneng (located to the north), Stocking, Matholeng and Mohlakwana (located to the east) exist within the project area. The town of Steelpoort is located to the east of the TFC Smelter.

The details regarding the proposed sites are provided in Table 2-1. The landowners for the powerline routes are in the process of being verified.

Table 2-1: Property details (PV plant)

Site	Size (ha)	Property Details	Landowner	21 Digit Surveyor-General Code	Zoning
1	24.2	Goudmyn 337 KT Portion 00001 (Remaining Extent)	Samancor Chrome Ltd	T0KT00000000033700001	Agriculture/ Mining
2	24.2	Goudmyn 337 KT Portion 00001 (Remaining Extent)	Samancor Chrome Ltd	T0KT00000000033700001	Agriculture
		Goudmyn 337 KT Portion 00010	Goldbroz Inv Pty Ltd	T0KT00000000033700010	Possible Agriculture
3	13.7	Goudmyn 337 KT Portion 00000 (Remaining Extent)	Samancor Chrome Ltd	T0KT00000000033700000	Industrial
4	15.6	Goudmyn 337 KT Portion 0000 (Remaining Extent)	Samancor Chrome Ltd	T0KT00000000033700000	Industrial
5	59.2	Goudmyn 337 KT Portion 0000 (Remaining Extent)	Samancor Chrome Ltd	T0KT00000000033700000	Agriculture
		Goudmyn 337 KT Portion 0006	Samancor Chrome Ltd	T0KT00000000033700006	Agriculture

2.2 Project Coordinates

The corner points of each site is provided below in Table 2-2. The coordinates of the proposed overhead powerlines and access routes are provided in **Appendix A**.

Table 2-2: Project co-ordinates

Component	Coordinates
Site 1	A: 24°43'31.02"S; 30°12'18.02"E B: 24°43'24.40"S; 30°12'27.18"E C: 24°43'48.38"S; 30°12'45.13"E D: 24°43'50.12"S; 30°12'35.36"E
Site 2	A: 24°43'59.87"S; 30°12'51.81"E B: 24°44'5.70"S; 30°12'58.81"E C: 24°44'17.42"S; 30°12'27.03"E D: 24°44'12.03"S; 30°12'20.22"E

Component	Coordinates
Site 3	A: 24°44'36.11"S; 30°11'12.04"E B: 24°44'49.93"S; 30°11'22.50"E C: 24°44'48.60"S; 30°11'10.57"E D: 24°44'42.36"S; 30°11'0.28"E
Site 4	A: 24°44'51.24"S; 30°10'48.35"E B: 24°44'48.67"S; 30°10'53.17"E C: 24°45'5.58"S; 30°11'7.04"E D: 24°45'10.50"S; 30°11'7.16"E E: 24°45'14.15"S; 30°11'2.87"E
Site 5	A: 24°44'46.48""S; 30°10'44.29""E B: 24°44'31.56""S; 30°10'38.02""E C: 24°44'0.69""S; 30°11'11.95""E D: 24°44'5.99""S; 30°11'15.79""E E: 24°44'31.73""S; 30°11'11.60""E"

2.3 Technical Description

The main components of a PV plant include the following:

- Solar PV panels/ modules that convert solar radiation directly into electricity through the PV effect. The output from a PV module is direct current (DC) electricity. A PV plant contains many cells connected together in modules and many modules connected together in strings to produce the required DC power output.
- Inverters that convert DC generated by the PV modules into alternating current (AC) to be exported to the electrical grid.
- Mounting structures for the solar panels in a fixed or tracking configuration.
- Step-up transformers that raise the voltage to reach the AC grid voltage level.
- Grid connection infrastructure to enable the electricity to be exported into the grid network. This includes new 33kV overhead powerlines between the various sites and either the Tubatse East- and Tubatse West substations as well as containerised switchgear substation at Tubatse East- and West substations for connecting to the substation busbars. Each site will also have its own on-site substation and transformer.
- Battery Energy Storage System (BESS) either lead-acid or lithium-ion.

Associated infrastructure includes:

- Cabling between the structures, to be laid underground where practical;
- Instrumentation and control consisting of hardware and software for remote plant monitoring and operation of the facility.
- Fencing (approximately 3m in height), gates and access control.
- Guard houses at each site and possibly a centralised office, workshops and stores on one of the sites.

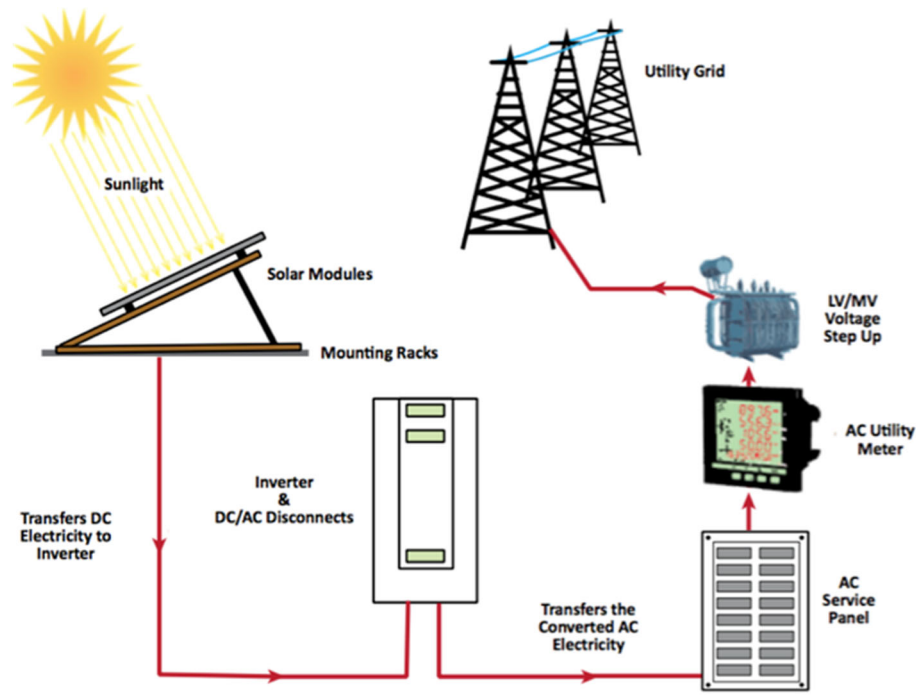


Figure 2-1: Overview of a solar PV plant³

2.4 Construction Camps/ Laydown Areas

Construction camps/ laydown areas will be required during the construction phase of the project. It is proposed that these construction camps/ laydown areas be located at existing transformed “brownfield” sites within /or around the TFC Smelter property.

2.5 Water Provision

Water will be required during the construction as well as during the operational phase for panel cleaning. It is estimated that the proposed PV plant will require approximately 1.2Mℓ per cleaning cycle (based on best-practice and to be confirmed with the concept (envelope) design). The cleaning cycle depends on the type of technology, the pollution at the location as well as the seasonality. Lastly, it also depends on the maintenance regime of the chosen IPP. One can assume to allow for 2 cleaning cycles per month as this is a typical global approach, but as the costs of these influence the tariff, the chosen IPP will need to take this into account.

The concept (envelope) design will determine volume of water and quality of water required, as well as potential water sources. Should raw water sources be required, this will need to be applied for as part of the Water Use Licence Application (WULA) to be undertaken.

2.6 Access

Internal access roads (4 - 6m wide) will be constructed, but existing roads will be used as far as possible.

Further technical details for the PV plant are provided in Table 2-3.

³ Source: International Finance Corporation. 2015. *Utility-scale Solar Photovoltaic Power Plants. A Project Developer's Guide*.

Table 2-3: Technical details (components and description) of the proposed PV plant

Facility Component	Description
Height of PV panels	Approximately 4.5m, to be confirmed by the concept (envelope) design and IPP
Area occupied by inverter/ transformer stations/ substations	Approximately 50m x 50m at each site, to be confirmed by the concept (envelope) design and IPP
Capacity of on-site substation	33kV
Area occupied by both permanent and construction laydown areas	Approx. 5ha, to be confirmed by the concept (envelope) design and IPP
Area occupied by buildings, switch houses, guard houses, offices, stores and workshops	Approximately 5ha (facilities used during the construction to be confirmed by the concept (envelope) design and IPP
Length of internal roads	To be finalized during concept (envelope) design of facility
Width of internal roads	4m - 6m
Height of and type of fencing	Security fencing approximately 3m high
Overhead powerline length	Varies in length
Overhead powerline servitude	11m on each side of the centre line
Overhead powerline tower height	Minimum 7m, conductor height approximately 6.5m
Battery Energy Storage System (BESS)	Lead-acid or lithium-ion – to be determined during concept (envelope) design and IPP

2.7 Project Motivation and Desirability

South Africa experiences some of the highest levels of solar radiation in the world. The average daily solar radiation in South Africa varies between 4.5 and 6.5kWh/m² (16 and 23 MJ/m²), compared to about 3.6kWh/m² for parts of the United States and about 2.5kWh/m² for Europe and the United Kingdom.

Figure 2-2 below shows the annual solar radiation (direct and diffuse) for South Africa, which reveals considerable solar resource potential for solar water heating applications, solar photovoltaic and solar thermal power generation.

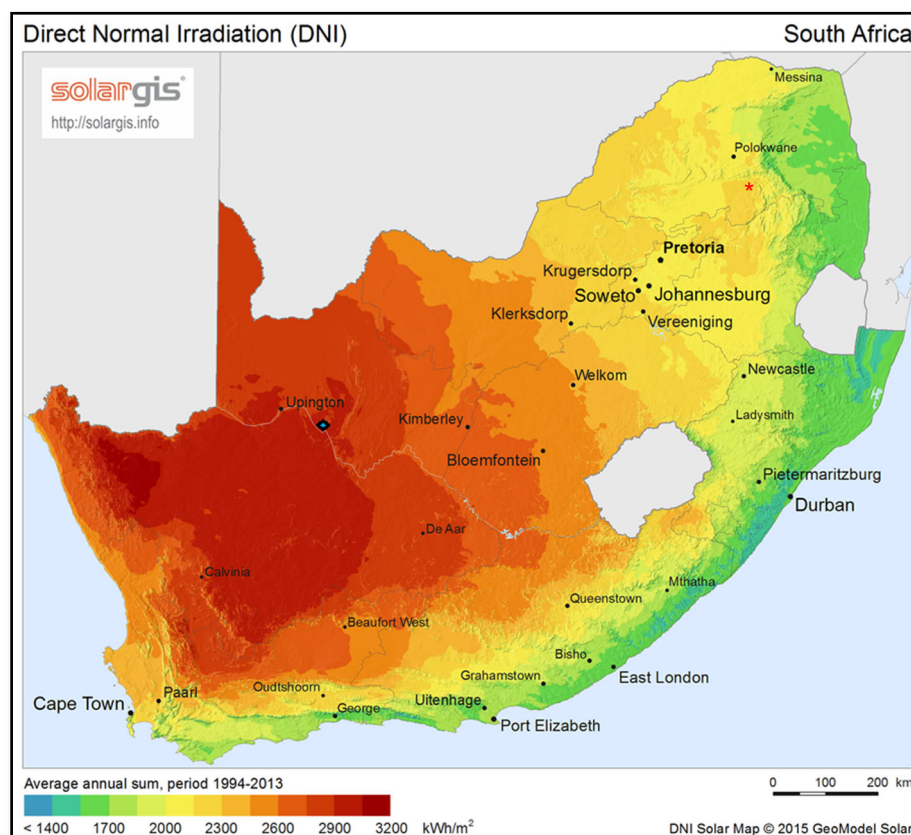


Figure 2-2: Annual incoming short-wave radiation for South Africa⁴ (indicative study area indicated by the red asterisk)

2.7.1 Integrated Resources Plan (2019)

The Integrated Resources Plan (IRP 2019) is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, considering security of supply and the environment (minimize negative emissions and water usage). The promulgated IRP 2010 – 2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development.

Besides capacity additions, several assumptions have changed since the promulgation of IRP 2010 – 2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP which resulted in the draft IRP 2018 and the promulgation of the IRP 2019.

The IRP 2019 recognises that whilst South Africa relies heavily on coal to meet its energy needs, the country is well endowed with renewable energy resources that offer sustainable alternatives to fossil fuels and therefore the country continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. The extent of decommissioning of the existing coal fleet due to end of design life, could provide space for a completely different energy mix relative to the current mix. Solar PV, wind and Concentrated Solar Power (CSP) with storage present an opportunity to diversify the electricity mix, to

⁴ www.solargis.info

produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain.

The recent power cuts or increasingly severe load shedding events by Eskom have emphasised the need for additional power generation capacity in South Africa. There is a focus on moving towards increased generation from renewable energy sources. Due to South Africa's electricity generation and supply system being overloaded, the demand for an increased and stable electricity supply is a priority. Solar energy plants are important for reducing the country's overall environmental footprint from power generation and for directing a pathway towards sustainability.

2.7.2 The National Development Plan (2030)

The National Development Plan⁵ (NDP) for 2030 seeks to promote economic growth and development through the provision of quality energy services that are competitively priced, reliable, and efficient. The NDP also seeks to promote social equity through the expansion of access to energy services. *Chapter 5: Environmental Sustainability and Resilience*, focuses on ensuring environmental sustainability and an equitable transition to a lower carbon economy and includes a number of objectives and actions which are specifically linked to climate change.

There are also strong climate change links with other chapters in the NDP, including *Chapter 3: Economy and Employment*, which includes a focus on the green economy, transition to a low carbon economy and society, and fostering motivation in green product and service development; *Chapter 4: Economy Infrastructure*, which includes the efficient and effective implementation of the environmental impact management governance system for new developments and the implementation of Strategic Infrastructure Projects (SIPs) proactive authorisation process. *Chapter 6* focuses on the promotion of an integrated and inclusive rural economy and *Chapter 8: Transforming Human Settlements* focuses on green cities and sustainable development.

The NDP states that energy generation makes up to 48% of South Africa's emissions, coupled with extensive natural coal resources, the Energy sector is both the most important and most challenging to transform. It is further suggested in the NDP that industrial energy consumption makes up to 9% of South Africa's emissions, with a further 14% from industrial processes and product use. The chemical industry, especially coal to liquids, and the minerals industry are primary contributors. The development of the PV plants to support the operations at the TFC Smelter can be seen as a means to reduce the reliance on traditional coal generated electricity thereby ensuring that there is a reduction in emissions and the successful implementation through Samancor Chrome's activities can set the precedent for other industries to incorporate more sustainable methods of generating electricity.

2.7.3 Fetakgomo Tubatse Local Municipality Integrated Development Plan

According to the FGTM Integrated Development Plan (IDP)⁶, the local economy is driven by mining and agricultural activities, and the PV development will be used to supplement electricity requirements for the TFC Smelter. The FGTM hosts the biggest portion of the eastern limb of the Platinum Group Metals and the chrome ore. The Municipality, in conjunction with other government sectors, are busy with projects to expand the roads, ensuring that there is water to run the mines and the community, sourcing electrical energy to supply the mine and community etc. The project area is located between a Provincial Growth Point located in Burgersfort which consists of higher order land uses including residential, retail, warehouses, government functions and transport facilities. The construction of the PV development also provides a significant

⁵ South Africa. 2012. *The National Development Plan 2030: Our Future-Make it Work*. National Planning Commission Department of The Presidency Republic of South Africa.

⁶ Fetakgomo Tubatse Local Municipality. 2020. *2020/21 Integrated Development Plan (IDP) & Budget*

opportunity for members of the immediate community to benefit from the creation of jobs during the construction phase of the project and an opportunity to become skilled. The proposed number and type of employment opportunities will be confirmed by the appointed IPP at a later stage during the EIA process.

2.7.4 Samancor Chrome Operations

The TFC Smelter consumes on average (between 2018 – 2020) 1425GWh/year of electricity supplied by Eskom and whilst the proposed project will only provide approximately 35% of the smelter's electricity requirements, the tariff is the main driver for the project as it has a negative impact on the production and revenue of Samancor Chrome's business. The PV plant will assist to generate energy during the peak tariff times at a lower tariff than the current Megaflex peak tariff, thereby resulting in an overall production cost saving.

The long-term profitability of the smelter operations at the TFC Smelter depend on minimising the cost of production. Electricity comprise a significant portion of this production cost. The proposed project will assist in alleviating the cost pressure of continuously increasing electricity costs and help to improve the GHG footprint of the operations and reduce the exposure to carbon tax. This will also help to reduce the risk of job losses associated with businesses under cost pressures.

This has motivated Samancor Chrome to consider renewable energy generation at their smelter plants as well as going 'green' with their operations. The ability for Samancor Chrome to generate electricity can also be seen as a means to alleviate pressure on the National Grid that is already severely constrained and can indirectly positively impact the surrounding community as there will be more capacity available in the grid to supply other users.

3 ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

In order to protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are a number of significant environmental legislation (Table 3-1 and Table 3-2) that need to be considered during this study.

This section outlines the legislation that is applicable to the proposed project and has been considered in the preparation of this report.

Table 3-1: Key legislation considered

Acts	Objectives, important aspects, associated notices and regulations
National Environmental Management Act, 1998 (Act No. 107 of 1998)(as amended)	<p>Objectives: To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state.</p> <p>Relevant Notices and Regulations:</p> <ul style="list-style-type: none"> ▪ Environmental Impact Assessment Regulations 2014 (GNR 326 in Government Gazette - GG 40772 as amended on 04 April 2017) ▪ Listing Notice 1 (GNR 327) as amended in 2017 ▪ Listing Notice 2 (GNR 325) as amended in 2017 ▪ Listing Notice 3 (GNR 324) as amended in 2017 ▪ National Web-based Environmental Screening Tool (2017). ▪ Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act - NEMA, 1998, when applying for EA in GG 43110, 20 March 2020). <p>Relevance to the proposed project:</p> <ul style="list-style-type: none"> ▪ Development must be socially, environmentally and economically sustainable. ▪ Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated; the social, economic and environmental impacts of activities including disadvantages and benefits, must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration. ▪ 'Polluter Pays' principle. ▪ Any activity that is proposed and which is listed in the NEMA EIA Regulations, requires environmental authorisation. <p>Potentially listed activities: <u>Listing Notice 1:</u></p> <ul style="list-style-type: none"> ▪ Activity 9 - The development of infrastructure exceeding 1000m in length for the bulk transportation of water or stormwater – (i) with an internal diameter of 0.36m or more; or (ii) with a peak throughput of 120ℓ/s or more. ▪ Activity 11 - The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275kV; or (ii) inside urban areas or industrial complexes with a capacity of 275kV or more. ▪ Activity 12 - The development of – (ii) infrastructure or structures with a physical footprint of 100m² or more; where such development occurs – (a)

Acts	Objectives, important aspects, associated notices and regulations
	<p><i>within a watercourse; or (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.</i></p> <ul style="list-style-type: none"> ▪ <i>Activity 19 - The infilling or depositing of any material of more than 10m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m³ from a watercourse.</i> ▪ <i>Activity 24 – The development of a road-</i> <ul style="list-style-type: none"> i. <i>for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</i> ii. <i>with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</i> ▪ <i>Activity 28 - Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture on or after 01 April 1998 and where such development will occur outside an urban area, where the total land to be developed is bigger than 1ha.</i> ▪ <i>Activity 56 - The widening of a road by more than 6m, or the lengthening of a road by more than 1km – (i) where the existing reserve is wider than 13.5m; or (ii) where no reserve exists, where the existing road is wider than 8m; excluding where widening or lengthening occur inside urban areas.</i> <p><u><i>Listing Notice 2:</i></u></p> <ul style="list-style-type: none"> ▪ <i>Activity 1 - The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more.</i> ▪ <i>Activity 4 - The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500m³.</i> ▪ <i>Activity 15 - The clearance of an area of 20ha or more of indigenous vegetation.</i> <p><u><i>Listing Notice 3:</i></u></p> <ul style="list-style-type: none"> ▪ <i>Activity 10(e)(i) - The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30m³ but not exceeding 80m³. In Limpopo – all areas.</i>
National Water Act (Act No. 36 of 1998) (as amended)	<p>Objectives:</p> <p>The National Water Act (NWA) is a legal framework for the effective and sustainable management of water resources in South Africa. Central to the NWA is recognition that water is a scarce resource in the country which belongs to all the people of South Africa and needs to be managed in a sustainable manner to benefit all members of society. The NWA places a strong emphasis on the protection of water resources in South Africa, especially against its exploitation, and the insurance that there is water for social and economic development in the country for present and future generations.</p> <p>Relevance to the proposed project:</p> <ul style="list-style-type: none"> ▪ Sustainable protection, use, development and conservation of water resources – including aquatic ecosystems. ▪ Defines 11 water uses and provides licensing procedures.

Acts	Objectives, important aspects, associated notices and regulations
	<p>Notices and Regulations:</p> <ul style="list-style-type: none"> ▪ General Authorisation in terms of Section 39 of the National Water Act (Act No. 36 of 1998, Water Uses Section 21 (a) and (b) (GN in GG 40243 of 02 September 2016). ▪ General Authorisation in terms of Section 39 of the National Water Act (Act No. 36 of 1998, Water Uses Section 21 (c) and (i) (GN in GG 40229 of 26 August 2016). <p>It is understood that Tubatse Chrome (Pty) Ltd has two existing water use licences (WULs) as follows:</p> <ol style="list-style-type: none"> 1. Licence Number 04/B41J/ABEG/2492 issued in 2014 and amended in 2016 for Section 21 a, b, e and g water uses; and 2. Licence Number 03/B41J/AG/4545 issued in 2016 for Section 21 a and g water uses. <p>Licence 04/B41J/ABEG/2492 and subsequent amendment authorises the following:</p> <ul style="list-style-type: none"> ▪ 21 (a): Abstraction of water from 36 groundwater boreholes for the use of water at the TFC Smelter; the employees residential areas; and for treatment and subsequent use in the plant. ▪ 21 (a): Abstraction of water from the Steelpoort River for unlisted uses. ▪ 21 (a): Abstraction of water from the existing dirty stormwater dam for use in the process plant. ▪ 21 (b) Storage of water from the Steelpoort River into the Bertha Dam and storage of water from the Bertha Dam to the Tubatse Main Dam. ▪ 21 (e): Use of treated effluent from treated sewage for irrigation of a golf course. ▪ 21 (g): Process plant infrastructure. <p>The licence is valid for 20 years (up to 2034) with five yearly reviews required.</p> <p>Licence 03/B41J/AG/4545 authorises the following:</p> <ul style="list-style-type: none"> ▪ 21 (a): Abstraction of groundwater through Aureus opencast for treatment and use in the plant. ▪ 21 (g): Process plant infrastructure. <p>The abstraction of water for all Section 21 (a) water uses across all licences and amendments will require that the Applicant remain within the stated volumes per abstraction point per day as detailed in the licences.</p> <p>Furthermore, the licence conditions require that the Applicant investigate new and emerging technologies and the use of water efficient devices to minimise water use requirements in the future.</p> <p>Potential water uses:</p> <ul style="list-style-type: none"> ▪ Section 21 (a) – taking water from a water resource <i>Applicable if water is abstracted for construction and cleaning of panels. This water may be obtained from the following sources: boreholes, Steelpoort River or the Tubatse Dam.</i> ▪ Section 21 (c) - impeding or diverting the flow of water in a watercourse <i>Applicable to any infrastructure (e.g. pump in the Steelpoort River or any other associated infrastructure like pipelines) within the 1:100 year floodline of a river or within 500m to wetlands.</i> ▪ Section 21 (i) - Altering the bed, banks, course or characteristics of a watercourse

Acts	Objectives, important aspects, associated notices and regulations
	<p><i>Applicable to any infrastructure (e.g. pump in the Steelpoort River or any other associated infrastructure like pipelines) within the 1:100 year floodline of a river or within 500m to wetlands.</i></p>
National Heritage Resources Act (Act No. 25 of 1999)	<p>Section 34 - No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.</p> <p>Section 35 - 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.</p> <p>Section 36 - No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.</p> <p>Section 38 (a) - the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; (b) the construction of a bridge or similar structure exceeding 50m in length; (c) any development or other activity which will change the character of a site (i) exceeding 5000m² in extent.</p> <p>Potential permits:</p> <ul style="list-style-type: none"> ▪ A permit issued under Section 35 of the Act that will include, surface collections, test excavations and analysis of recovered archaeological material. A further permit may be required for the destruction of the archaeological resources. ▪ Permit to relocate graves in terms of Section 36 of the Act.
National Environmental Management Biodiversity Act (Act No. 10 of 2004)	<p>Objectives:</p> <p>Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.</p> <p>Notices and Regulations:</p> <ul style="list-style-type: none"> ▪ National Biodiversity Strategy and Action Plan (2005). ▪ National List of Ecosystems that are Threatened and in Need of Protection in terms of Section 52(1)(a) of the National Environmental Management Biodiversity Act (Act No. 10 of 2004), GN 1002 in GG 34809, 09 December 2011. ▪ Threatened or Protected Species (GN 388 in GG 36375, 16 April 2013). ▪ Alien and Invasive Species Regulations (GNR 506 in GG 36683, 19 July 2013). ▪ Publication of Exempted Alien Species (GNR 509 in GG 36683, 19 July 2013). ▪ Publication of National List of Invasive Species (GNR 507 in GG 36683, 19 July 2013). ▪ Publication of Prohibited Alien Species (GNR 508 in GG 33683, 19 July 2013). ▪ Limpopo Conservation Plan (2013). ▪ National Biodiversity Assessment – The Status of South Africa's Ecosystems and Biodiversity (2018). ▪ Draft National Offset Policy (2018).

Acts	Objectives, important aspects, associated notices and regulations
	<ul style="list-style-type: none"> ▪ Sekhukhune Bioregional Plan (2020) – the Bioregional Plan has been gazetted in Notice 29 of 2020 (GG 3074, 27 March 2020) in terms of Section 40(1) of the National Environmental Management: Biodiversity Act, 2004.
Limpopo Environmental Management Act (Act No. 07 of 2003)	<p>Objectives:</p> <ol style="list-style-type: none"> a) to manage and protect the environment in the Province b) to secure ecologically sustainable development and responsible use of natural resources in the Province c) generally to contribute to the progressive realisation of the fundamental rights contained in section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996); and d) to give effect to international agreements effecting environmental management which are binding on the Province. <p>Relevance to the proposed project:</p> <ul style="list-style-type: none"> ▪ Part 2 – Sites of Ecological Importance, Section 18 – 20. ▪ Part 3 – Protected Environmental and Private Nature Reserves, Section 21. ▪ Section 64(c)(iv) – Protection of indigenous plants – no person may without a permit pick any indigenous plant in a Provincial Nature Reserve, a Site of Ecological Importance, a Protected Environment or a Private Nature Reserve. ▪ Chapter 13 – Environmental Pollution. <p>Potential permits:</p> <ul style="list-style-type: none"> ▪ Permits issued in terms of Schedules 2 (Specially protected wild animals), 3 (Protected wild animals), 7 (Undesirable animals), 9 (Prohibited aquatic growths), 10 (Invertebrates), 11 (Specially protected plants) and 12 (Protected plants) of the Act to remove, relocate or destroy species listed in the above Schedules.
National Forests Act (Act No. 84 of 1998)	<p>Provides for the protection of certain tree species, groups of trees, woodland or forests as declared by the Minister and prohibits the destruction of protected trees without an approval in place. Protected tree species have been confirmed within the study area.</p> <p>Regulations: List of Protected Tree Species under the National Forests Act, 1998 (GNR 690, 08 September 2017).</p> <p>Potential licence:</p> <ul style="list-style-type: none"> ▪ Licence to cut, disturb, damage or destroy any protected tree.

3.1 Other Relevant Acts, Guidelines, Department Policies and Environmental Management Instruments

Table 3-2: Other relevant acts, guidelines, policies and environmental management instruments

Acts/Guideline/Policies/Environmental Management Instruments	Considerations
The Constitution (No. 108 of 1996)	Chapter 2 – Bill of Right Section 24 – Environmental Rights
National Environmental Management: Waste Act (Act No. 59 of 2008) as amended	Section 17 - Every attempt must be made to reduce, recycle or re-use all waste before it is disposed. Section 25 - All waste (general and hazardous) generated during construction may only be disposed of at appropriately licensed waste disposal sites.

Acts/Guideline/Policies/Environmental Management Instruments	Considerations
	All waste management activities (e.g. recycling, treatment) meeting the relevant thresholds should be authorised under the National Environmental Management: Waste Act (Act No. 59 of 2008) [NEM:WA] (as amended) and Government Notice (GN) 921 of 29 November 2013 (as amended in 2015 and 2017). No person may commence, undertake or conduct a waste management activity listed GN 921 (as amended) unless a licence is issued in respect of that activity.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Section 32 - Control of dust. Section 34 - Control of noise. Section 35 - Control of offensive odours. National Dust Control Regulations published in GNR 827 in GG 36974, 01 November 2013.
Electricity Regulation Act No. 4 of 2006 as amended by the Electricity Regulation Amendment Act No. 28 of 2007	These regulations regulate the use and generation of electricity.
Occupational Health and Safety Act (Act No. 85 of 1993)	Section 8 - General duties of employers to their employees. Section 9 - General duties of employers and self-employed persons to persons other than their employees.
Construction Regulations (2014)	Contractors must comply with the Construction Regulations which lay out the framework for construction related activities.
Other:	
<ul style="list-style-type: none"> ▪ BirdLife South Africa: Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa (2017) ▪ Conservation of Agricultural Resources Act (Act No. 43 of 1983) ▪ Civil Aviation Act (Act No. 13 of 2009) and Civil Aviation Regulations of 1997 ▪ Disaster Management Act (Act No. 57 of 2002, as amended) ▪ Electricity Act (Act No. 41 of 1987) ▪ Environmental Impact Assessment Guidelines for Renewable Energy Projects, GNR 989 of 2015 ▪ Greater Tzaneba Municipality Final Integrated Development Plan (IDP) 2016/ 17 – 2020/ 21 ▪ Hazardous Substance Act (Act No. 15 of 1973) and Regulations ▪ Limpopo Climate Change Response Strategy 2016 - 2020 ▪ Limpopo Green Economy Plan (2013) ▪ National Climate Change Bill (2018) ▪ National Climate Change Response White Paper (2011) ▪ Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 – Section 53(1)) ▪ National Road Traffic Act (Act No. 93 of 1996) ▪ South African National Standard (SANS) 10103: 2008 – The measurement and rating of environmental noise with respect to annoyance and to speech communication ▪ Relevant By-laws ▪ Sekhukhune District Municipality Final IDP 2016/ 17 – 2020/ 21 ▪ Sekhukhune District Municipality Draft Spatial Development Framework 2018. ▪ Spatial Planning and Land Use Management Act (Act No. 16 of 2013) ▪ White Paper on Renewable Energy (2003) 	

3.2 International Conventions and Agreements

Other relevant environmental and social international conventions and agreements to which South Africa is a party that is applicable to this project are presented in Table 3-3.

Table 3-3: Relevant international conventions to which South Africa is a party

Convention	Summary of Objectives or Relevant Conditions	South African Status
Convention concerning the Protection of the World Cultural and Natural Heritage 1972 (Paris)	Ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage	Ratification
Montreal Protocol on Substances That Deplete the Ozone Layer (1 January 1989)	Calculated levels of consumption and production of chlorofluorocarbons must not exceed the stipulated thresholds.	Party to
Convention on Biological Diversity (29 December 1993)	The Convention has a bearing on the management of biodiversity at the study area. Countries such as South Africa that ascribe to the Convention must rehabilitate or restore degraded ecosystems through the formulation of appropriate strategies and plans.	Party to
United Nations Framework Convention on Climate Change (21 March 1994)	Protection of the climate system: Operations must protect the climate system by controlling greenhouse gases not controlled by the Montreal Protocol, which cause climate change through anthropogenic interference with the climate system.	Party to
United Nations Convention to Combat Desertification (26 December 1996)	To combat desertification and mitigate the effects of drought through national action programs.	Party to
United Nations Framework Convention on Climate Change - Kyoto Protocol (23 February 2005)	To further reduce greenhouse gas emissions by enhancing the national programs of developed countries aimed at this goal and by establishing percentage reduction targets for the developed countries and through the clean development mechanism (where developed countries can invest in developing country clean technology to offset emissions).	Party to
Paris Agreement adopted on 12 December 2015 at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC CoP21)	The Agreement is a comprehensive framework which will guide international efforts to limit greenhouse gas emissions and to meet all the associated challenges posed by climate change. The main objective of the Agreement is to limit the global temperature increase to well below 2 degrees Celsius, while pursuing efforts to limit the increase to 1.5 degrees.	Ratified
Sendai Framework for Disaster Risk Reduction (2015)	The Sendai Framework for Disaster Risk Reduction 2015 - 2030 was adopted at the Third United Nations World Conference in Sendai, Japan, on March 18, 2015. The Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. One of the lessons learned from the HFA is that more dedicated	Party to

Convention	Summary of Objectives or Relevant Conditions	South African Status
	<p>action needs to be focused on tackling underlying disaster risk drivers, such as the consequences of climate change and variability. As such, the Sendai Framework considers the incorporation of disaster risk reduction measures into programmes within and across all sectors, as appropriate, related to, among other things, the adaptation to climate change.</p>	
Sustainable Development Goals (2015)	<p>The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all UN Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs recognise that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.</p> <p>SDG 7 requires Affordable and Clean Energy for all. Investing in solar, wind and thermal power, improving energy productivity, and ensuring energy for all is vital if we are to achieve SDG 7 by 2030. Expanding infrastructure and upgrading technology to provide clean and more efficient energy in all countries will encourage growth and help the environment.</p>	Party to

4 PROJECT ALTERNATIVES

In terms of the NEMA EIA Regulations 2014 (as amended in 2021), feasible alternatives are required to be considered as part of the environmental studies. An alternative in relation to a proposed activity refers to the different means of meeting the general purpose and requirements of the activity which may include alternatives to:

- the property on which or location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

4.1 Site Alternatives

Royal HaskoningDHV undertook an Environmental Screening Investigation (ESI) during November 2020 for twelve sites identified by Samancor Chrome for the development of a PV plant (Figure 4-1). These sites were adjacent to the TFC Smelter along the eastern, western, northern, south-eastern and south-western boundary and varied in extent from 5.83ha to 660ha.

During the ESI, these sites were assessed albeit at a high-level using national, provincial and municipal GIS datasets, the DFFE National Web-based Environmental Screening Tool and various literature sources i.e. previous environmental studies, specialist assessments and planning documents. In addition, a rapid field assessment was conducted with key personnel from the TFC Smelter to determine further sensitivities based on their experience in the study area(s).

The ESI concluded that whilst the sites did not present any environmental fatal flaws to the proposed development there were some aspects which may be considered sensitive e.g. topography, untransformed and indigenous vegetation, watercourses, riparian vegetation and heritage resources. The ESI further recommended Sites 8, 10 and 12 (northern-most portion) for the development of the PV plant subject to a detailed EIA study.

Subsequent to a workshop held with Project Technical Team, Site 10 was no longer preferred due to the uncertainty of mining operations by the Aureus Industrial and Mining Operations Pty Ltd and this site was subsequently discarded. Further to this, Site 5 (close to the H:H facility), Site 6 (Quartz Mine) and Site 7 were discarded due various technical limitations. The area of Site 12 was reduced to exclude the southern extent of the site (that extends into the hilly incised terrain to the south-east of the Steelpoort town) as well as the north-eastern portion, so that it does not infringe on the residential development to the north-west of the site.

Prior to the commencement of the ESS, some sites were revised either in size or consolidated and the sites were renamed as follows:

- Site 12 was renamed as the 'new' Site 1;
- Site 8 was renamed as the 'new' Site 2;
- Site 1 was renamed as the 'new' Site 3;
- Site 4 – no change; and
- Sites 2, 3 and 11 were consolidated to form the 'new' Site 5.

Refer to Figure 4-2 for the revised potential sites that were assessed in this ESS.

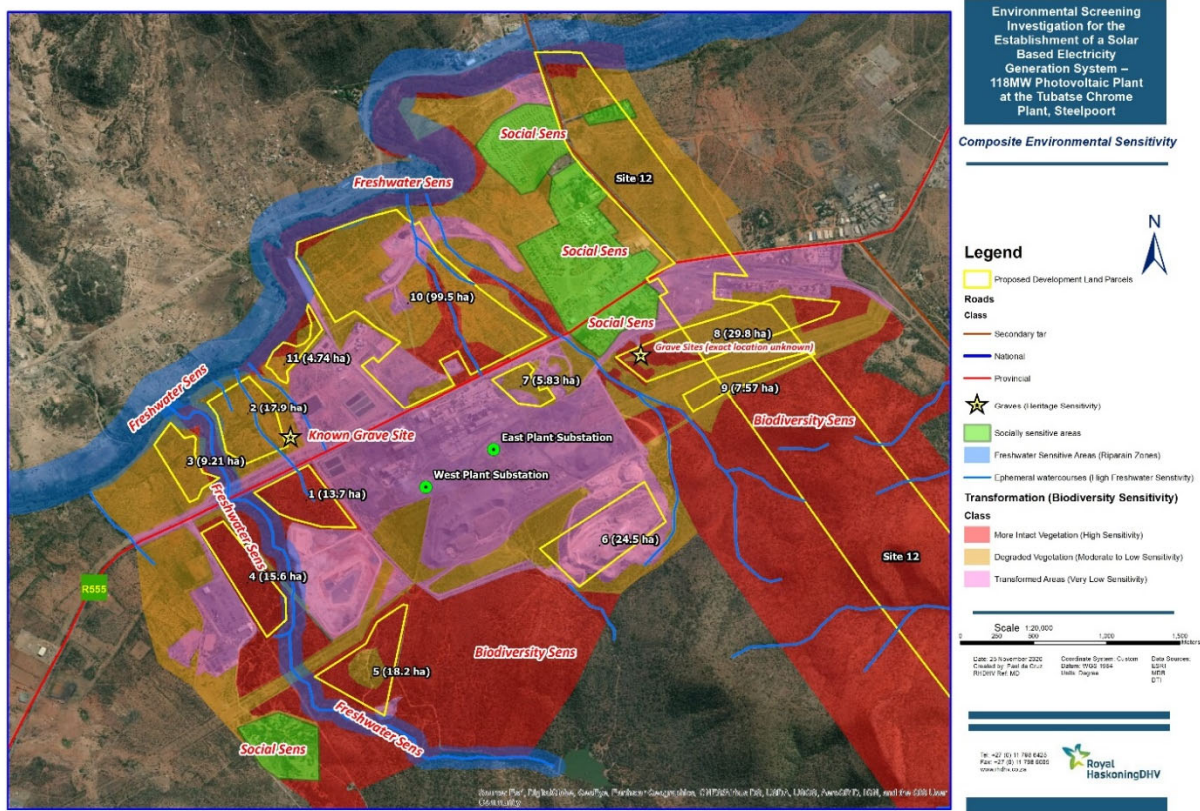


Figure 4-1: Sites assessed as part of the ESI (November 2020)

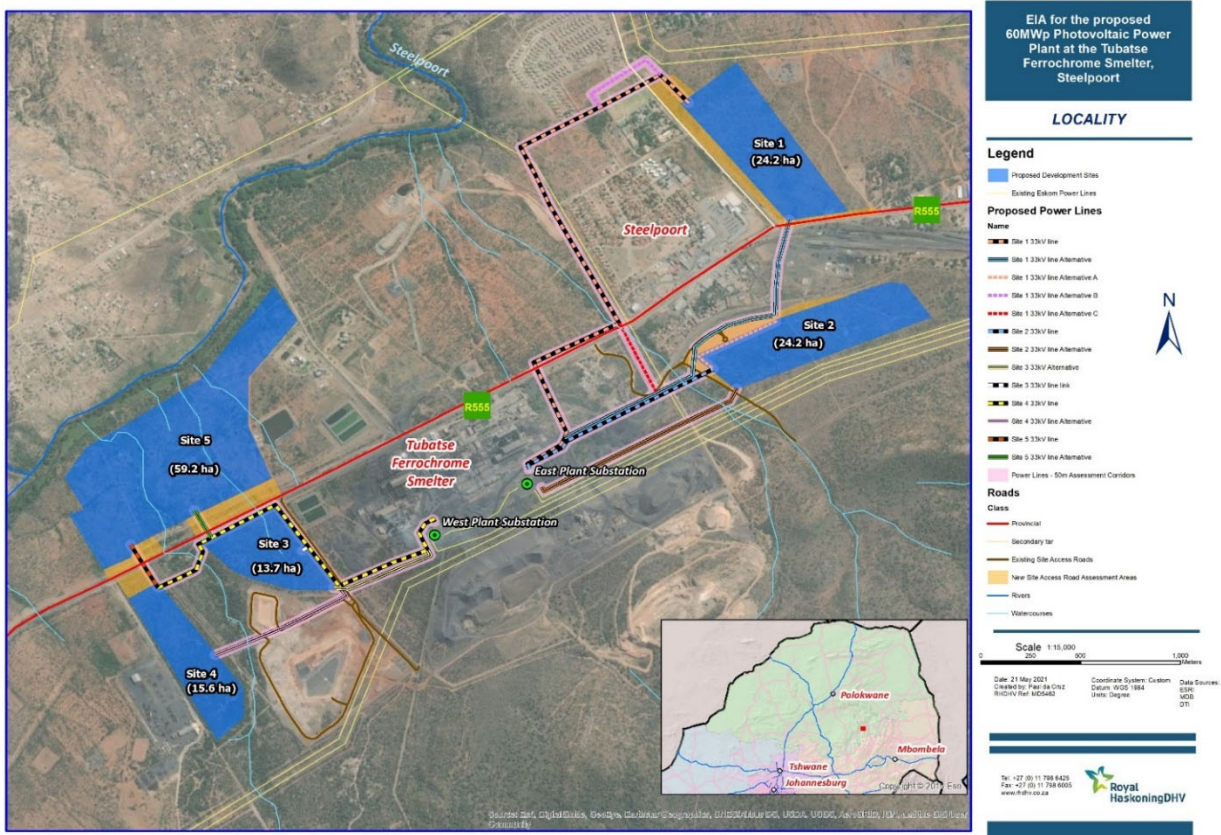


Figure 4-2: Revised sites assessed in this ESS

Selecting a suitable site is crucial for the development of a viable PV plant. The site selection process relied on various criteria as presented in Table 4-1.

Table 4-1: Site selection criteria

Criteria	Description
Available area	The proposed PV plant will require approximately 1.5ha of land per 1MWp generated. The total extent of all 5 potential sites is approximately 136ha, which will be sufficient for the development of the 60MWp plant over these sites. The configuration and layout of the solar panels across these sites will be developed during the conceptual design phase to determine the MWp output per site making up the 60MWp.
Topography	The slope of the project site is considered to be acceptable for the development of a PV plant. This reduces the need for any extensive earthworks or levelling activities.
Land ownership and zoning	All of the sites for the development of the PV plant belong to Samancor Chrome, except for the western portion of Site 2 that belongs to GoldBroz Inv Pty Ltd. Samancor Chrome have entered into discussions with the private landowner for possible lease/ acquisition. The servitudes for the powerlines may have to be acquired if they are not on Samancor Chrome land.
Accessibility	The sites are easily accessible from the R555.

Criteria	Description
Grid connection	New 33kV overhead powerlines will link the PV plant over the various sites to the Tubatse East and -West substations. There will be an on-site substation and transformer yard at each site.
Water availability	<p>The proposed PV plant will require approximately 20kl x 60 = 1.2Ml per cleaning cycle (based on best-practice and to be confirmed with the concept (envelope) design). The cleaning cycle depends on the type of technology, the pollution at the location as well as the seasonality. Lastly, it also depends on the maintenance regime of the chosen IPP. One can assume to allow for 2 cleaning cycles per month as this is a typical global approach, but as the costs of these influence the tariff, the chosen IPP will need to take this into account.</p> <p>The water can be provided by the TFC Smelter based on the amount of industrial water available and the quality of water required as well as the conditions of the current WUL. The industrial water may need to be demineralized before it can be used on the panels.</p>

It is proposed that the PV plant be developed over these 5 potential sites, therefore, these sites are not considered alternatives.

4.2 Design Alternatives

4.2.1 Fixed and Tracking Systems

PV panels/ modules must be mounted on a structure to keep them orientated in the correct direction and to provide them with structural support and protection. Mounting structures may either be fixed-angle or tracking (Figure 4-3).

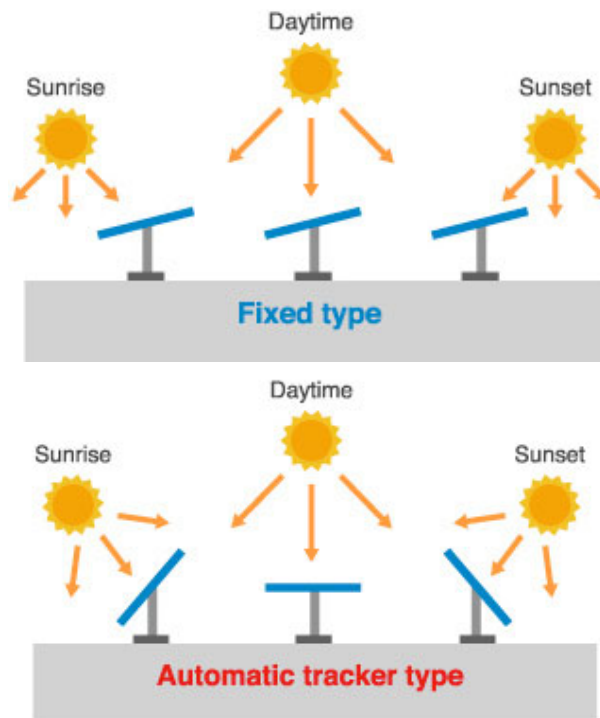


Figure 4-3: Fixed and tracking systems operation⁷

⁷ Source: <https://sunbenefit.jp/products/suntracking.html>

Fixed mounting systems keep the rows of modules at a fixed tilt angle while facing a fixed angle of orientation. Fixed frames are simpler to install, cheaper and require less maintenance.⁸

In locations with a high proportion of direct irradiation, single- or dual-axis tracking systems can be used to increase the average total annual irradiation. Tracking systems follow the sun as it moves across the sky. Single-axis trackers alter either the orientation or tilt angle only, while dual-axis tracking systems alter both orientation and tilt angle. Dual-axis tracking systems are able to face the sun more precisely than single-axis systems.⁹ The foundation requirements also differ between these two technology types.

Both fixed and tracking systems will be assessed further in the EIA study.

4.2.2 Monofacial and Bifacial Solar Panels

Bifacial panels produce solar power from both sides of the panel, whereas monofacial panels only use one side for solar energy production. The top solar cells of a bifacial solar panel system face the sun, so they capture incident sun rays directly, absorbing only certain wavelengths. The top solar cells function like those of a conventional solar panel array.¹⁰ The bottom solar cells absorb light that is reflected off the ground (Figure 4-4). The ground reflectance or albedo is highly site-dependent. A higher albedo translates into greater reflection. Fresh grass has an albedo factor of 26%, reducing down to a minimum of approximately 15% when dry.¹¹ White gravel has an albedo of 27%.¹²

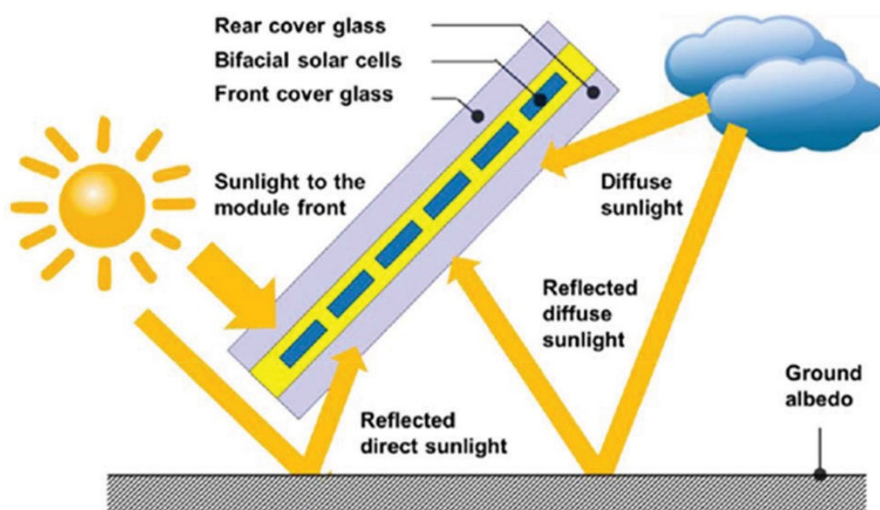


Figure 4-4: Image showing the operation of a bifacial solar panel¹³

The aim of bifacial technology is not to increase the efficiency of the solar module or panel but to capture more solar energy per module. Gains of up to 30% are projected, depending on factors such as the reflectivity of the ground surface, height above ground, tilt angle and several others.¹⁴

⁸ International Finance Corporation. 2015. *Utility-scale Solar Photovoltaic Power Plants. A Project Developer's Guide.*

⁹ Ibid.

¹⁰ <https://solarmagazine.com/solar-panels/bifacial-solar-panels/>

¹¹ International Finance Corporation. 2015. *Utility-scale Solar Photovoltaic Power Plants. A Project Developer's Guide.*

¹² <https://www.ee.co.za/article/bifacial-solar-pv-modules-give-increased-power-output-potential.html>

¹³ Source: <https://www.ee.co.za/article/bifacial-solar-pv-modules-give-increased-power-output-potential.html>

¹⁴ Ibid.

Both monofacial and bifacial solar panels will be considered in the EIA study.

4.2.3 Grid Infrastructure (Powerline) Alternatives

Various 33kV powerlines alternative routes have been proposed for further assessment to connect to either the Tubatse East or -West Substations. It is proposed that the powerline from Site 1 and 2 will connect to the Tubatse East Substation whilst the powerline from Sites 3, 4 and 5 will connect to the Tubatse West Substation. A 50m corridor is being assessed for the powerline and alternatives.

4.2.4 BESS

Either lead-acid or lithium-ion system may be proposed. Further details will be provided in the EIA study.

4.3 No-Go Option

South Africa currently relies almost completely on fossil fuels as a primary energy source with coal providing 75% of the fossil fuel-based energy supply.¹⁵ Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is the main GHG that has been linked to climate change. An emphasis has therefore been placed on securing South Africa's future power supply through the diversification of power generation sources. Furthermore, South Africa would have to invest in a power generation mix, and not solely rely on coal-fired power generation, to honour its commitment made under the Copenhagen Accord and Paris Agreement to mitigate climate change challenges. Under the Accord, the country committed to reduce its carbon dioxide emissions by 34% below the "business as usual" level by 2020. Under the Paris Agreement, the country is committed to limiting the global temperature increase to well below 2°C.

With an increasing demand in energy predicted and growing environmental concerns about fossil fuel-based energy systems, the development of large-scale renewable energy supply schemes such as PV is strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports in the country.

In the case of Samancor Chrome, the rising electricity tariffs in South Africa, combined with the increasingly severe load shedding patterns experienced across the country, has a negative impact on the production and revenue of Samancor Chrome's business. This has motivated Samancor Chrome to consider renewable energy generation at their smelter plants. Implementing solar PV generation will result in improved availability of supply and reduced utility bills. It will further reduce the operational Scope 2 GHG footprint.

Without the implementation of this project, the use of renewable options for power supply will not be realised. Therefore, the No-Go option is not considered as a feasible option on this proposed project.

¹⁵ Department of Minerals and Energy. 1999. *Digest of South African Energy Statistics*, compiled by CJ Cooper.

5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.1 Biophysical Environment

5.1.1 Meteorological Conditions

The TFC Smelter has an on-site meteorological monitoring station that measures various meteorological parameters such as wind speed, wind direction, surface temperature, humidity and rainfall data.

5.1.1.1 Wind

Based on the available meteorological data from the period January 2012 to December 2014, easterly winds predominate, accompanied by strong winds occurring within the north and north-easterly sectors. The TFC Smelter is located within a valley and as such, wind speeds are generally low over the monitoring period. Calm conditions, which are defined as wind speeds less than 1m/s, occur frequently (22.25% of the time) - Figure 5-1. In comparison, the modelled Steelpoort Area (MM5) meteorological data shows dominant south-easterly winds. Wind speeds are moderate to fast, with calm conditions occurring 2.63% of the time¹⁶ - Figure 5-1.

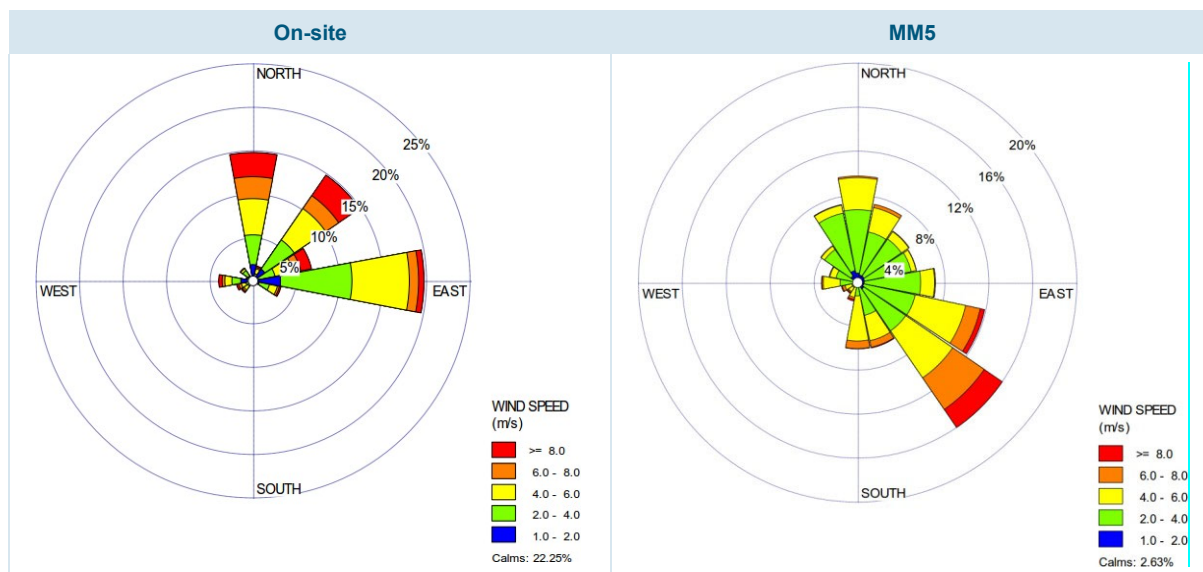


Figure 5-1: Period wind rose for Tubatse Chrome and Steelpoort (MM5) for the period January 2012 to December 2014¹⁷

5.1.1.2 Temperature

The Steelpoort climate is warm and temperate. The Köppen-Geiger chart describes the prevailing climate in Steelpoort as a local steppe climate (BSh, hot semi-arid climate). Throughout the year, the average daily maximum temperatures in the region range between 18°C (June, July) and 25°C (October - February), while daily minimum temperatures range from 14°C (December – February) and a low of round 4°C in July (Figure 5-2).

¹⁶ Sunderland, A. and Enslin, N. 2018. Air Quality Impact Assessment Update for Tubatse Chrome Pty Ltd prepared by WSP Environmental Pty Ltd.

¹⁷ Ibid.

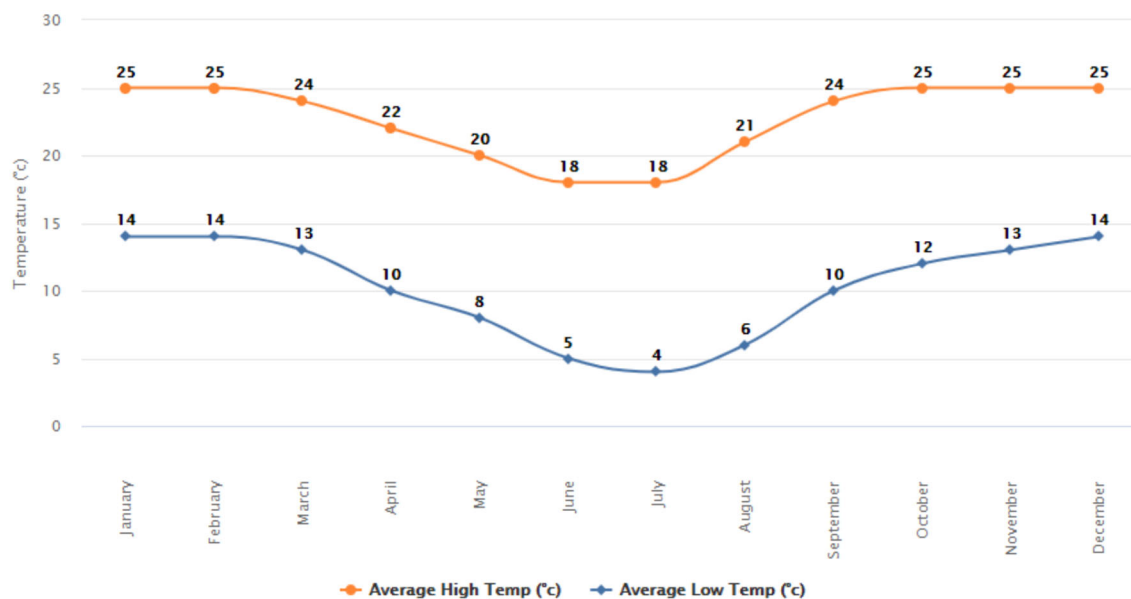


Figure 5-2: Average daily maximum and minimum temperatures¹⁸

5.1.1.3 Regional Rainfall

The site falls in quaternary catchment B41J, in the B4D rainfall zone and has a Mean Annual Precipitation (MAP) of 598mm/yr characteristic of the arid north of the country (40% of South Africa's MAP of approximately 460mm/yr.¹⁹) Average monthly rainfall data for the catchment was extracted from WR2012 and is presented in Figure 5-3.

Three South African Weather Service (SAWS) stations were identified in the vicinity: Ga-Sekhukhuneland, Maandagshoek and Rustplaats. These were compared to the quaternary catchment average monthly rainfall and MAP (Table 5-1).

Table 5-1: SAWS station parameters

Station Name	Number	Years	MAP (mm/yr)	Altitude (mamsl)
Ga-Sekhukhuneland	0593015W	77	517	1282
Maandagshoek	0593126W	69	574	1033
Rustplaats	0594141W	75	545	1250

Relative humidity is generally low to moderate, with an average of 41% during winter and 58% during summer.²⁰

¹⁸ <http://www.worldweatheronline.com/>

¹⁹ World Bank Group. 2021. Climate Change Knowledge Portal. Retrieved from <https://climateknowledgeportal.worldbank.org/country/south-africa/climate-data-historical>

²⁰ Sunderland, A. and Enslin, N. 2018. Air Quality Impact Assessment Update for Tubatse Chrome Pty Ltd prepared by WSP Environmental Pty Ltd.

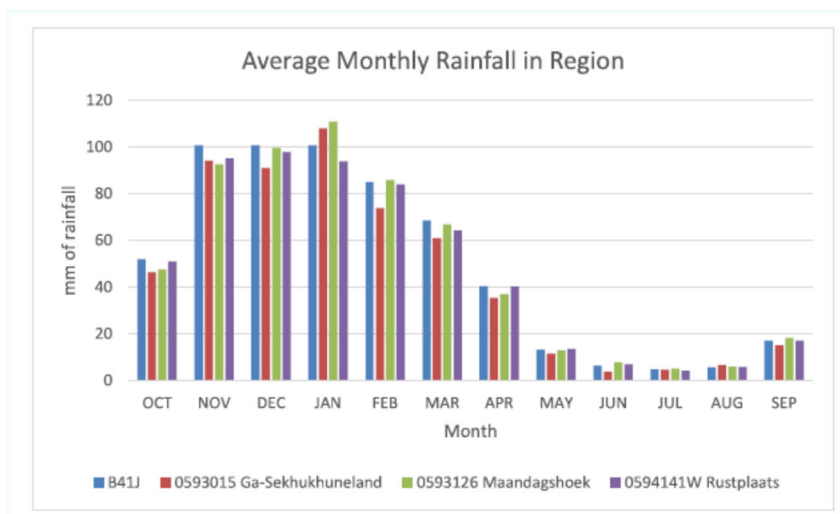


Figure 5-3: Average monthly rainfall

5.1.2 Topography

The Steelpoort region is highly mountainous, hence development occurs mostly in valleys, while ridges and mountains form linear dividers between settlements. This is particularly evident from developments and anthropogenic activities along the Steelpoort River. Ridges further divide the municipal areas creating pockets of homogenous compositions, which determine growth and development potential.

The proposed sites are geographically situated on the slightly undulating plains around Steelpoort. Local and minor drainage patterns and topographical features include shallow and incised drainage lines that are often characterised by steep banks. The land generally slopes in a north-western direction towards the Steelpoort River and the topographical elevation varies between approximately 810m (Site 2) and 747m (Site 5) - Figure 5-4. The Steelpoort River drains in an eastern direction.

No site-specific and accurate contours were available for the sites during the compilation of this report.

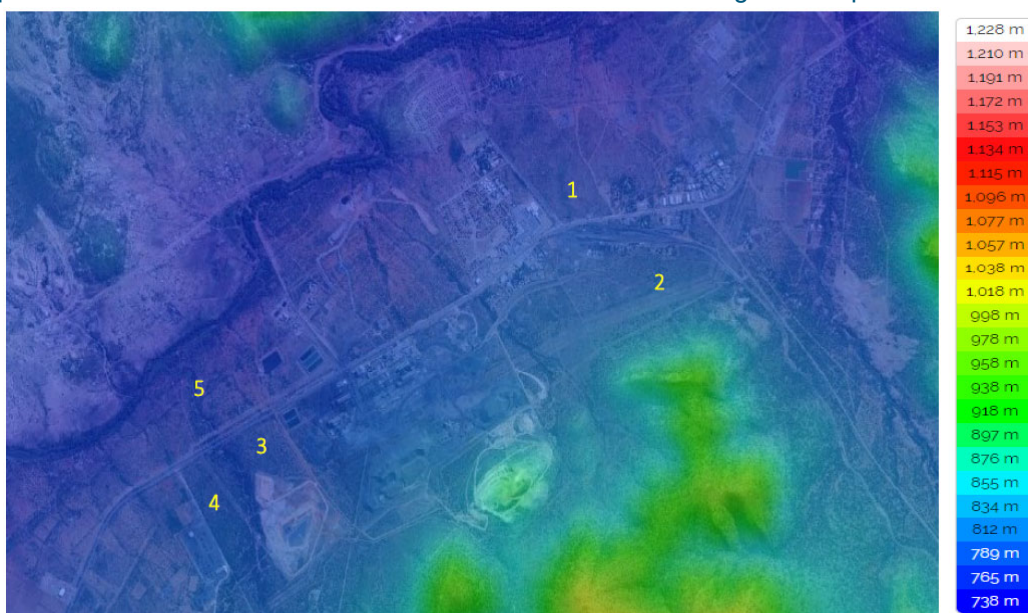


Figure 5-4: Topographical elevation variations on a local scale

5.1.3 Soils and Geology

The site is located in the Eastern limb of the Bushveld Igneous Complex and is underlain by the rocks of the Rustenburg Layered Suite, largely comprising the Dwars River Norites and Vermont Hornfels (Figure 5-5). Norite is a mafic intrusive igneous rock (magma forced into older rocks at depths) composed largely of the calcium-rich plagioclase labradorite, orthopyroxene and olivine, and is predominantly composed of orthopyroxenes, largely high magnesian enstatite or an iron bearing intermediate hypersthene. The Vermont Formation is composed mainly of hornfels), with subordinate quartzite, dolomitic limestone and chert.

Weathering of these geological formations produces soils that are included in the Ae27 and Ea88 land types (Figure 5-6). Map units A refer to yellow and red soils without water tables and belonging in one or more of the following soil forms: Inanda, Kranskop, Magwa, Hutton, Griffin and Clovelly. The map units refer to land which does not qualify as a plinthic catena and in which one or more of the above soil forms occupy at least 40 % of the area. In Ae (red-yellow apedal, freely drained soils, red high base status, >300mm deep, no dunes) yellow soils occupy less than 10% of the area while dystrophic and/ or mesotrophic soils occupy a larger area than high base status red-yellow apedal soils.

The Ea88 land type indicates land with high base status, dark coloured and/ or red soils, usually clayey, associated with basic parent materials, often described as dark, swelling clays. A land type more than half of which is covered by soil forms with vertic, melanic and red structured diagnostic horizons qualifies for inclusion in unit Ea provided it does not qualify for inclusion in units A, B, or C. Land types in which these soils cover less than half of the area may also qualify for inclusion (i) where duplex soils occur in the non-rock land but where unit Ea soils cover a larger area than the duplex soils, or (ii) where exposed rock covers more than half the land type. The Arcadia soil form predominates in this unit.

High variability of soils across the proposed development footprints were noted, ranging between rocky and gravelly soils in upland areas, red, sandy and loamy soils in midland positions and soils of a dark, clayey and structured disposition in bottomland positions.

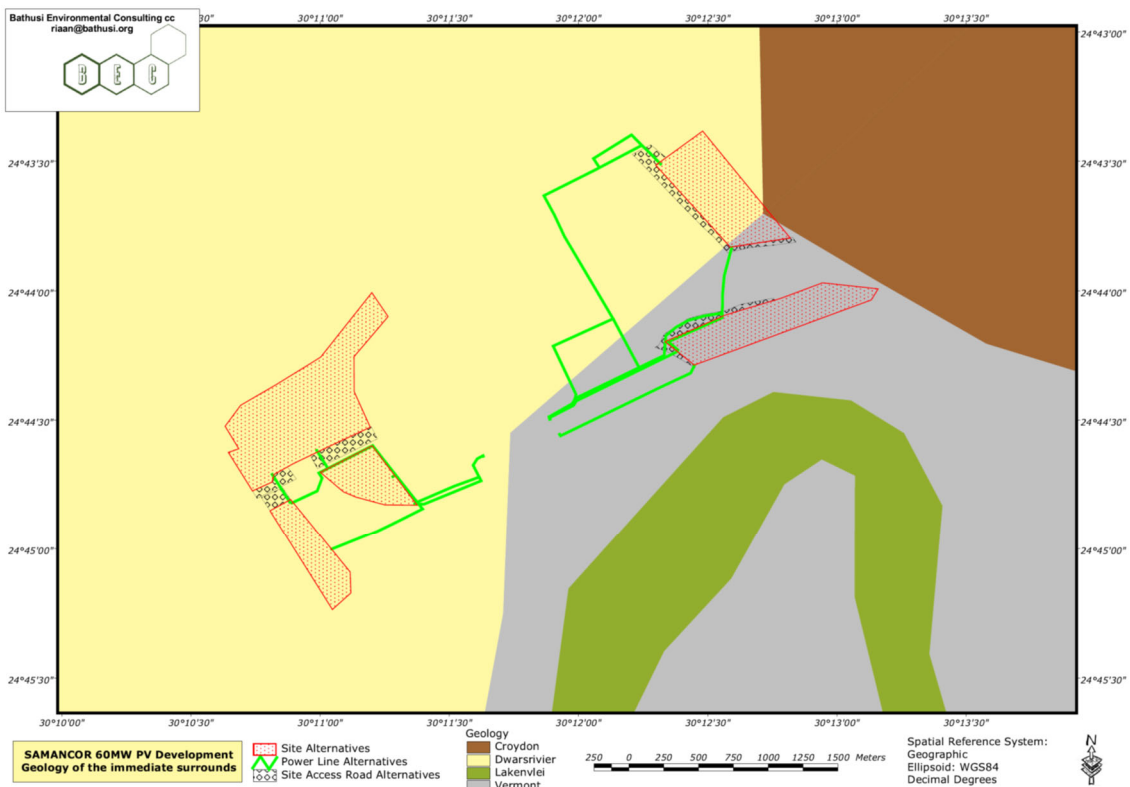


Figure 5-5: Geological patterns of the immediate surrounds

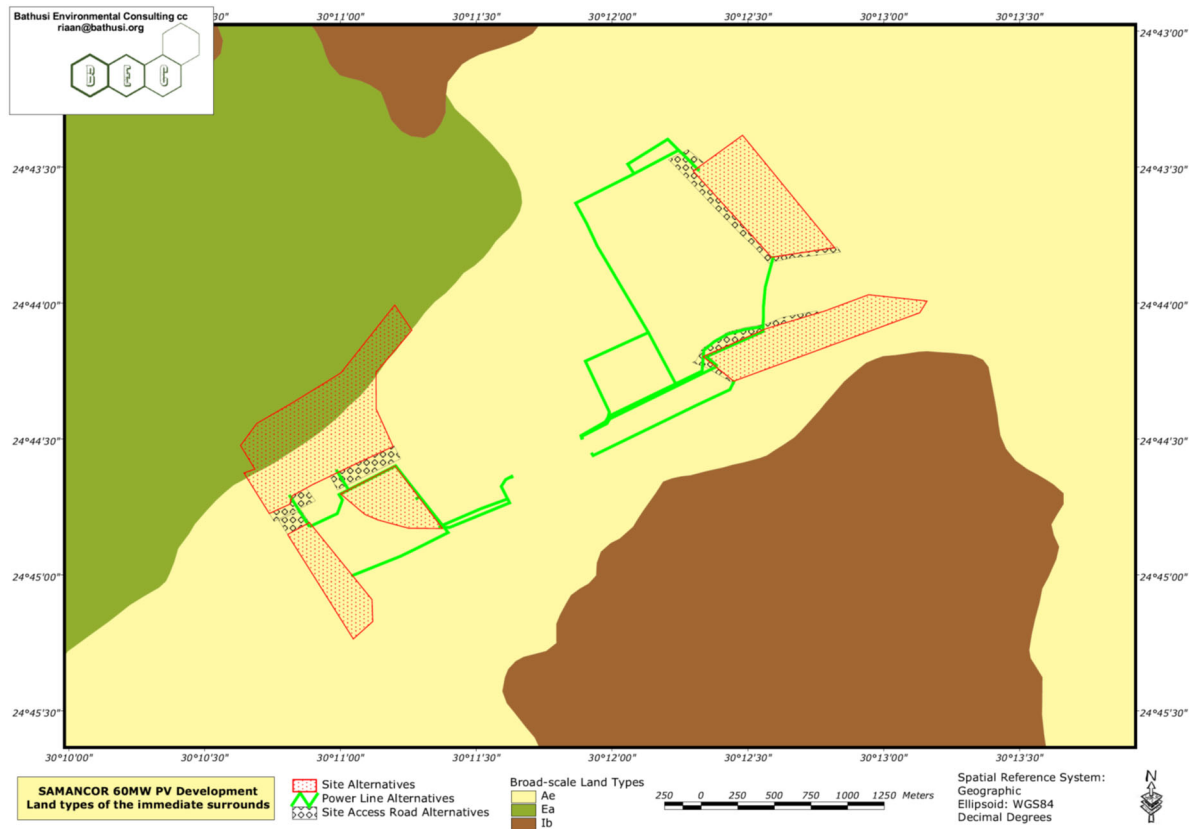


Figure 5-6: Land types of the study area

5.1.4 Hydrology

The sites fall in quaternary catchment B41J, in the B4D rainfall zone. The catchment has a gross area of 691km² and drains to the Steelpoort River. The Steelpoort River Valley is steep with slopes of 2.5% in the plain and steep hills with slopes of 23% rising 1000m to altitudes of 1700 meters above mean sea level (mamsl) on the sides from approximately 700 mamsl along the river. The hills are rocky and the plains are densely vegetated with grasses, shrubs and trees. The Steelpoort River has major tributaries of the Tubatsane River which joins it from the north, downslope of the site. There are many small non-perennial drainage lines throughout the valley.

5.1.4.1 Floodline Delineation

The site is in the valley, adjacent to the escarpment and therefore receives run-off from the hills. There are many drainage lines running through the valley. Two drainage catchments influencing the sites that drain to the Steelpoort River were identified. Refer to Figure 5-7 for the topography of the area and sub-catchments and drainage lines affecting the sites.

- **Site 1**

There are no drainage lines through Site 1. The site is just 800m from the Steelpoort River and is bordered by the R555 to the south and an unnamed arterial road to the west. It is approximately 900m long and 375m wide and 24.2ha in area. From site observations of scouring, it appears that run-off from the road flows alongside the road (no formal channel) to the river and therefore do not affect the site. There is a low point on the site at its south-west corner, where the two roads intersect, that has manholes and there is evidence of some flow here (gauged from flattened vegetation). However, no defined flow path could be identified from visual inspection or topographical modelling and it was therefore assumed that the flow volumes are not large and are dissipated into the area as overland flow. The area is densely vegetated with grasses and shrubs, on sandy soil. There is no existing infrastructure on the site.

As there are not any drainage lines through Site 1, there will not be any floodlines to be considered in the planning and layout of the proposed PV plant. For the purposes of floodline determination, no sub-catchments were delineated for this site, although for the conceptual stormwater management plan an assessment of surface run-off over the area will be required.

- **Site 2:**

There are no drainage lines through Site 2. The site is located behind the factory and railway line, at the foot of the hills. It is a long rectangular site, approximately 1300m long (east to west) by 250m wide, with an area of 24.2ha. The vegetation is dense and diverse, with grasses, shrubs and large trees. The soil is sandy and loose and will have a high drainage potential. There are two boreholes located on the site, and access roads leading to them. The site is otherwise undeveloped. The topography was observed to be gently sloping with no localized surface depressions or outcrops.

To the west of the site (outside of the site boundary) there is a significant watercourse that is channelled beneath the railway line through a square concrete culvert approximately 3m wide by 2.5m high, and 16m long. The invert level of the culvert is approximately 5m below the railway line, and the channel has steep slopes and falls steeply from the hills. This shape and slope would result in high velocity flows. No water was observed in the channel, indicating that it is a non-perennial river.

It was deemed necessary to investigate the floodline associated with this channel to determine if it will influence the site. The topography was examined and the sub-catchments contributing flow to this drainage line were delineated using the Geographic Information System (GIS). The hills do not

have a plateau, so the run-off is from their slopes only. The total sub-catchment area is approximately 227ha with a slope of 20% on the hills and 5% on the plains and a flow length of 2015m.

- **Site 3, Site 4 and Site 5**

These three sites are located to the west of the smelter and are all irregular in shape with areas of 13.7 and 15.6ha and Site 5 being the largest site at 59.2ha. There are no drainage lines through Site 3 and Site 4, but they lie adjacent to a significant drainage line that continues through Site 5. The R555 road lies between Site 3 and 4 and Site 5. The vegetation is extremely dense and varied on these sites. They are undeveloped and have no existing infrastructure on them. These sites have hilly topography and slope towards the drainage line.

The drainage line is approximately 5m deep with steep sides. It did not have water flowing in it at the time of the site visit, indicating that it is non-perennial. There is a rock feature protruding in it, which will have turbulent flow over its steep faces during rainfall events. The drainage line passes below the R555 road through a bridge consisting of two concrete openings estimated to be 5m by 5m in width and height.

This drainage line receives run-off from a contributing sub-catchment that originates in the large hill formation lying to the south. The total area of the sub-catchment is 2260ha and is steep. This will result in high peak flows through the drainage channel. The floodline was determined from these observed catchment characteristics.

- **Site 5:**

In addition to the major line passing through the site, there are three minor drainage lines that discharge into the site from under the road and drain to the Steelpoort River. These sub-catchments have areas of 0.15, 0.29 and 2.17ha. It was not possible to delineate floodlines of these drainage lines as the Digital Elevation Model (DEM) did not reflect their cross-sections. However, peak flows have been estimated and based on-site measurements of the channel's size their water surface levels on the site will be calculated.

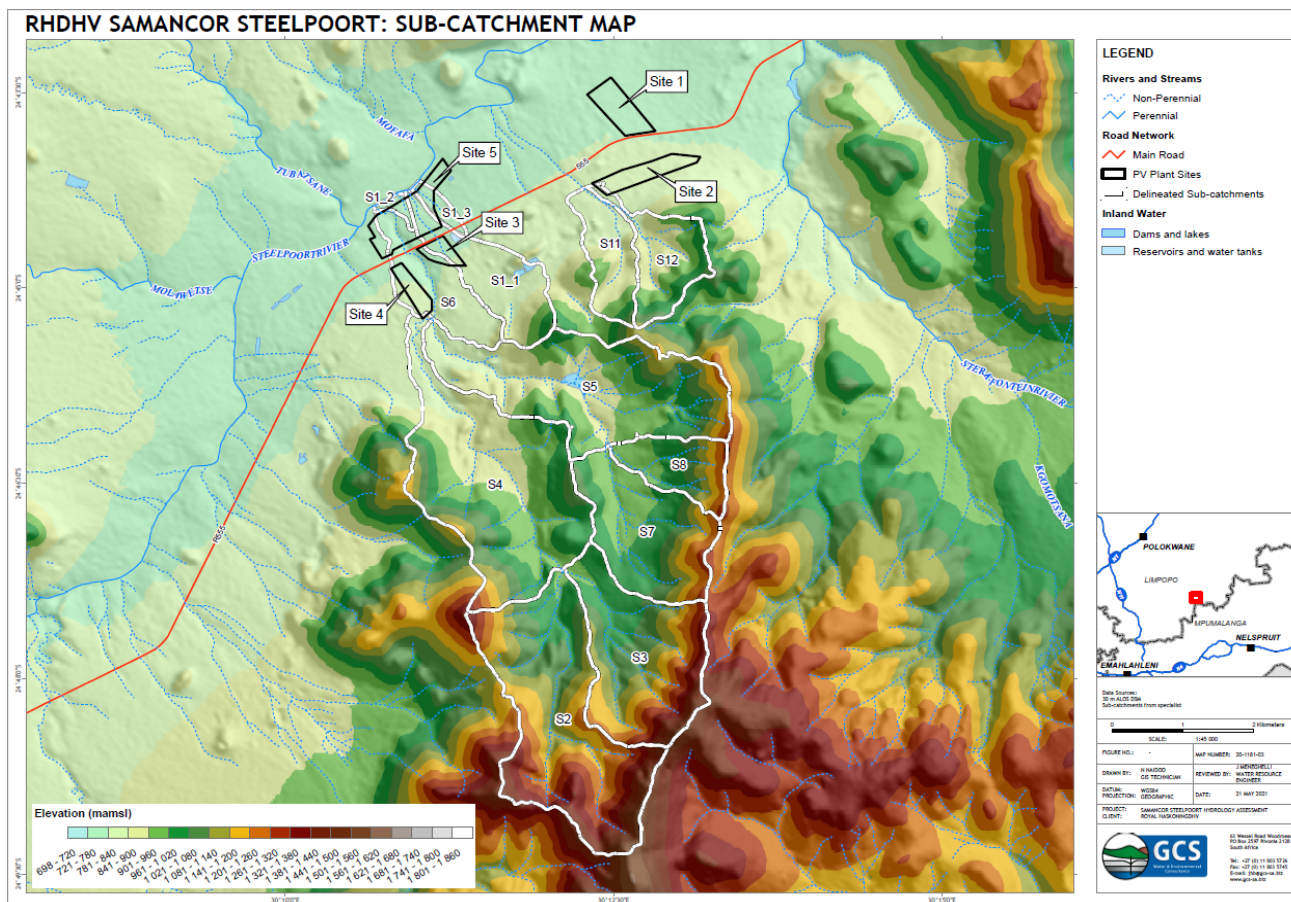


Figure 5-7: Delineated sub-catchments

All catchment characteristics are summarized in Table 5-2 for the sub-catchments delineated in Figure 5-4.

Table 5-2: Catchment attribute summary as per labelling in Figure 5-7

Catchment Name	Area (ha)	Flow Length (km)	Slope (%)
S1_2	0.16	0.57	3.46
S1_1	2.17	2.94	6.08
S1_3	0.29	1.03	3.29
S2	482.97	4.35	11.30
S3	323.58	2.83	9.87
S4	517.27	5.26	6.13
S5	441.58	4.43	8.00
S6	135.64	1.93	2.09
S7	253.14	2.53	8.47
S8	106.11	1.73	20.30
S11	104.04	2.02	5.45
S12	122.91	2.02	12.10

5.1.4.2 Peak Flow Calculation

Peak flows were calculated for each sub-catchment for the 1:10, 1:20, 1:50 and 1:100 year design storm events. Peak flows calculated using the Standard Design Flood method were selected to be used for analysis for the large catchments, meaning that those peak flows calculated by the rational method may not be truly representative of the site. For the small catchments (S1_1, S1_2 and S1_3) values determined by the rational method were used.

All peak flows calculated per delineated sub-catchment for each event are summarised in Table 5-3. Two of the drainage lines with large peak flows and floodlines were generated based on these using the GeoHECRAS model. The three minor catchments through Site 5 have small flows and floodlines were calculated for these, water surface elevations were calculated using the Personal Computer Stormwater Management Model.

Table 5-3: Peak flows calculated for sub-catchments

Catchment Name	Peak Flows (m ³ /s) Return Period (years)			
	10	20	50	100
S1_1	0.36	0.44	0.56	0.67
S1_2	0.07	0.09	0.12	0.14
S1_3	0.08	0.10	0.13	0.16
S2	31.99	45.77	66.21	83.30
S3	25.89	37.04	53.58	67.41
S4	26.72	38.23	55.30	69.58
S5	26.80	38.34	55.46	69.78
S6	9.39	13.43	19.43	24.44
S7	20.84	29.82	43.14	54.27
S8	12.70	18.17	26.28	33.06
S11	8.94	12.79	18.50	23.27
S12	12.46	17.82	25.78	32.44

5.1.4.3 River System Modelling Results and Analysis

The first drainage line that passes Site 2 does not encroach on the site for any event and therefore does not exclude any area available for development. Key characteristics for each flood event are presented in Table 5-4. The maximum water surface elevation is 801.22 mamsl which is 2m below the edge Site 2. The maximum surface width is 58.61m from the drainage centreline which does not influence the site as the centreline is 130m west of the site. Refer Figure 5-8 for a map of the floodlines for Tributary 2.

Table 5-4: Floodline attributes for a typical transect on the drainage line past Site 2

Return Interval (years)	Water Surface Elevation (mamsl)	Depth (m)	Velocity (m/s)	Surface Width (m)	Total Volume (1 000 m ³)
10	800.97	0.47	1.63	48.52	1.17
20	801.05	0.54	1.82	51.46	1.52
50	801.15	0.64	2.00	55.36	1.95
100	801.22	0.71	2.12	58.61	2.29

Invert Elevation: 800.51mamsl



Figure 5-8: Tributary 2 floodline map

The second major drainage line that passes between Sites 3 and 4 and through Site 5 experiences large volumes of flow (454 300m³ for the 1:100 year event). The floodlines encroach slightly on the south-east corner of Site 4 and do not affect Site 3. However, there is a significant impact on Site 5 as the flood will spread up to 88m in width, rendering a large area of the site unsuitable for development (Table 5-5). Refer to Figure 5-9 for the floodline map.

Table 5-5: Floodline attributes for a typical transect on the drainage line past Site 3 and 4 and through Site 5

Return Interval (years)	Water Surface Elevation (mamsl)	Depth (m)	Velocity (m/s)	Surface Width (m)	Total Volume (1 000 m ³)
10	761.50	0.74	1.88	69.93	23.96
20	761.62	0.86	2.03	77.79	30.51
50	761.79	1.03	2.16	85.87	39.26
100	761.89	1.13	2.30	88.73	45.43

Invert Elevation: 760.76mamsl

A limitation for this assessment is that there was not elevation data available for the smaller drainage lines through Site 5. The channel was simulated to be triangular with a width of 50m and side slopes of 1:5m/m. For the 1:100 year event, the surface width of flow was estimated to spread to 17m. This indicates that a drainage channel with suitable hydraulic infrastructure is required as part of the Stormwater Management Plan (SWMP) to canalise this flow, such that the maximum possible area of the site can still be used. It is

recommended that topographical survey of the three minor drainage lines on the site be carried out in order to accurately model the floodlines and flows associated with these channels.

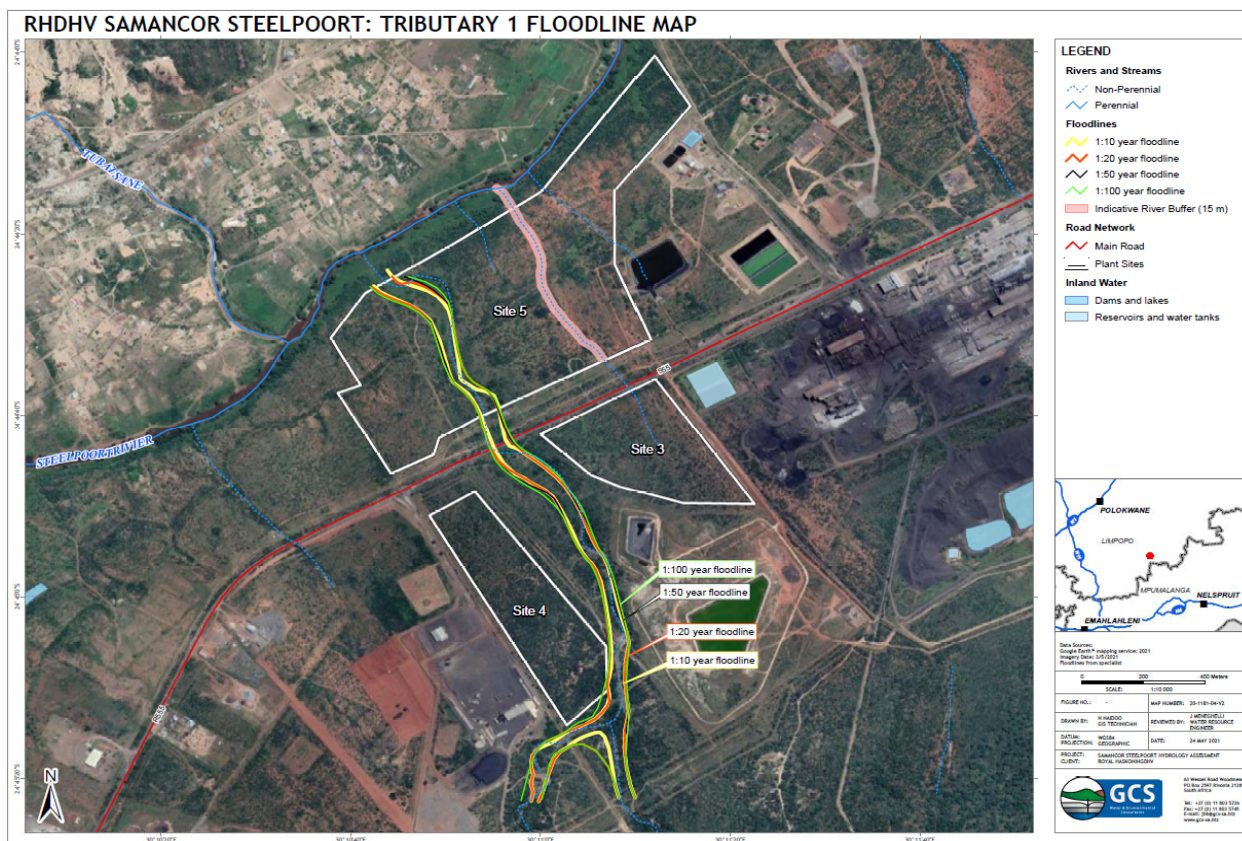


Figure 5-9: Tributary 1 floodline map

5.1.5 Freshwater

5.1.5.1 National Freshwater Ecosystem Priority Areas (NFEPA) – Wetlands and Rivers

The National Freshwater Ecosystem Priority Areas (NFEPA) project is a multi-partner project between Council for Scientific and Industrial Research, South African National Biodiversity Institute, Water Research Commission, DWS, DEA, World Wildlife Fund, South African Institute for Aquatic Biodiversity and SANParks. The NFEPA project aims to:

- Identify FEPAs to meet national biodiversity goals for freshwater ecosystems; and
- Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

The project further aims to maximize synergies and alignment with other national level initiatives such as the National Biodiversity Assessment (NBA) and the Cross-Sector Policy Objectives for Inland Water Conservation.

According to the NFEPA database, there are no natural or artificial wetlands situated within the study area however there are five artificial unchanneled valley bottom wetland features located within the investigation area. These wetlands are indicated by NFEPA to be heavily to critically modified (Figure 5-10). During the field assessment these were observed to be impoundments associated with the TFC Smelter operations as well as impoundments associated with other operations within the study area.

According to the NFEPA database the Steelpoort River is located approximately 150m north of the study area and the Tubatsane River confluences with the Steelpoort River approximately 150m west of the study area. The Steelpoort River is considered moderately modified (Class C) and considered a fish support area, while the Present Ecological State (PES) 1999 classification indicates that the Tubatsane River is moderated modified (Class C), however the NFEPA database indicates the Tubatsane River as not intact (Class Z). These low PES scores may be mainly attributed to the mining activities and urban development, present within the catchment.

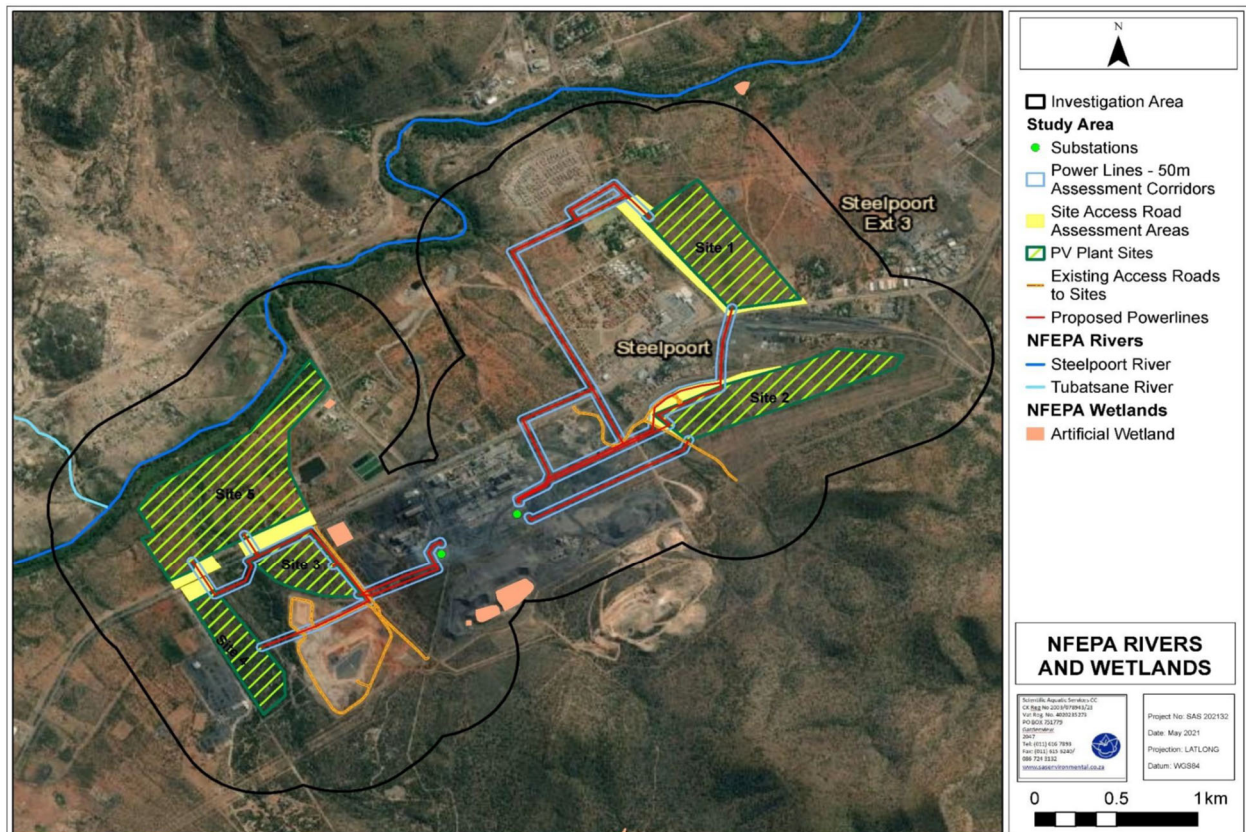


Figure 5-10: The artificial wetlands, Steelpoort and Tubatsane Rivers associated with the study and investigation areas, according to NFEPA

5.1.5.2 National Biodiversity Assessment (NBA) 2018: South African Inventory of Inland Aquatic Ecosystems (SAIIAE)

The National Biodiversity Assessment (NBA) is a tool for monitoring and reporting on the state of biodiversity in South Africa. It is used to inform policies, strategies and actions in a range of sectors for managing and conserving biodiversity more effectively. The NBA is a summary of the state of South Africa's biodiversity and is prepared as part of the SANBI mandate under the Biodiversity Act (NEMBA, Act No. 10 of 2004). While the NBA is considered the latest (with the current version updated in 2018 and released in 2019) primary tool in monitoring, both NFEPA and NBA projects are considered invaluable and should be considered in tandem as each database supplements the other.

According to the NBA 2018: SAIIAE there are no natural wetland features associated with the study area or investigation area, however the artificial unchanneled valley bottom wetland features as identified by the NFEPA database are classified as dams, open reservoirs and large reservoirs according to the NBA dataset (2018) - Figure 5-11. According to the NBA dataset, the Steelpoort River is largely modified (Class D), while

the Tubatsane River is seriously modified (Class E). Both rivers are currently poorly protected (Ecosystem Protection Level (EPL) and therefore considered Endangered (Ecosystem Threat Status – ETS).

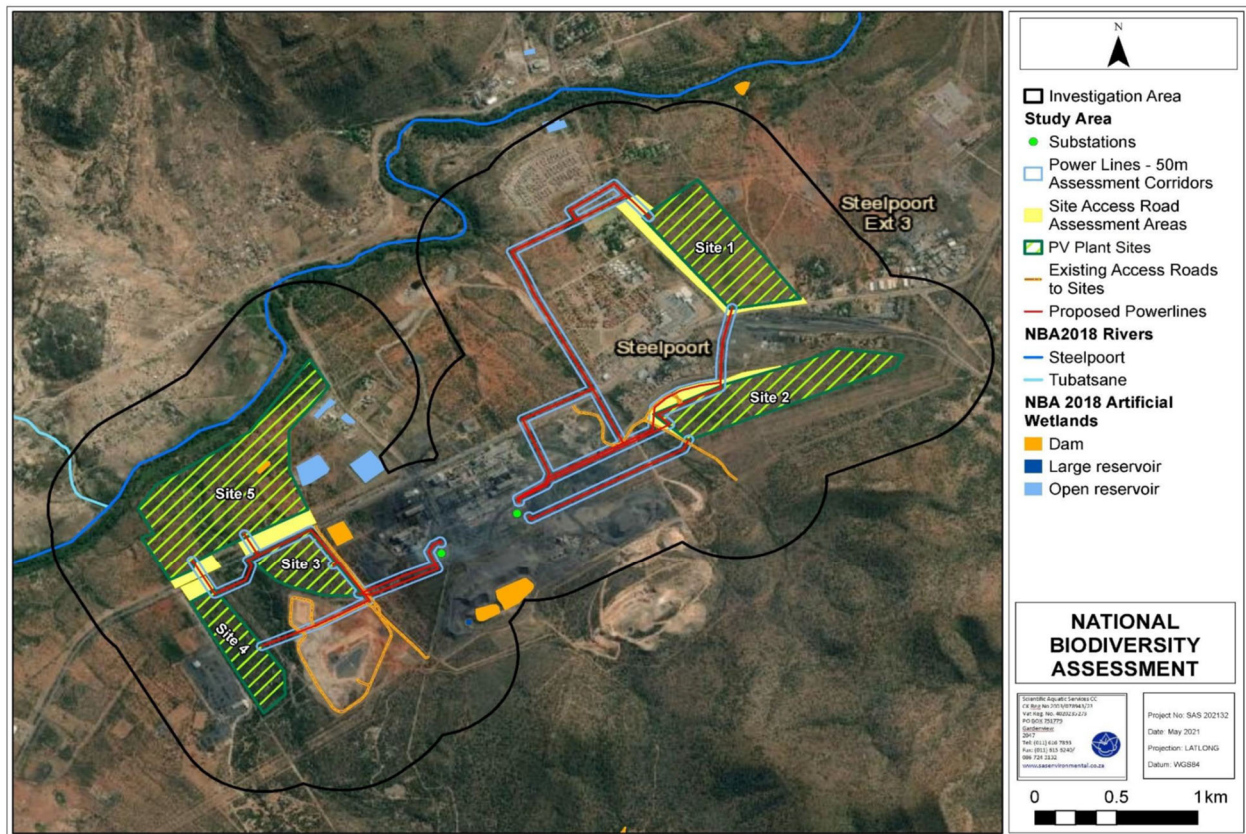


Figure 5-11: The artificial features and Steelpoort and Tubatsane Rivers associated with the study and investigation areas (NBA)

5.1.5.3 Fish Support Area

The majority of the study area (95%) falls within a sub-quaternary catchment considered an important fish support area, while a small western portion of the study area falls within a sub-quaternary catchment not considered important in terms of watercourse conservation. Fish Support Areas include sub-quaternary catchments that are important for the migration of the fish species *Opsaridium peringueyi* (Least Concern).

5.1.5.4 Watercourse Delineation and Sensitivity Mapping

The Steelpoort River with its associated riparian habitat as well as the non-perennial rivers and ephemeral drainage lines were delineated using desktop methods with the use of aerial photographs, digital satellite imagery and topographical maps. These delineations were then ground-truthed during the field assessment undertaken in April 2021, according to the method presented in the “Updated manual for the identification and delineation of wetland and riparian resources”.²¹

The Steelpoort River has a well-developed riparian zone while the non-perennial tributaries have riparian zones which vary from moderately to weakly developed depending on the position in the landscape as well as the effects of geological characteristics and geomorphological processes at play. In terms of NEMA (Act

²¹ Department of Water Affairs and Forestry (DWAf). 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Report no. X. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.

No. 107 of 1998) any activities falling within 32m of the delineated boundary will trigger a listed activity. Any activities proposed within the watercourse and the associated 1:100 year flood line of the watercourse or 100m GN 509 Zone of Regulation (ZOR) (in the absence of the 1:100 year flood line), including rehabilitation, must be authorised by the Department of Human Settlements, Water and Sanitation (DHSW&S) in terms of Section 21 (c) & (i) of the NWA (Act No. 36 of 1998). Should this not be feasible, the proponent could undergo a WULA process to attempt to obtain approval from the DHSW&S in terms of Section 21 c and i of the NWA.

The 100m and 32m ZOR around the watercourses are indicated in Figure 5-12 and Figure 5-13. It is considered essential that the 1:100 year flood line be determined for these watercourses to verify the regulated zone of the watercourse.

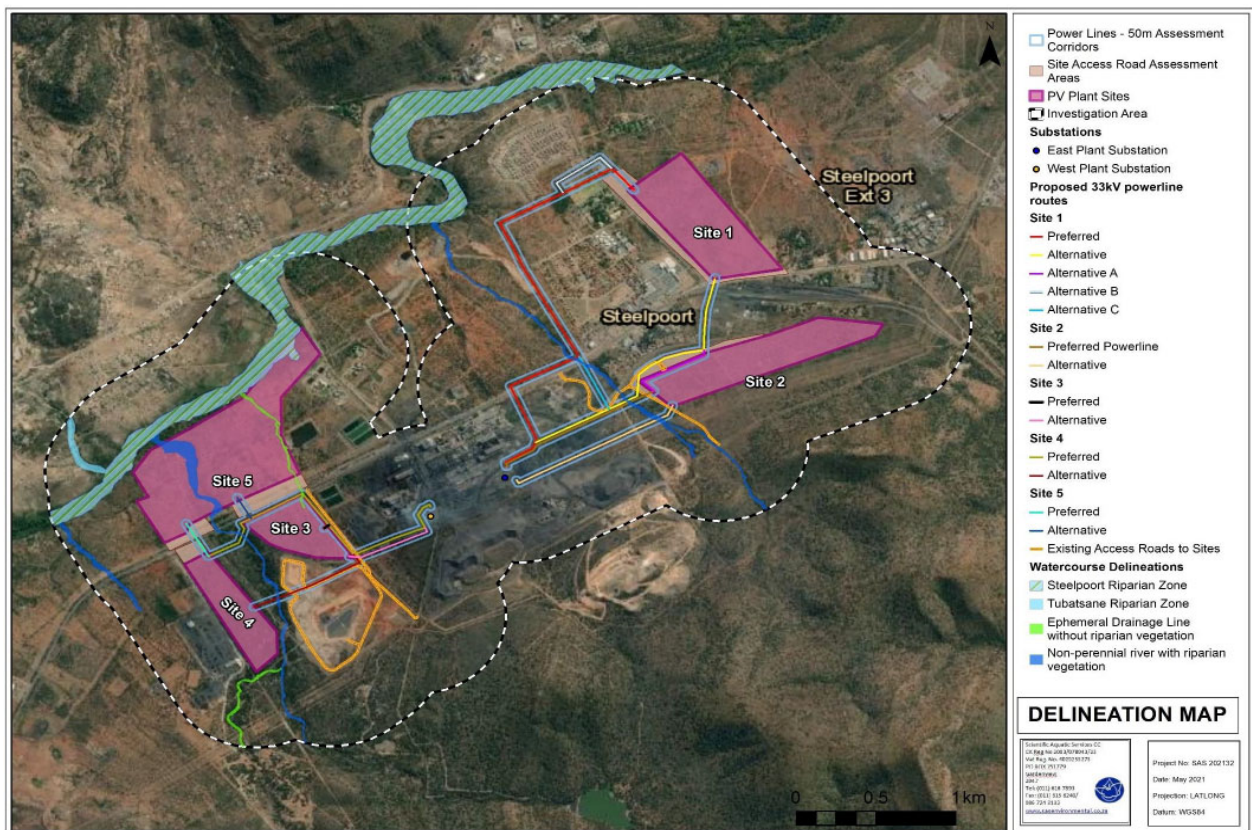


Figure 5-12: Watercourse delineation associated with the study area and investigation area

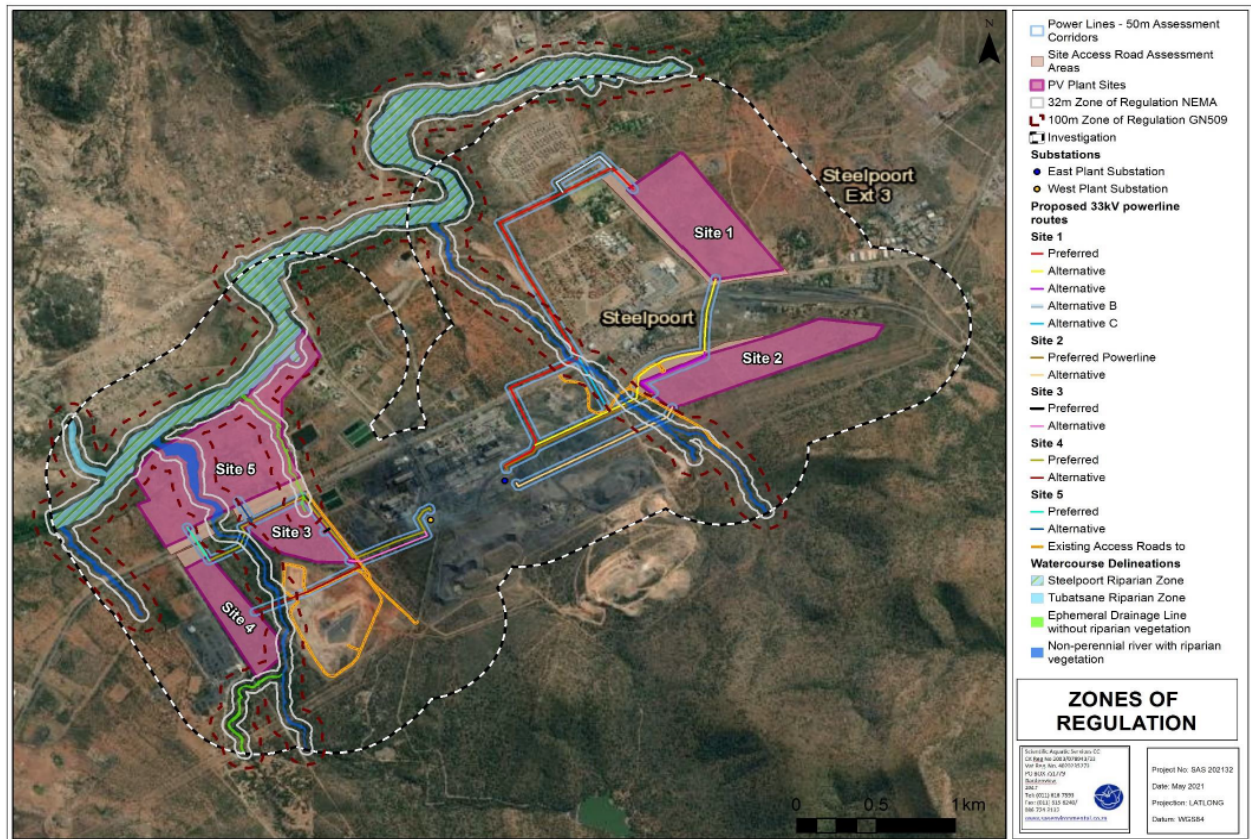


Figure 5-13: Zones of regulation associated with the study area and investigation area

5.1.5.5 Aquatic Present Ecological State

Two points (Sites TS1 and TS2) were selected as representative points on the Steelpoort River during the site assessment. A third point (Site TS3) was considered in terms of water quality and macro-invertebrate community integrity, but no fish assessment was conducted at site TS3. The results from Site TS3 were used from a previous aquatic ecological assessment of the Steelpoort River conducted in December 2020 and yielded similar results to Sites TS1 and TS2 as conducted in April 2021.

Results are presented in Table 5-6 to Table 5-8 below.

Table 5-6: Results of the assessment at Site TS1 (located on the Steelpoort River, upstream of the proposed PV plant)


Site TS1		In situ physico-chemical water quality		Aquatic macro-invertebrate community integrity		
 <p>Figure 10: View of site TS1 at the time of the assessment.</p>	<p>pH 8.51</p> <p>EC (mS/m) 35.5</p> <p>DO (mg/L) 9.61</p> <p>DO (% sat) 123.0</p> <p>Temp (°C) 23.8</p>		<p>RWQO EWR9 Steelpoort River (DWS, 2018)</p> <p>pH 5.0 – 10.0</p> <p>EC (mS/m) ≤ 85</p> <p>DO (mg/l) ≥ 5.0</p>		<p>Invertebrate community assessment (SASS5 and IHAS)</p> <p>SASS5 score 95</p> <p>ASPT score 7.3</p> <p>IHAS score 65 (Adequate)</p> <p>MIRAI score 81.0 (Category B/C)</p>	
	<p>Water Quality Comments:</p> <ul style="list-style-type: none"> ➤ The pH value measured during the assessment was largely natural and complied with the RWQO (DWS, 2018); ➤ The EC complied with the guideline limits required by the RWQO (DWS, 2018); ➤ The DO saturation was considered adequate and complied with the recommended the 5.0 mg/L requirement stated by the RWQO (DWS, 2018); ➤ Temperature was considered largely natural considering diurnal variation and the time of day of the assessment; and ➤ Overall, the water quality of this section of the Steelpoort River was considered good. 			<p>Macro-Invertebrate Community Integrity Comments:</p> <ul style="list-style-type: none"> ➤ The aquatic macro-invertebrate community integrity was classified as a Category C (Moderately Modified) condition according to the MIRAI EcoStatus tool; ➤ Highly sensitive taxa observed on site was Heptageniidae and moderately sensitive taxa was Leptophlebiidae, Tricorythidae and Ecnomidae. The taxa observed on site had a diverse preference for stones, vegetation and GSM with airbreathers limited to Belostomatidae; ➤ The habitat suitability was considered adequate at the time of the assessment, however, significant sand mining of this section of the Steelpoort River has resulted in bank incision, erosion, increased sedimentation and some loss of instream habitat. 		
	<p>Algal proliferation: Slight proliferation on rocks.</p> <p>Depth profiles: Limited depth variation at the site under the current flow conditions. The site is dominated by shallow riffles and deeper pools.</p> <p>Flow condition: Moderately slow flow.</p> <p>Riparian zone characteristics: The riparian zone is considered relatively narrow due to the incised nature of the system. The site is dominated by trees, grasses and shrubs</p> <p>Water clarity and odour: Water was clear. No odours present.</p> <p>Signs of pollution or impact: Significant sand mining occurring in this section of the Steelpoort River, resulting in erosion, sedimentation and loss of instream habitat.</p>		<p>Index of Habitat Integrity</p> <p>Instream IHI – 76.8 (Category C) Riparian IHI – 75.0 (Category C)</p> <p>Erosion evident at several points along the embankment. Alien vegetation encroachment is evident in the whole study area. Significant sedimentation and some algal proliferation observed on instream rocks.</p>		<p>Fish Community Assessment</p> <p>FRAI Score 63.9 (Category C. Moderately Modified)</p> <p>Species: <i>Chiloglanis pretoriae</i>, <i>Enteromius neefi</i>, <i>Enteromius trimaculatus</i>, <i>Labeobarbus marequensis</i></p>	
	<p>MIRAI Category B/C (Largely Natural to Moderately Modified)</p> <p>Instream IHI Category C (Moderately Modified)</p> <p>Riparian IHI Category C (Moderately Modified)</p> <p>VEGRAI Category C (Moderately Modified)</p> <p>FRAI Category C (Moderately Modified)</p>		<p>Riparian Vegetation Response Assessment Index</p> <p>VEGRAI score 72.9 (Category C)</p> <p>Some alien vegetation encroachment present in the study area, along with significant areas of vegetation clearing due to rural community settlements. Alien vegetation species include <i>Datura sp.</i> (Caster-oil plant), <i>Solanum mauritianum</i> (Bugweed), <i>Phragmites australis</i> (Common reed), <i>Lantana camara</i> (Common lantana) and <i>Amaranthus sp.</i> (Pigweed).</p>		<p>Key Drivers of System Change:</p> <ul style="list-style-type: none"> ➤ Possible cumulative impacts on the water quality as a result of mining activities upstream of this point. ➤ Cumulative impacts from surrounding rural communities (subsistence farming, cattle watering, and washing of clothes). ➤ Significant areas of vegetation clearing and sand mining, leading to increased erosion and sedimentation. ➤ Due to upstream impoundments (De Hoop Dam) the natural flow of the Steelpoort River has been altered and results in significant variability in system flow rate (i.e. natural constraints). Bed-modification due to community sand mining has also resulted in significant instream habitat changes (deeper slow flowing pools, shallow runs) thus limiting the diversity and sensitivity of the aquatic community likely to occur. ➤ Bank erosion and instream sedimentation evident resulting from the sand mining activities as well as slight algal proliferation. 	
	<p>Integrated Ecological Category: 73.7% (Category C: Moderately Modified)</p>					

Table 5-7: Results of the assessment at Site TS2 (located on the Steelpoort River, downstream of Sites 3, 4 and 5 of the proposed PV plant)



		In situ physico-chemical water quality		Aquatic macro-invertebrate community integrity													
		<p>pH 8.56</p> <p>EC (mS/m) 28.5</p> <p>DO (mg/L) 6.1</p> <p>DO (% sat) 71.2</p> <p>Temp (°C) 19.1</p>	<p>RWQO EWR9 Steelpoort River (DWS, 2018)</p> <p>pH 5.0 – 10.0</p> <p>EC (mS/m) ≤ 85</p> <p>DO (mg/l) ≥ 5.0</p>	<p>Invertebrate community assessment (SASS5 and IHAS)</p> <p>SASS5 score 90</p> <p>ASPT score 6.0</p> <p>IHAS score 79 (Excellent)</p> <p>MIRAI score 77.9 (Category C)</p>													
<p>Figure 11: View of site TS2 at the time of the assessment.</p>		<p>Water Quality Comments:</p> <ul style="list-style-type: none"> The pH value measured during the assessment was largely natural and complied with the RWQO (DWS, 2018); The EC complied with the guideline limits required by the RWQO (DWS, 2018); The DO saturation was considered adequate and complied with the recommended the 5.0 mg/L requirement stated by the RWQO (DWS, 2018); Temperature was considered largely natural considering diurnal variation and the time of day of the assessment; and Overall, the water quality of this section of the Steelpoort River was considered good. 		<p>Macro-Invertebrate Community Integrity Comments:</p> <ul style="list-style-type: none"> The aquatic macro-invertebrate community integrity was classified as a Category C (Moderately Modified) condition according to the MIRAI EcoStatus tool; Highly sensitive taxa observed on site was Oligoneuridae and moderately sensitive taxa was Leptophlebiidae and Economidae. The taxa observed on site had a diverse preference for stones, vegetation and GSM with airbreathers limited to Corixidae; The habitat suitability was considered excellent at the time of the assessment, with biotope diversity including stones in and out of current, marginal vegetation and GSM. 													
<table border="1"> <tr> <td>Algal proliferation:</td> <td>Slight proliferation on rocks.</td> </tr> <tr> <td>Depth profiles:</td> <td>Some depth variation at the site under the current flow conditions. The site is dominated by shallow runs and riffles and deeper pools.</td> </tr> <tr> <td>Flow condition:</td> <td>Moderately slow flow.</td> </tr> <tr> <td>Riparian zone characteristics:</td> <td>The riparian zone is moderately wide. The site is dominated by trees, shrubs and grasses.</td> </tr> <tr> <td>Water clarity and odour:</td> <td>Water was clear. No odours present.</td> </tr> <tr> <td>Signs of pollution or impact.</td> <td>None observed.</td> </tr> </table>		Algal proliferation:	Slight proliferation on rocks.	Depth profiles:	Some depth variation at the site under the current flow conditions. The site is dominated by shallow runs and riffles and deeper pools.	Flow condition:	Moderately slow flow.	Riparian zone characteristics:	The riparian zone is moderately wide. The site is dominated by trees, shrubs and grasses.	Water clarity and odour:	Water was clear. No odours present.	Signs of pollution or impact.	None observed.	<p>Index of Habitat Integrity</p> <p>Instream IHI – 81.2 (Category B/C) Riparian IHI – 75.0 (Category C)</p> <p>Alien vegetation encroachment is evident in the whole study area. Slight sedimentation and some algal proliferation observed on instream rocks.</p>		<p>Fish Community Assessment</p> <p>FRAI Score 75.1 (Category C. Moderately Modified)</p> <p>Species: <i>Chiloglanis pretoriae</i>, <i>Clarias gariepinus</i>, <i>Enteromius neefi</i>, <i>Enteromius trimaculatus</i>, <i>Enteromius paludinosus</i>, <i>Labeo cylindricus</i>, <i>Labeobarbus marequensis</i>, <i>Oreochromis mossambicus</i></p>	
Algal proliferation:	Slight proliferation on rocks.																
Depth profiles:	Some depth variation at the site under the current flow conditions. The site is dominated by shallow runs and riffles and deeper pools.																
Flow condition:	Moderately slow flow.																
Riparian zone characteristics:	The riparian zone is moderately wide. The site is dominated by trees, shrubs and grasses.																
Water clarity and odour:	Water was clear. No odours present.																
Signs of pollution or impact.	None observed.																
<table border="1"> <tr> <td>MIRAI</td> <td>Category C (Moderately Modified)</td> </tr> <tr> <td>Instream IHI</td> <td>Category B/C (Largely Natural to Moderately Modified)</td> </tr> <tr> <td>Riparian IHI</td> <td>Category C (Moderately Modified)</td> </tr> <tr> <td>VEGRAI</td> <td>Category C (Moderately Modified)</td> </tr> <tr> <td>FRAI</td> <td>Category C (Moderately Modified)</td> </tr> </table>		MIRAI	Category C (Moderately Modified)	Instream IHI	Category B/C (Largely Natural to Moderately Modified)	Riparian IHI	Category C (Moderately Modified)	VEGRAI	Category C (Moderately Modified)	FRAI	Category C (Moderately Modified)	<p>Riparian Vegetation Response Assessment Index</p> <p>VEGRAI score 72.9 (Category C)</p> <p>Some alien vegetation encroachment present in the study area, along with significant areas of vegetation clearing due to rural community settlements. Alien vegetation species include <i>Datura sp.</i> (Caster-oil plant), <i>Solanum mauritanum</i> (Bugweed), <i>Phragmites australis</i> (Common reed), <i>Lantana camara</i> (Common lantana) and <i>Amaranthus sp.</i> (Pigweed).</p>		<p>Key Drivers of System Change:</p> <ul style="list-style-type: none"> Possible cumulative impacts on the water quality as a result of mining activities upstream of this point. Cumulative impacts from surrounding rural communities (subsistence farming, cattle watering, and washing of clothes). Significant areas of vegetation clearing and sand mining, leading to increased erosion and sedimentation. 			
MIRAI	Category C (Moderately Modified)																
Instream IHI	Category B/C (Largely Natural to Moderately Modified)																
Riparian IHI	Category C (Moderately Modified)																
VEGRAI	Category C (Moderately Modified)																
FRAI	Category C (Moderately Modified)																
<p>Integrated Ecological Category: 75.2% (Category C: Moderately Modified)</p>																	

Table 5-8: Results of the assessment at Site TS3 (located on the Steelpoort River, downstream of the proposed PV plant). Assessed December 2020

Site TS3	In situ physico-chemical water quality		Aquatic macro-invertebrate community integrity	
	pH	7.55	RWQO EWR9 Steelpoort River (DWS, 2018)	
	EC (mS/m)	37.2		
	DO (mg/L)	7.52	pH	5.0 – 10.0
	DO (% sat)	100.4	EC (mS/m)	≤ 85
	Temp (°C)	25.8	DO (mg/l)	≥ 5.0
	Water Quality Comments:		Macro-Invertebrate Community Integrity Comments:	
	<ul style="list-style-type: none"> ➤ The pH value measured during the December 2020 assessment was largely natural and complied with the RWQO (DWS, 2018); ➤ The EC complied with the guideline limits required by the RWQO (DWS, 2018); ➤ The DO saturation was considered adequate and complied with the recommended 80 – 120% saturation range as stipulated by the guidelines (DWAf, 1996), as well as the 5.0 mg/L requirement stated by the RWQO (DWS, 2018); ➤ Temperature was considered largely natural considering diurnal variation and the time of day of the assessment; and ➤ Overall, the water quality of this section of the Steelpoort River was considered good. 		<ul style="list-style-type: none"> ➤ The aquatic macro-invertebrate community integrity was classified as a Category B/C (Largely Natural to Moderately Modified) condition according to the MIRAI EcoStatus tool; ➤ Highly sensitive taxa observed on site was Pyralidae and moderately sensitive taxa was Leptophlebiidae, Tricorythidae Chlorocyphidae and Elmidae. The taxa observed on site had a diverse preference for stones, vegetation and GSM with multiple airbreathers (five taxa) ranging from low to moderate sensitivity; ➤ The habitat suitability was considered as adequate at the time of the assessment, with biotope diversity including stones in and out of current, marginal vegetation and GSM. 	
	Figure 12: View of site TS3 at the time of the assessment.		Key Drivers of System Change:	
Algal proliferation:	Slight proliferation on rocks.		<ul style="list-style-type: none"> ➤ Possible cumulative impacts on the water quality as a result of mining activities upstream of this point. ➤ Cumulative impacts from surrounding rural communities (subsistence farming, cattle watering, and washing of clothes). ➤ Significant areas of vegetation clearing and sand mining, leading to increased erosion and sedimentation. 	
Depth profiles:	Some depth variation at the site under the current flow conditions. The site is dominated by shallow runs and riffles and deeper pools.			
Flow condition:	Moderately slow flow.			
Riparian zone characteristics:	The riparian zone is moderately wide. The site is dominated by trees, shrubs and grasses.			
Water clarity and odour:	Water was clear. No odours present.			
Signs of pollution or impact.	None observed.			
MIRAI	Category B/C (Largely Natural to Moderately Modified)			
Instream IHI	NA			
Riparian IHI	NA			
VEGRAI	NA			
FRAI	NA			
NA= Not Assessed during the December 2020 assessment.				

5.1.6 Agriculture

The general assessment of agricultural sensitivity that is employed in the DFFE National Web-based Environmental Screening Tool, identifies all arable land that can support viable production of cultivated crops, as at least high sensitivity. This is because there is a scarcity of arable production land in South Africa.

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, irrespective of its land capability rating.

Uncultivated land is classified by the screening tool in terms of its land capability rating, as per the 2017 Department of Agriculture, Forestry and Fisheries updated and refined land capability mapping for South Africa. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥ 8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

A map of the proposed development area overlaid on the screening tool sensitivity is provided in Figure 5-14. Because there is no cultivation, agricultural sensitivity is purely a function of land capability. The land capability of the investigated site varies from 6 to 10. A map of the land capability of the site is provided in Figure 5-15. Land capability values of 6 to 8 give medium agricultural sensitivity and values of 9 to 10 give high agricultural sensitivity. The small-scale differences in land capability (pixels) across the project area are not very significant and are more a function of how the land capability data is generated by modelling, than actual meaningful differences in agricultural potential on the ground.

The land capability rating for the site is highly likely to be accurate. The terrain and climate are suitable for cultivation and the indications of soil potential from the land type data are that dominant soil types are deep, well-drained Hutton soils that are suitable for cultivation, although shallower soils do also occur.

However, there are other factors, apart from the natural agricultural resources, that limit the agricultural potential of the land on this site. Agriculture is not possible on the sites while Samancor Chrome and related industries are operating there. One of the restrictions to agricultural activities is that Samancor Chrome utilises boreholes on the sites for their water supplies and therefore have strict controls over land use. The current owners of the land (Samancor Chrome) have little interest in using the land for agriculture and the land around the sites is broken up by mining and smelting related industry which makes it impractical to use as farmland.

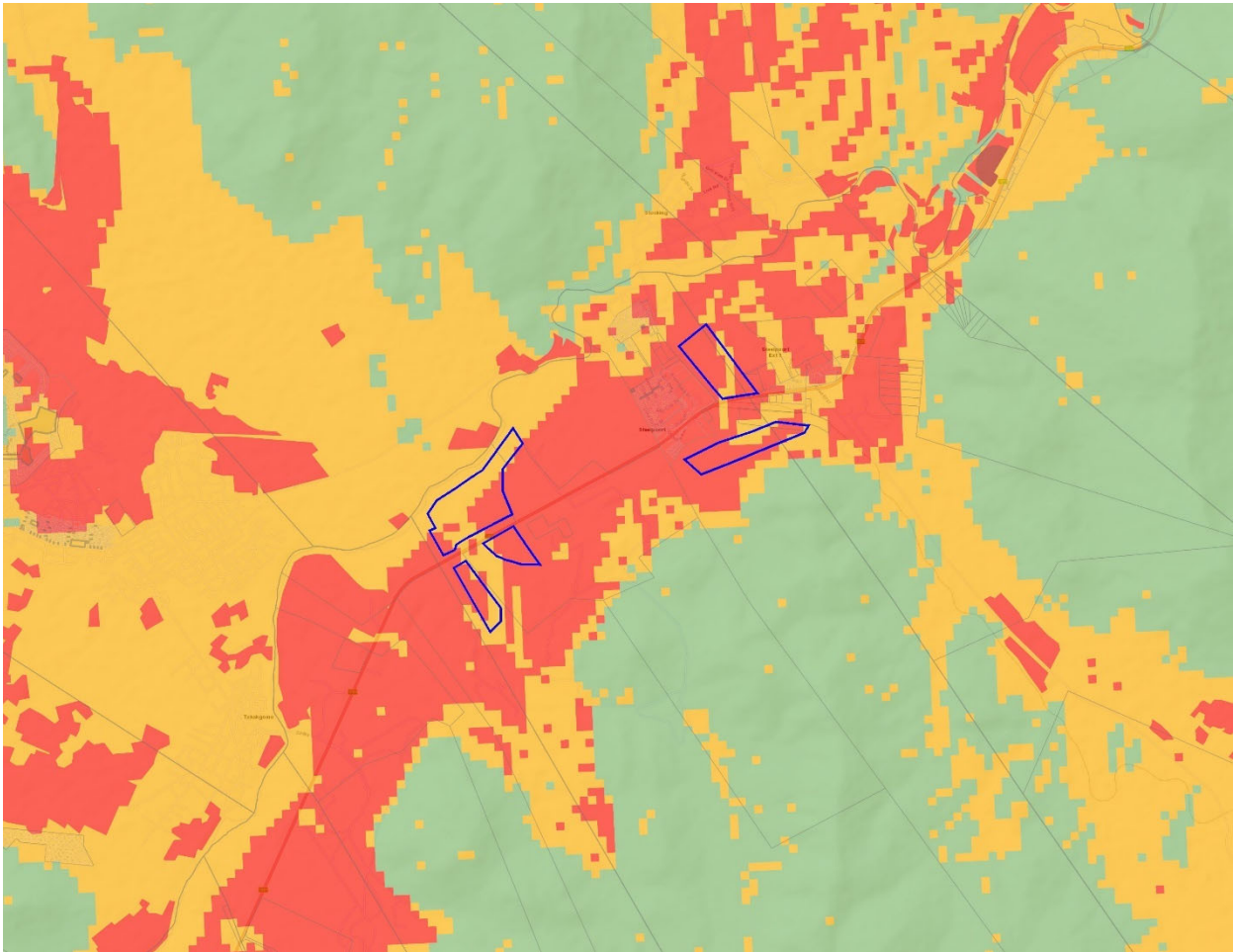


Figure 5-14: The proposed development site (blue outlines) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high)

The purpose of the NEMA Agricultural Protocol and the sensitivity rating of agricultural land by the screening tool is to conserve functional agricultural land, particularly arable land for agricultural use, within the context of a shortage of arable land that is suitable for crop production in South Africa. However, if land cannot be used for agriculture and particularly the production of cultivated crops, then it does not make sense to conserve it for agricultural use, by preventing other land uses.

It is important to note that the need to conserve arable land is not only relevant to the present, but also to the future. The natural agricultural resources of this land must be conserved for a potential future time when the mining and smelting related industries no longer occupy the site and agricultural use may again become possible. The proposed development is associated with those industries and so if they cease to occupy the site, the proposed development will also cease to occupy the site. Its impact does not therefore prevent future agricultural use.

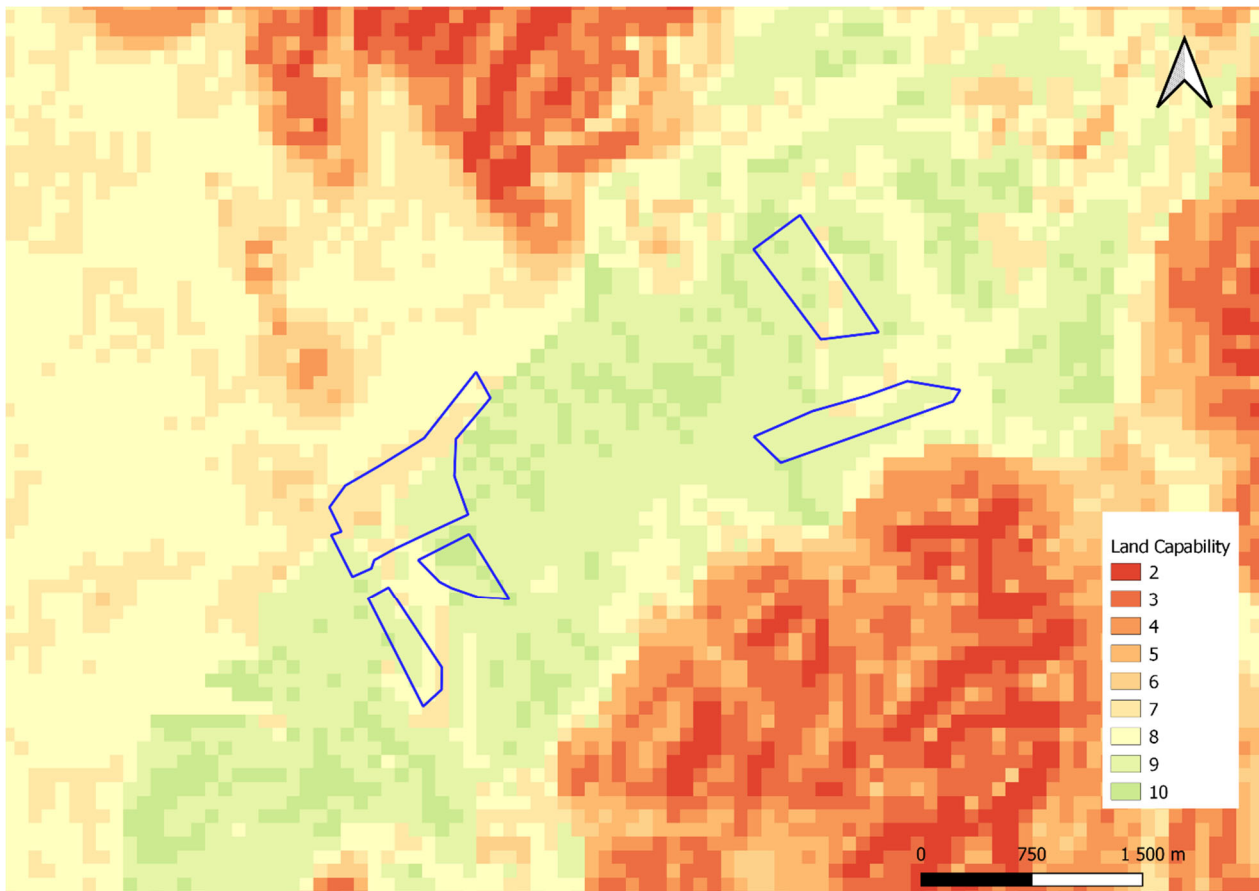


Figure 5-15: The land capability of the proposed development site (blue outlines)

5.1.7 Biodiversity

5.1.7.1 Regional Biodiversity

The project area is located in the Savanna biome which covers approximately 48% of the SDM with grasslands covering 39% and the remainder being made up of forest (9%) biomes. Azonal vegetation is found in patches along the Steelpoort and Olifants Rivers.

The proposed study area is spatially situated within the Sekhukhune Centre of Plant Endemism – SCPE (Figure 5-16). The SCPE contains more than 2200 indigenous species of vascular plants making it an area of exceptionally high biodiversity that is globally recognised.²² The SCPE comprises a mountainous region with flat to undulating valleys. Sekhukhuneland is known for its parallel belts or rocky ridges and mountains, including the Leolo and Dwars River ranges. The core of the SCPE is formed by the surface outcrops of the Rustenburg Layered Suite of the eastern Bushveld Complex.

²² Limpopo Department of Economic Development, Environment and Tourism (LDEDET), 2018. Sekhukhune District Bioregional Plan.

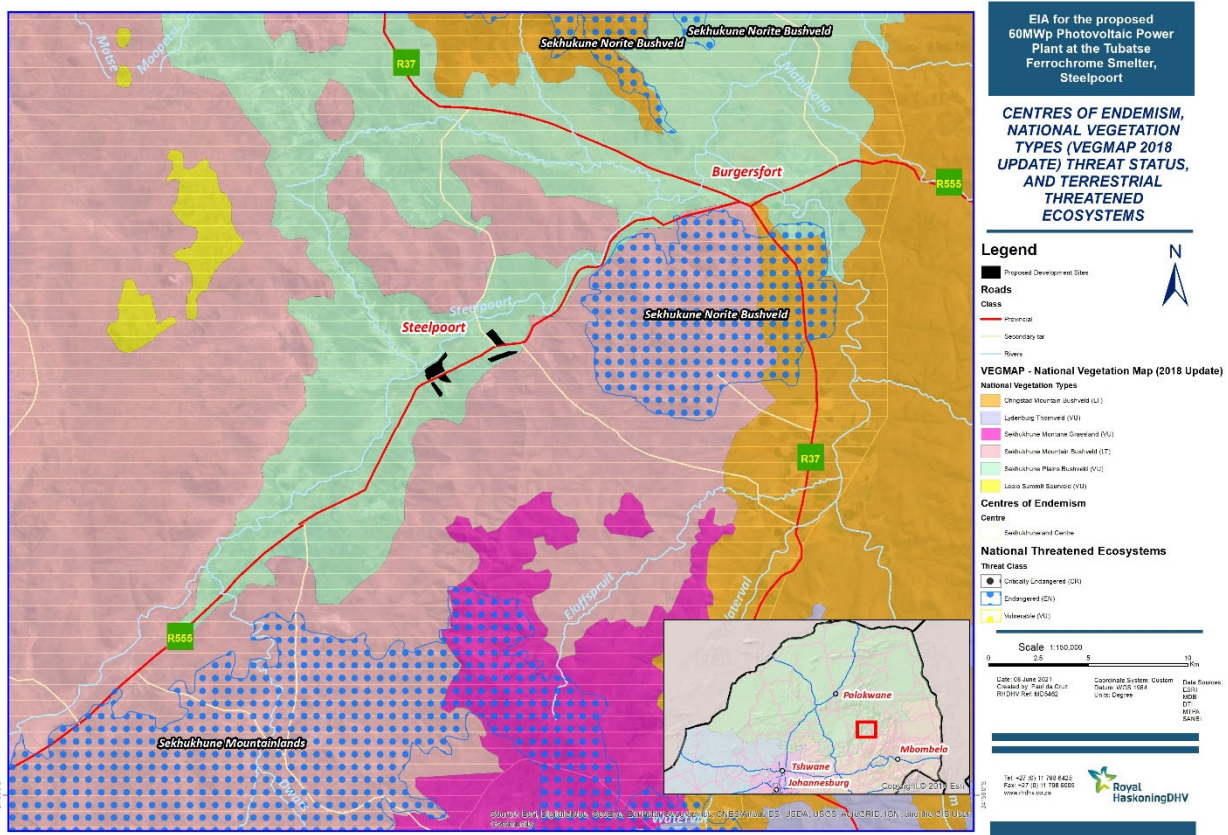


Figure 5-16: SCPE, vegetation types and threatened ecosystems

5.1.7.2 Vegetation Type

The Sekhukhune Plains Bushveld vegetation type is present within the study area (Figure 5-16). The current conservation level of this unit is set at Vulnerable; with a target of 19 %, only 2% is statutorily conserved in Potlake, Bewaarkloof and Wolkberg Caves Nature Reserves. Approximately 25% of this area has already been transformed and is mainly under dry-land subsistence cultivation. A small area is under pressure from chrome and platinum mining activities and associated urbanisation, notably around the Steelpoort area.

There is a high level of degradation of much of the remaining vegetation as a result of unsustainable harvesting, utilisation and exploitation. Erosion is widespread at usually high to very high levels with donga formation, but also expansive sheet and rill erosion. Alien Agave species, *Caesalpinia decapetala*, *Lantana camara*, *Melia azedarach*, *Nicotiana glauca*, *Opuntia* species, *Verbesina encelioides* and *Xanthium strumarium* are widespread but scattered, often with strong correlation with drainage lines and rivers.

5.1.7.3 Threatened Ecosystems

The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) provides for listing of threatened or protected ecosystems. The study area is not within a threatened ecosystem, with the closest threatened ecosystem being the Sekhukhune Norite Bushveld with an Endangered Threat Class (Figure 5-16).

5.1.7.4 Protected Areas

The study area is not situated within or in proximity to a declared protected area. The following protected areas (Figure 5-17) are in close proximity to the project area:

- De Hoop Dam Protected Environment (approximately 27km south-west from the project area);
- Steelpoort Private Nature Reserve (approximately 27km south-west from the project area);
- Apiesboom Private Nature Reserve (approximately 11km north-east from the project area);
- Luiperdhoek Private Nature Reserve (approximately 12km north-east from the project area); and
- Glen Ora Private Nature Reserve (approximately 16km east from the project area).

The sites are not within any National Protected Areas Expansion Focus Areas.

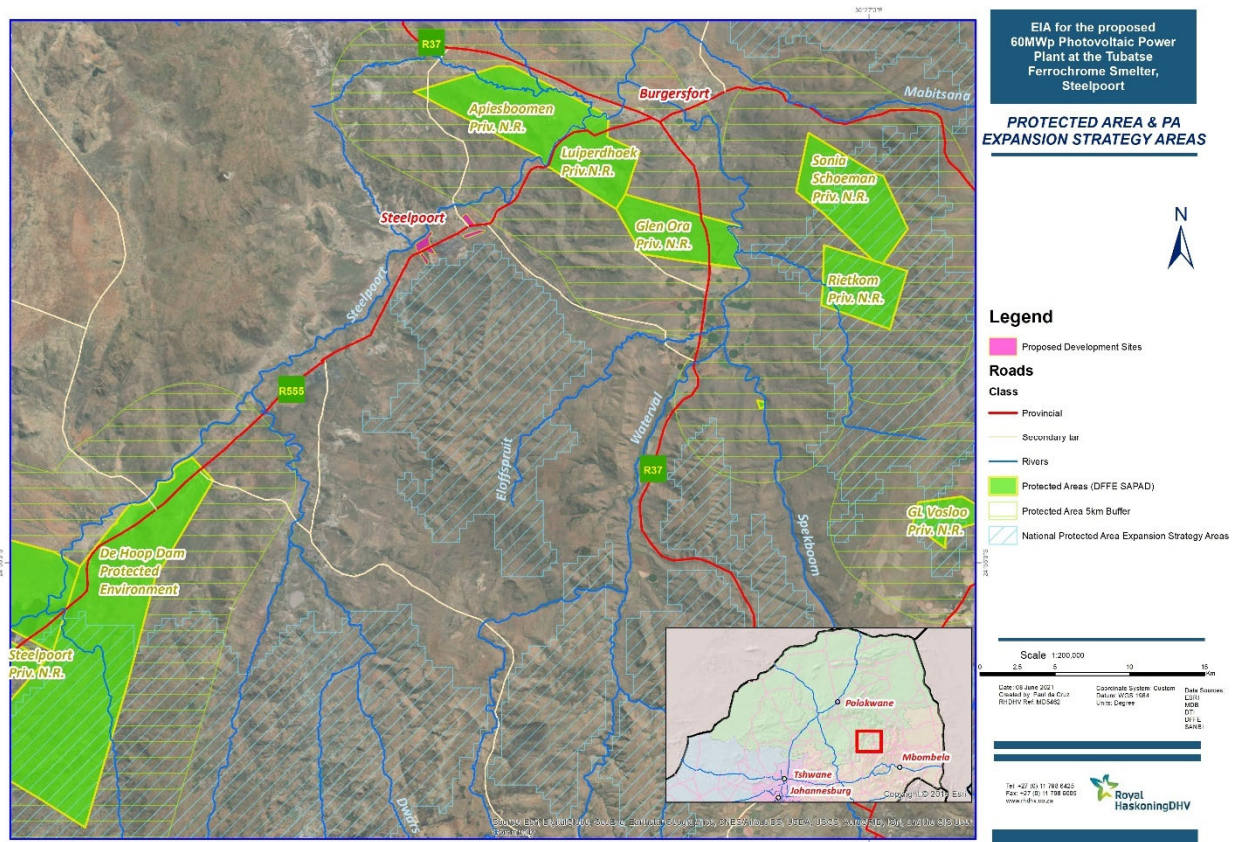


Figure 5-17: Protected areas in relation to the study area

5.1.7.5 Limpopo Province Conservation Plan (2013)

The purpose of the Limpopo Conservation Plan (C-Plan) v2 (2013) is to develop the spatial component of a bioregional plan – BRP (i.e. map of Critical Biodiversity Areas and associated land use guidelines). The purpose of a BRP is to inform land use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity.²³

The Limpopo C-Plan categories are presented in Table 5-9.

²³ Desmet, P. G., Holness, S., Skowno, A. & Egan, V.T. 2013. Limpopo Conservation Plan v.2: Technical Report. Contract Number EDET/2216/2012. Report for Limpopo Department of Economic Development, Environment & Tourism (LEDET) by ECOSOL GIS.

Table 5-9: Limpopo C-Plan categories

C-Plan Category	Description
Protected Areas (PA)	Declared and formally protected areas under the Protected Areas Act, such as National Parks, Nature Reserves, World Heritage Sites and Protected Environments that are secured by appropriate legal mechanisms. Recommendations for this category include maintaining of the current status or obtaining formal conservation protection.
Critical Biodiversity Areas (CBAs)	The CBAs are sites that are required to meet biodiversity targets for ecosystems and species and need to be maintained in good ecological condition. CBAs in the SDM can be divided into two subcategories, namely <i>Irreplaceable (CBA 1)</i> in that there are little choice in terms of areas available to meet targets or <i>Optimal (CBA 2)</i> whereby the selected sites are the ones that are best to achieve targets of the systematic biodiversity plan.
Ecological Support Areas (ESAs)	ESAs are required to support and sustain the ecological functioning of CBAs and Protected Areas and for meeting biodiversity targets. <i>ESA 1</i> are natural, near natural and degraded areas supporting CBA by maintaining ecological processes. <i>ESA 2</i> are areas with no natural habitat that important for supporting ecological processes.
Other Natural Areas (ONA)	Natural and intact but not required to meet targets or identified as CBA or ESA.
No Natural Habitat Remaining (NNHR)	Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure.

Figure 5-18 illustrates the categorisation of the sites as inclusive of CBA 1 (Portion of Site 5), CBA 2 (Site 1 and 4 and portions of Site 2, 3 and 5), ESA 1 (Portion of Site 2, 3 and 5) and ESA 2 (Portion of Site 3) categories. The Ecological Specialist is not entirely in agreement with the information source on a wider scale as it is evident that the C-Plan does not accurately reflect the level of habitat loss and deterioration from the urban and industrial zones around Steelpoort that is prevalent. It should be noted that the erroneous assignment of conservation categories is most likely the result of data with a coarse scale and outdated information on a local scale. Since the inception of this information source in 2013, there have been considerable changes in land use and the associated deterioration of ecological status and connectivity of habitat occurred, notably in the immediate surrounds of settlements and residential areas.

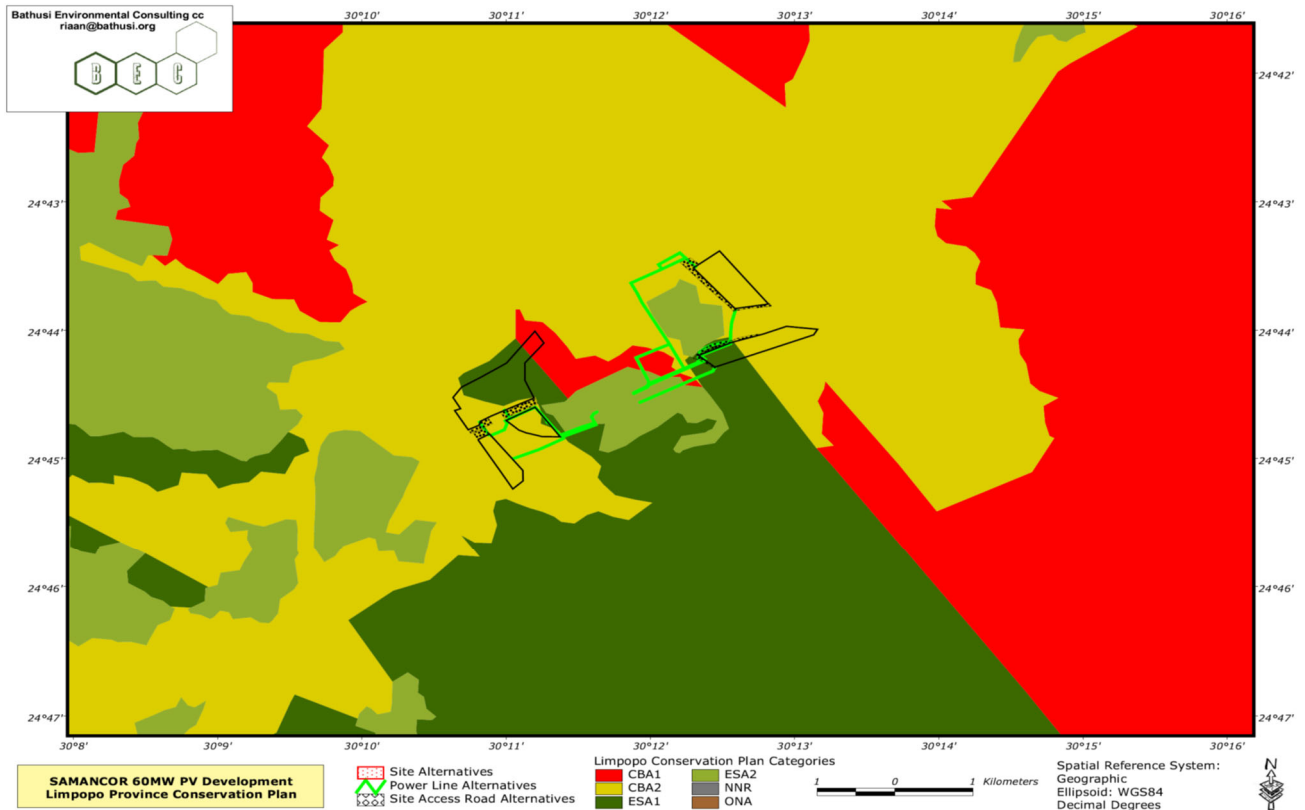


Figure 5-18: Limpopo C-Plan illustrating conservation categories and importance

5.1.7.6 Sekhukhune Bioregional Plan (2020)

This BRP was gazetted in 2020 and is based primarily on datasets and information available at the time, notably from the CBAs and ESAs that were identified and delineated for the Limpopo C-Plan (2013).

The categories of the BRP are the same as those for the Limpopo C-Plan as indicated in Table 5-9. An appraisal of the BRP categories, specifically in comparison with the Limpopo C-Plan, provides for a more accurate and appropriate categorisation of remaining areas of natural habitat within the development footprints. Where the Limpopo C-Plan indicates elevated conservation contribution and status, the BRP more accurately describes land transformation and habitat deterioration that is associated with the fragmented and isolated portions of woodland habitat in the immediate surrounds of Steelpoort. The discrepancy between the 2 datasets is likely a result of refined and more recent interpretation of background layers. According to the BRP (Figure 5-19), all sites are within the ESA 1 category.

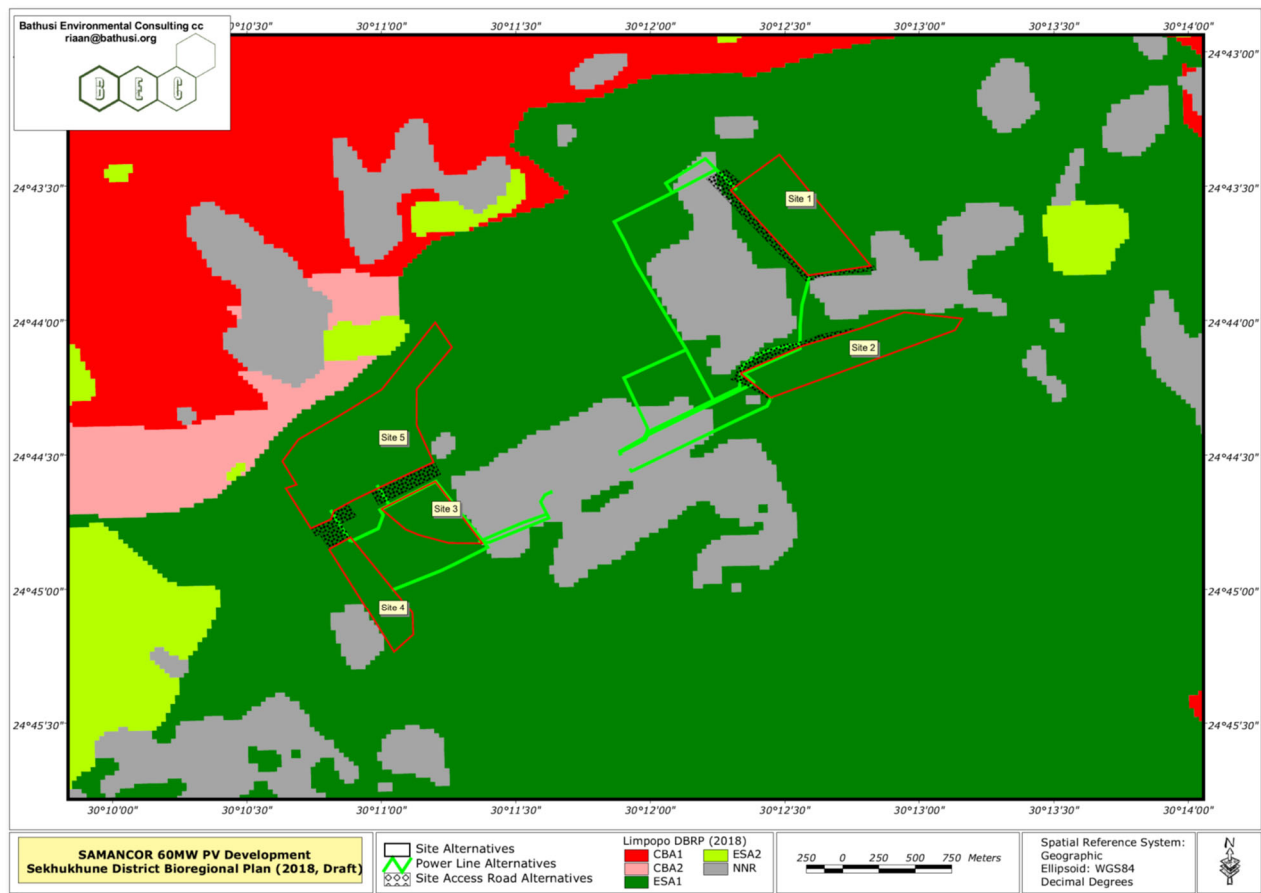


Figure 5-19: Sites in relation to the BRP²⁴

5.1.7.7 Plants of Conservation Concern

Results from the brief site inspection noted presence of several plant taxa of conservation concern namely:

- *Adenia fruticosa* (Limpopo Environmental Management Act - LEMA Schedule 12)
- *Balanites maughamii* (National Protected Tree)
- *Boscia albitrunca* (National Protected Tree)
- *Eulophia speciosa* (LEMA Schedule 12)
- *Sclerocarya birrea* (National Protected Tree)
- *Stapelia gettliffei* (LEMA Schedule 12)

A brief review of the DFFE Web-based Environmental Screening Tool Environmental Screening Tool, indicated the following aspects of importance pertaining to plant species sensitivities:

- Medium Sensitivity: Sensitive species²⁵ 1252 (Vulnerable)²⁶;

²⁴ Information in draft form and not to be disseminated indiscriminately.

²⁵ Please note that the Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly, and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. As per the best practise guideline that accompanies the protocol and screening tool, names of the sensitive species may not appear in the final EIA report or any specialist reports released into the public domain. It should be referred to as sensitive plant.

²⁶ A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.

²⁶ A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.

- Medium Sensitivity: Sensitive species 1033 (Endangered)²⁷;
- Medium Sensitivity: Sensitive species 587 (Rare)²⁸;
- Medium Sensitivity: *Asparagus fourei* (Vulnerable);
- Medium Sensitivity: *Polygala sekhukhuniensis* (Vulnerable);
- Medium Sensitivity: *Searsia batophylla* (Vulnerable);
- Medium Sensitivity: *Searsia sekhukhuniensis* (Rare); and
- Medium Sensitivity: *Combretum petrophilum* (Rare).

5.1.7.8 Broad Habitat Types of the Site and Immediate Surrounds

Vegetation within the sites and immediate surrounds exhibit moderate effects of long-term impacts associated with surrounding land uses and notable changes in vegetational structure, species abundance, presence, absence and composition is evident. However, a brief appraisal of the vegetational physiognomy as well as compositional and structural aspects of the predominant vegetation of the sites indicated a high correlation to the principal vegetation type (Section 5.1.7.2).

A preliminary evaluation indicated the following broad habitat types:

- Non-perennial Drainage Zones and Riparian Vegetation; and
- Open and Closed Mixed Shrubveld (Terrestrial Woodland).

A collage of photos with examples of habitat conditions and physiognomy is presented in Figure 5-20.

▪ **Riparian Vegetation and Drainage Zones**

The nature of habitat associated with (perennial) rivers and drainage lines vary significantly as a result of topographical placement, underlying edaphic conditions, slopes, etc. Drainage lines and riparian habitat varies from small, ill-defined and shallow drainage lines where water irregularly accumulates subsequent to rainfall advents, and immediately evacuates the drainage lines to lower, significantly incised and deep gulleys, towards the riparian levees and Steelpoort River where it dominated by prominent reedbeds (*Phragmites mauritianus*) and dense grass stands.

Upper, ill-defined drainage lines, apart from bare stream bottoms that are often devoid of a prominent vegetation layer and with exposed substrata and rocks, most often does not comprise of a typical wetland, or riparian (ephemeral and mesic environment) vegetation type, but rather reflect the surrounding terrestrial woodland vegetation types.

Floristically these features mostly do not contain any particularly significant flora (apart from occasional protected taxa), but typical ecological attributes associated with riparian and wetland habitat types dictate a moderate-high sensitivity (at least) where natural vegetation and processes characterise the area.

▪ **Opened and Close Mixed Shrubveld (Terrestrial Woodland)**

Physiognomically, the terrestrial woodland of the sites represents a continuum that range from open and closed shrubveld variations to a closed woodland that contain prominent and tall trees. Mostly however, the terrestrial woodland conforms to a closed shrub/ treeveld where microphyllous and broadleaf species co-occur at moderate densities. Locally, the sporadic increase in encroaching (indigenous) microphyllous species are noted, which is estimated to be a reference to management principles and high grazing pressure.

²⁷ A species is Rare when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria.

The terrestrial woodlands of the sites reflect vegetational patterns of the region and the presence of several protected plant taxa was noted during the brief site inspections. A moderate-high floristic sensitivity is therefore ascribed to these portions, which is mostly a reflection of the presence of numerous protected plant taxa, but also a result of the Vulnerable status ascribed to the regional ecological type (Sekhukhune Plains Bushveld).





Site 3: Natural open woodland



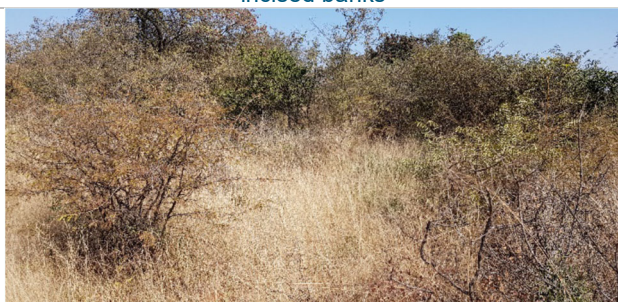
Site 3: Natural closed woodland



Site 4: Significant nearby drainage line with deeply incised banks



Site 4: Natural closed woodland



Site 4: Natural closed woodland



Site 4: Encroached woodland (*Dichrostachys cinerea*)



Site 5: Riparian levees dominated by grasses and reeds



Site 5: Steelpoort, note sand mining on opposite banks



Site 5: Encroached riparian levees (*Acacia* species)



Site 5: Small non-perennial drainage line

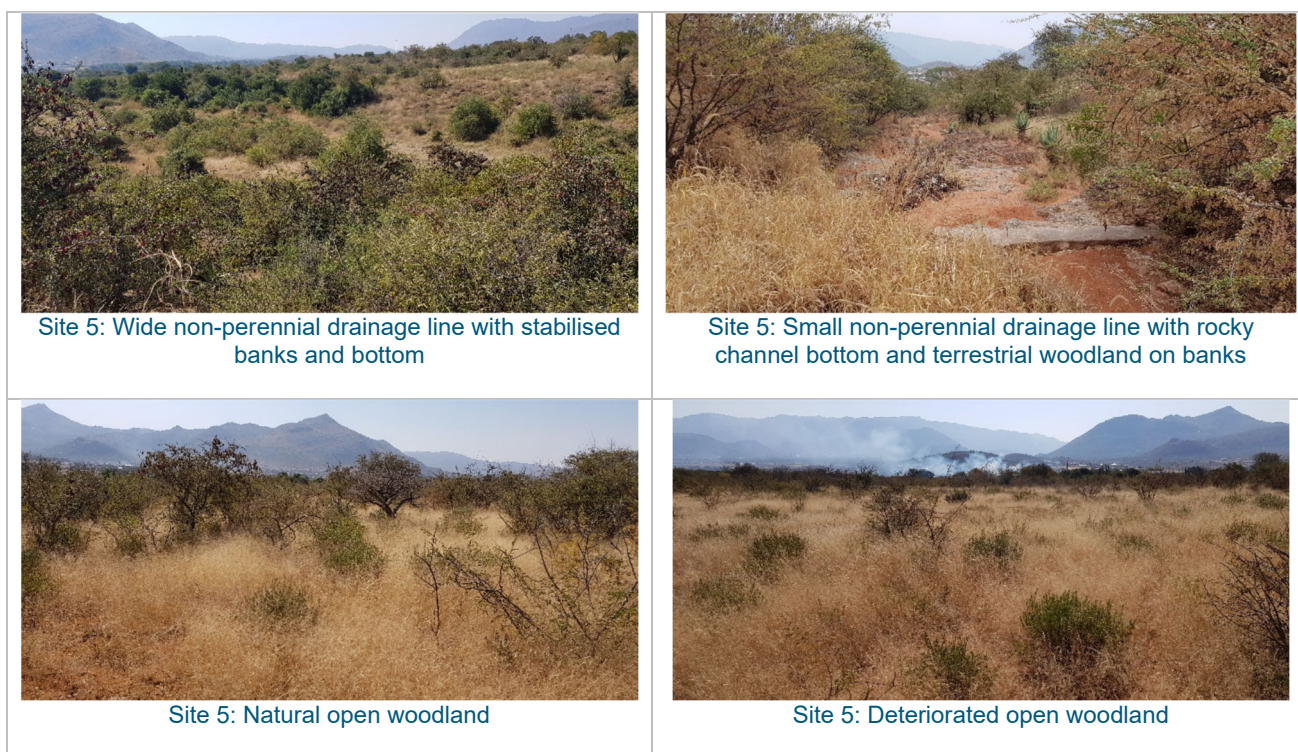


Figure 5-20: Images highlighting habitat attributes from the respective sites

5.1.7.9 Faunal Attributes

The faunal attributes of the study area are presented in Table 5-10.

Table 5-10: Faunal attributes of the study area

Component	Attributes
Mammals	Records indicate the historical presence of 49 mammal species within the wider study area. Based on habitat types, as well as the historical and extant distribution ranges, the study site and immediate surrounding habitat could possibly sustain 18 mammal species, while other species are considered highly unlikely to occur within the study sites and immediate surrounds. Eight mammal species of conservation concern (SCC) were previously recorded from the wider study area. Only 2 species are considered to exhibit moderate or higher likelihood of occurrence within the study sites and immediate surrounds, namely: Serval (<i>Leptailurus serval</i>) - Near Threatened. This feline species have a moderate probability of occurrence and may associate with the moist grassland along the Steelpoort River north of Site 5; and African Clawless Otter (<i>Aonyx capensis</i>) - Near Threatened. A widespread mustelid that is likely to associate with moist and dense grass patches along the Steelpoort River north of Site; a moderate Probability of Occurrence is estimated for this species.
Amphibians	A total of only 15 species have previously been recorded from the wider study region. Habitat types within the study sites and immediate surrounds that are likely to sustain a high diversity of amphibian diversity include the nearby Steelpoort River and associated mesic reedbed and moist grassland environs that are present in proximity to Site 5. No frog species of conservation concern is expected to be present in the potential sites for the PV plant.
Reptiles	A moderate knowledge of the reptilian diversity of the wider region is indicated by the known distribution records of 67 species.

Component	Attributes
	No reptile species of conservation concern is expected to be present in the potential sites for the PV plant.
Invertebrates	A comparative high diversity of invertebrates are known from the wider study region. However, as habitat types and status within the sites are not particularly diverse, apart from the proximity of the Steelpoort River, a high invertebrate diversity is not expected from the site.

A brief review of the DFFE Web-based Environmental Screening Tool Environmental Screening Tool, produced a medium sensitivity for the animal theme on the study site, including the following aspects:

- Medium Sensitivity: Invertebrate - *Aroegas fuscus*;
- Medium Sensitivity: Mammalia - *Dasymys robertsij*;
- Medium Sensitivity: Mammalia - *Chrysospalax villosus*;
- Medium Sensitivity: Sensitive species²⁹ 2;
- Medium Sensitivity: Sensitive species³⁰ 7;
- Medium Sensitivity: Mammalia - *Crocidura maquassiensis*;
- Medium Sensitivity: Aves – *Sagittarius serpentarius*; and
- Medium Sensitivity: Aves – *Geronticus calvus*.

5.1.8 Avifauna

5.1.8.1 Important Bird Areas

There are no Important Bird Areas (IBAs) within or in the immediate vicinity of the study area. Three IBAs are located roughly equidistant from the study area – the Wolkberg Forest Belt to the north and north-west, the Blyde River Canyon to the east and north-east and the Steenkamp Berg IBA to the south (Figure 5-21). The closest IBA to the proposed study area is approximately 37km to the north-east – the Blyde River Canyon IBA.

5.1.8.2 Species List

270 bird species appear on the study area species list. The species composition of the study area is representative of the habitats present in the study area. The majority of bird species are typical of savannah (woodland or bushveld), the predominant habitat type within the study area. A relatively small number of species are associated with aquatic habitats, representing the presence of a perennial river and a number of artificial waterbodies (dams) within the wider study area. A small number of species more typically associated with grassland habitats do occur in the study area and have taken advantage of the modification of woodland habitat through clearing of woody vegetation.

The study area species list contains a number of larger bird species, including certain raptor and stork species. These species are significant as species from these groups of birds are often threatened (see Section 5.1.8.3 below) and are typically prone to being impacted by powerlines, an important component of the proposed development.

²⁹ Please note that the Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly, and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. As per the best practise guideline that accompanies the protocol and screening tool, names of the sensitive species may not appear in the final EIA report or any specialist reports released into the public domain. It should be referred to as sensitive animal.

³⁰ Ibid.

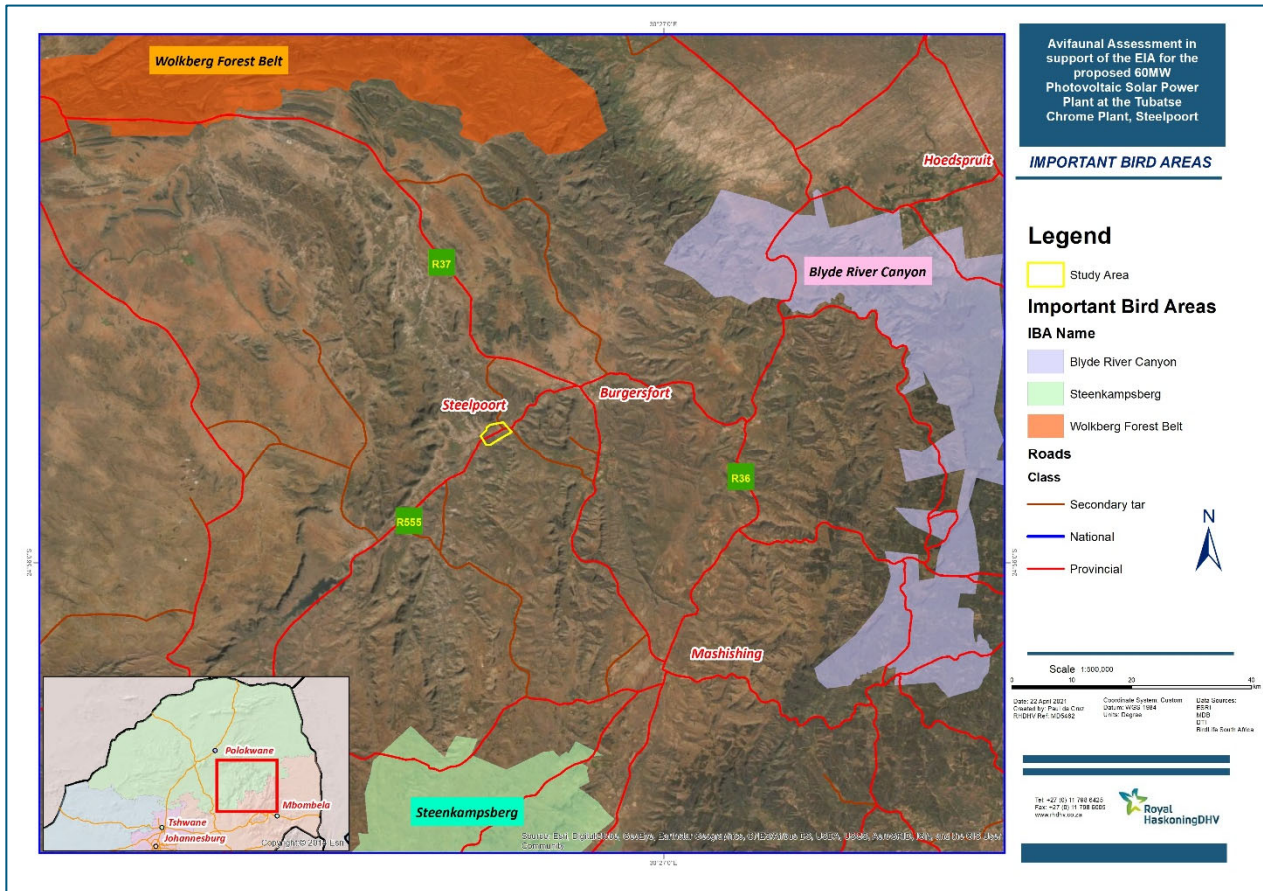


Figure 5-21: Location of IBAs in relation to the study area

5.1.8.3 Occurrence of Red Data Species

A number of Red Data species have either been recorded or could potentially occur within the study area. The latest list of Red Data List bird species is contained within the 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Ten (10) Red Data species have been identified for the study area species list and are presented in Table 5-11.

Red Data species are very important in the context of the proposed development, as any impacts on these threatened species will be potentially significant at the population level. In addition, certain of these species are large birds that are vulnerable to collisions with infrastructure, especially powerlines.

Table 5-11: Red Data list birds recorded or potentially occurring within the study area

Scientific Name	Common Name	Regional Threat Category
<i>Ciconia abdimii</i>	Abdim's Stork	Near Threatened
<i>Ciconia nigra</i>	Black Stork	Vulnerable
<i>Geronticus calvus</i>	Southern Bald Ibis	Vulnerable
<i>Sagittarius serpentarius</i>	Secretarybird	Vulnerable
<i>Gyps coprotheres</i>	Cape Vulture	Endangered
<i>Gyps africanus</i>	White-backed Vulture	Endangered

Scientific Name	Common Name	Regional Threat Category
<i>Falco biarmicus</i>	Lanner Falcon	Vulnerable
<i>Polemaetus bellicosus</i>	Martial Eagle	Endangered
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	Near threatened
<i>Coracias garrulus</i>	European Roller	Near threatened

5.1.8.4 Occurrence of Endemic Species

Table 5-12 lists the endemic species that have been recorded within the study area. Endemic species are of importance due to their limited distribution and impacts on their populations (especially at cumulative level) could be significant. It should be noted that species endemic to the southern African sub-region have been listed. A distinction has been drawn between birds completely endemic to the sub-region, as well as those species whose distributions mostly fall within the sub-region (near endemic).

Table 5-12: Endemic or Near Endemic species recorded or potentially occurring within the study area

Scientific Name	Common Name	Endemism Status
<i>Geronticus calvus</i>	Southern Bald Ibis	Endemic
<i>Gyps coprotheres</i>	Cape Vulture	Endemic
<i>Buteo rufofuscus</i>	Jackal Buzzard	Endemic
<i>Pternisits natalensis</i>	Natal Spurfowl	Near Endemic
<i>Lophotis ruficrista</i>	Red-crested Korhaan	Near Endemic
<i>Pterocles bicinctus</i>	Double-banded Sandgrouse	Near Endemic
<i>Centropus burchellii</i>	Burchell's Coucal	Near Endemic
<i>Tockus leucomelas</i>	Southern Yellow-billed Hornbill	Near Endemic
<i>Tricholaema leucomelas</i>	Acacia Pied Barbet	Near Endemic
<i>Mirafra sabota</i>	Sabota Lark	Near Endemic
<i>Anthoscopus minutus</i>	Cape Penduline-Tit	Near Endemic
<i>Monticola rupestris</i>	Cape Rock Thrush	Endemic
<i>Cossypha humeralis</i>	White-throated Robin-Chat	Endemic
<i>Cercotrichas paena</i>	Kalahari Scrub-Robin	Near Endemic
<i>Parisoma subcaeruleum</i>	Chestnut-vented Tit-Babbler	Near Endemic
<i>Bradornis mariquensis</i>	Marico Flycatcher	Near Endemic
<i>Sigelus silens</i>	Fiscal Flycatcher	Endemic
<i>Laniarius ferrugineus</i>	Southern Boubou	Endemic
<i>Laniarius atrococcineus</i>	Crimson-breasted Shrike	Near Endemic
<i>Cinnyris afer</i>	Greater Double-collared Sunbird	Endemic
<i>Cinnyris chalybeus</i>	Southern Double-collared Sunbird	Endemic
<i>Passer melanurus</i>	Cape Sparrow	Near Endemic
<i>Passer motitensis</i>	Great Sparrow	Near Endemic

Scientific Name	Common Name	Endemism Status
<i>Sporopipes squamifrons</i>	Scaly-feathered Finch	Near Endemic
<i>Amadina erythrocephala</i>	Red-headed Finch	Near Endemic
<i>Uraeginthus granatinus</i>	Violet-eared Waxbill	Near Endemic
<i>Vidua regia</i>	Shaft-tailed Whydah	Near Endemic
<i>Emberiza impetuana</i>	Lark-like Bunting	Near Endemic
<i>Emberiza capensis</i>	Cape Bunting	Near Endemic
<i>Zosterops virens</i>	Cape White-eye	Endemic

5.1.8.5 Identification and Occurrence of Priority Bird Species

Based on the species list compiled for the study area and the sensitivity analysis (Section 5.1.8.6), a number of 'priority species' with respect to the proposed development have been identified. The identification of priority species has also considered the conservation or endemism status of the species, as well as whether the species would be vulnerable to collisions with overhead powerlines or be impacted by PV-based solar power development. Species recorded in the wider area have been included as these could easily move into the study area. The priority species are:

- Abdim's Stork
- Black Stork
- Southern Bald Ibis
- Secretarybird
- Cape Vulture
- White-backed Vulture
- Peregrine Falcon
- Lanner Falcon
- Verreaux's Eagle
- Tawny Eagle
- Martial Eagle

It should be noted that the development sites and the study area is not considered to be of significant value to most of these priority species, with their presence in the study area being likely to be restricted to occasional visits. The largely undeveloped hilly woodland habitat located on the outer peripheries of the study area is considered more likely to attract certain of the raptor species, especially as these species are likely to move along the ridgelines running parallel to the Steelpoort Valley. The study area in the vicinity of the site is utilised by certain raptor species for hunting of prey or for perching and roosting along the numerous power line structures in the area.

Two records of a Lanner Falcon were made during the Scoping-phase site visit and its presence has thus been confirmed on the site (Figure 5-22). The relatively high density of seed-eating (granivorous) birds in the study area at the end of the summer of high rainfall as incidentally observed during the two Scoping-phase site visits is likely to have drawn this raptor species to the study area, its diet consisting primarily of small bird species to the area. Such raptor species including other species that prey on smaller birds such as the Peregrine Falcon and including many accipiter species may thus occur more regularly on the site in the mid and late summer when large numbers of granivores are present in the area.



Figure 5-22: A Lanner Falcon recorded in the study area close to Site 5

The two stork species included in the list of priority species are unlikely to be regular visitors to the site. The Abdim's Stork is a summer Intra-African migrant that would only occur in southern Africa during the summer months. This stork occurs in groups and may be attracted to the transformed open habitats in the study area such as the cleared formerly cultivated areas of land to the north of the Steelpoort River especially after periods of good rainfall when termite emergences occur. The Secretarybird is similarly largely absent from more densely wooded habitats and like the Abdim's Stork may occasionally visit such modified habitat cleared of woody vegetation. The scarcity of this species twinned with the high intensity of human activity in the study area is likely to entail that this species does not regularly visit the area. The last species which would occur in such modified open (formerly cultivated) habitats is the Southern Bald Ibis. The Southern Bald Ibis occurs much more commonly to the south-east in the higher-altitude grasslands and mountainous areas but may occasionally range into the Steelpoort Valley to forage in such habitats, although to date the species has not been recorded from the Steelpoort Valley by the SABAP2 Project.³¹ As such it is considered to be a very occasional visitor at best.

The Black Stork is a nomad that ranges widely. Breeding sites are located in the Blyde River Canyon IBA to the north and north-east and accordingly this species could occur at any waterbody (such as dams) or aquatic habitat that affords it fishing opportunities in shallow water. Due to its scarcity, low density of such habitats in the study area, and high degree of human activity it is expected to not occur regularly in the study area but may visit quieter waterbodies such as the Tubatse Dam.

It should be noted that certain species that could occur in the study area and which are threatened have not been included as priority species. In spite of being recorded in the study area, the typical habitat favoured by a number of species does not exist or only marginally exists in the study area. The Half-collared Kingfisher (*Alcedo semitorquata*) has been confirmed to occur along certain of the rivers in the wider study area, in particular the Watervals River. This species is listed as near threatened but is unlikely to be affected by the development as no development components are anticipated to physically affect the Steelpoort River and its riparian corridor – the only habitat in which the species is likely to occur. The river was noted to highly polluted with silt with a very high level of turbidity. The river is thus not considered as suitable habitat for this species which favours fast-flowing, clear water rivers, and as such the species is considered to be unlikely to occur in the reaches of the Steelpoort River close to the study area.

³¹ <http://sabap2.birdmap.africa/species/82>

The European Roller (*Coracias garrulus*) has been recorded in the wider study area but is likely to occur very marginally within the study area. This species is a palaeartic summer migrant, thus only likely to occur in southern Africa in mid to late summer. The absence of large areas of lightly wooded grassland (the habitat favoured by this species) is likely to entail that the species will not occur widely within the study area.

Although the likelihood of the occurrence of certain of these species is likely to be very low, their threat status, twinned with their ability to range extensively over large territories or areas of occurrence entails that they could occur in the study area and should be considered.

5.1.8.6 Avifaunal Sensitivity Assessment

The habitat types: a) woodland (bushveld), rivers, b) watercourse and riparian habitat, c) other surface water features, d) cleared areas/ formerly cultivated land and e) other anthropogenic habit including infrastructure have been mapped across the study area utilising GIS software (Figure 5-23) and a sensitivity class has been assigned to each habitat type based on the relative abundance and species composition associated with each habitat type. The highest level of sensitivity has been assigned to riparian corridors and natural water bodies (including dams), with the lowest level of sensitivity being assigned to highly transformed habitats. Woodland habitat has been divided into untransformed woodland (i.e. in hilly terrain where there is very limited human activity, or within certain fenced areas (including some of the development sites to which there is no public/ open access) which has been assigned a high degree habitat-based of sensitivity, and 'degraded' woodland where human impacts are apparent. Such less intact woodland has been assigned a moderate degree of habitat-based sensitivity.

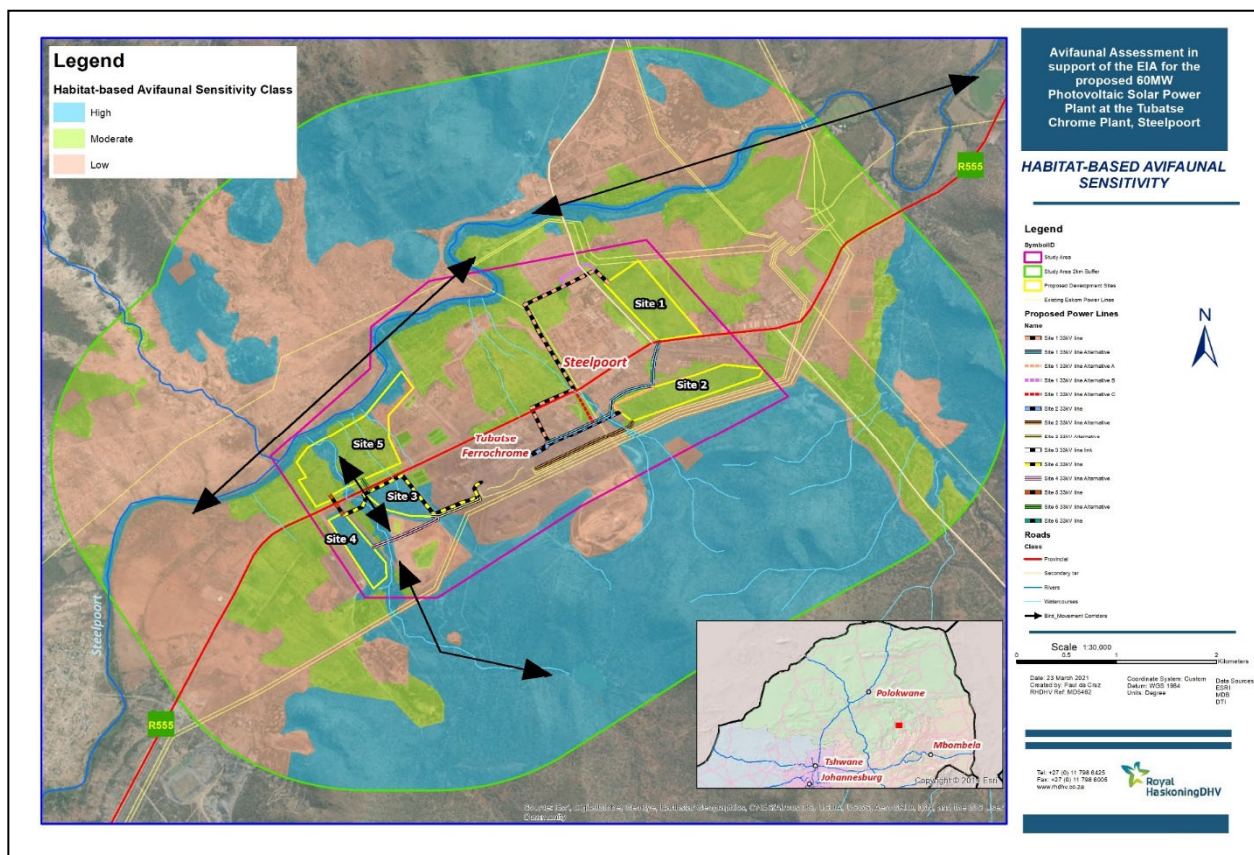


Figure 5-23: Areas of habitat-based sensitivity and bird movement corridors in the study area

The designation of habitat-based avifaunal sensitivity has implications for development of the respective development sites as certain habitats of high sensitivity are located on certain of the sites and as traversed by the alignments of proposed powerline servitudes, the powerline alternatives that cross the same watercourse to the south of the R555 road and riparian habitat associated with the Steelpoort River that borders the Site 5. The presence of such high sensitivity habitat will need to be considered in the next phase of the assessment and mitigation/ avoidance measures (such as designation of buffer) considered.

The majority of the study area and development site is comprised of moderate sensitivity or low sensitivity habitat type with a high degree of transformation in certain parts of the study area. It is important to note that in addition to the level of transformation, there is a high degree of human presence and activity and very high ambient noise levels, especially as one moves closer to the TFC Smelter. These factors collectively are likely to discourage certain larger bird species that are particularly sensitive to human activity.

The desktop assessment of species occurrence has not identified the development sites or study area as being important areas inhabited by populations of threatened or highly range-restricted or habitat-restricted species, or as foraging/ roosting/ nesting/ aggregating locations for those species. Much of the areas occupied by the development sites is comprised of woodland/ bushveld which has been degraded to a greater or lesser degree through overgrazing, removal of woody vegetation, or through proliferation of indigenous woody invasive species. Such bushveld vegetation would not be considered irreplaceable in the context of the wider area and as such is not considered critical to the occurrence of birds. Although ecological movement corridors do occur, much of the bushveld habitat in the vicinity of the development sites is already fragmented by existing transformation and development.

As discussed in Section 5.1.8.5 the likelihood of the regular occurrence of most of the priority bird species identified is deemed to be low, due to the human presence and disturbance factor, and due to the spatial occurrence of habitat types on the site, most of which are not regularly likely to host these priority species. Most of the priority species are species which range widely, and which may occasionally range onto the site, or more likely the less transformed hillside woodlands adjacent to the site.

The Steelpoort River has however been identified as a locally significant bird movement corridor. The river is a large perennial river that drains a wide, but enclosed valley. Although the natural riparian vegetation has been completely removed along large reaches of the river in the study area, thus minimising its utility as a mobility corridor for smaller passerines, the river and riparian corridor is still likely to be utilised as a movement corridor for waterfowl in particular, utilising the river to move between different river reaches or other waterbodies such as dams in vicinity of the river. One such dam is the Tubatse Dam located to the south of the development sites, and waterfowl may then fly along the watercourse that drains between Sites 3 and 4 and across Site 5 to reach this dam.

Apart from the occurrence of the Steelpoort River as a locally important bird movement corridor, there are no factors (as detailed above) which signify the study area as being of high or medium avifaunal sensitivity. The presence and significance of these corridors will need to be further investigated in the EIA study.

The high human disturbance and transformation factor, the habitat types found in the study area and the nature of priority species occurrence in the study area, would indicate that the overall avifaunal sensitivity of the development sites and study area would be low. However, the presence of the Steelpoort River as a locally important bird movement corridor meets one of the criteria for medium sensitivity and this is significant in the context of the development sites due to the close proximity of Site 5 to this corridor. The study area displays a medium avifaunal sensitivity.

5.2 Social Environment

5.2.1 Socio-Economic Baseline

The FGTM is a Local Municipality (Category B4) within the SDM, in the Limpopo Province. It was established after the August 2016 local elections by the merging of Fetakgomo and Greater Tubatse Local Municipalities. The Municipality borders Makuduthamaga Local Municipality in the south, Elias Motsoaledi Local Municipality in the east, Fetakgomo Local Municipality, Lepelle-Nkumpi Local Municipality in Capricorn District, Maruleng Local Municipality in Mopani District and Mpumalanga's Thaba Chweu Local Municipality. It is situated about 150km from Polokwane, and 250km from Mbombela. Geographically the Municipality is the biggest of the five (5) local municipalities in SDM, constituting 34.3% of the area with 4 550km² of the District's 13 264 km².

5.2.1.1 Population

The population size is 335 676. The population in the Municipality is constituted by 97.8% Black, 1,6% White, with other population groups making up the remaining 0.7% (Figure 5-24). The sex ratio in the Municipality is 88, meaning that for every 100 women there are 88 men. Languages spoken in the Municipality include Sepedi (78.6%), Tsonga (6.9%), *isiNdebele* (3.8%), *isiZulu* (2.1%) and other languages make up 8.6%. Of those aged 20 years and older, 22.6% have completed matric and 6.6% have some form of higher education.³²

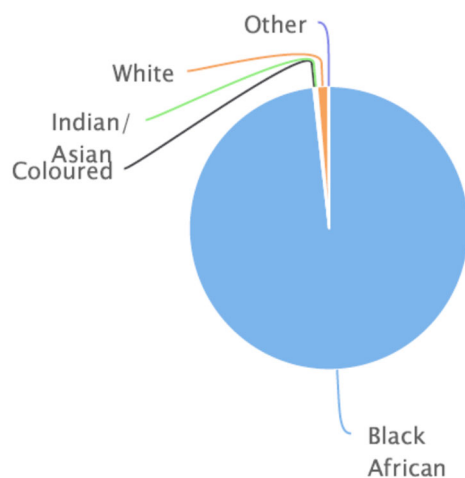


Figure 5-24: Population groups³³

5.2.1.2 Settlement Types

Over 90% of the settlements are tribal/ traditional with urban and farm settlements constituting 7.9% and 2% respectively (Figure 5-25).

³² Statistics South Africa. 2011 Census.

³³ *Ibid.*

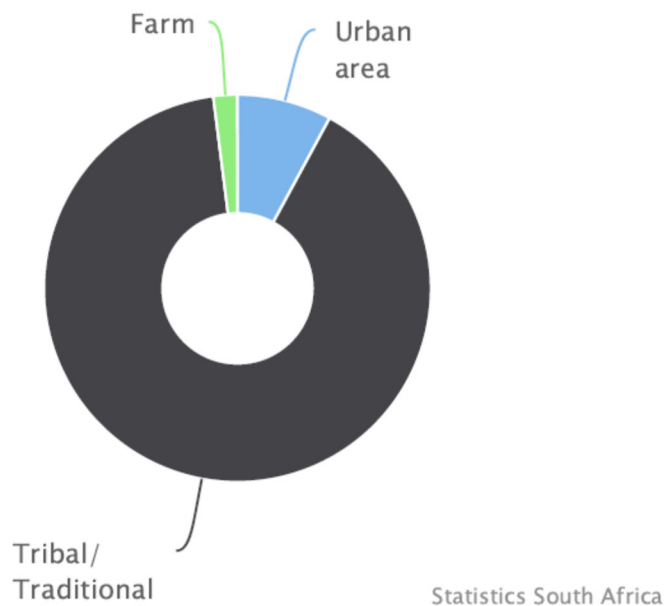


Figure 5-25: Settlement type³⁴

5.2.1.3 Water Scenario

The water sources found in the SDM include groundwater, wells, rivers, pools, and dams (20 small dams and 2 major dams i.e. Flag Boshielo and De Hoop Dams). The SDM relies on two major rivers where the two large dams are located within its jurisdiction. The Flag Boshielo Dam located on the Olifants River has, at full storage capacity, 185.2 million cubic metres (110%) as at January 2020. The De Hoop Dam located on the Steelpoort River has, at full storage capacity, 348.7 million cubic metres (81, 2%) as at January 2020.³⁵

The SDM is currently providing full water services in the main towns of Burgersfort (12 815 people), Marble Hall (4 025 people), Groblersdal (6 312 people), Steelpoort (3 374 people) and Ohrigstad (1 520 people). These areas have access to other high-level services such as refuse removal and roads infrastructure.

5.2.1.4 Electricity³⁶

The FGTM is not the electricity authority or provider for the Municipality, this is the sole responsibility of Eskom. Basic electricity infrastructure has been provided by Eskom, but many of the rural communities have inadequate access to electricity. This further supports the need for Samancor Chrome to develop alternative sources of electricity as this would enable the Municipality and Eskom to use more resources in ensuring that these communities can have improved access to electricity.

5.2.1.5 Sanitation³⁷

Sanitation services are a function of the SDM, the Municipality currently has a large backlog in terms of sanitation provision. Industrial consumers such as Samancor Chrome that operate in more urban areas discharge their effluent in existing wastewater treatment works *via* the municipal system. The FGTM IDP (2020) has stated that the Steelpoort sewerage plant has undergone a refurbishment to cater for the development in the area but the system is still overloaded due to the chemical toilets and septic tank

³⁴ *Ibid.*

³⁵ Source: DWS in Final DDP-IDP Budget 2020

³⁶ Fetakgomo Tubatse Local Municipality. 2020. 2020/21 Integrated Development Plan (IDP) & Budget.

³⁷ *Ibid.*

discharges at the plant. It is important to note that there is proposed sewage works planned downstream for Steelpoort and Winterveld, the exact location and details has not been provided in the IDP but this does highlight the importance of the Steelpoort area and ensuring that the communities in this area have access to some form of services.

5.2.1.6 Economy

The Municipality has a weak economic base and high poverty levels with 15.7% with no income (Figure 5-26). The Burgersfort town in the Municipality has been identified as a growth point in the province because of its mining activities. A potential to grow the economic base in the Municipality, through tourism, has been brought by the availability of natural resources. Poverty alleviation projects implemented by the Municipality have improved the socio-economic conditions.

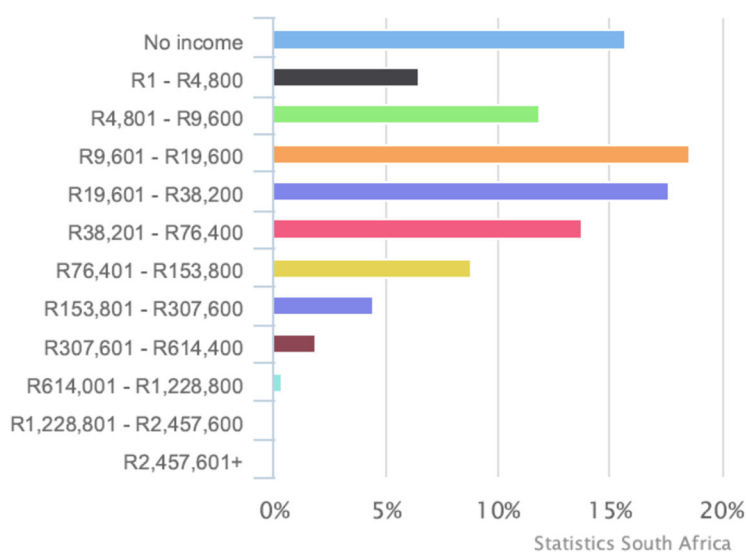


Figure 5-26: Average household income³⁸

5.2.1.7 Sekhukhune District Development Plan 2020-2021

The SDM accounts for a total population of 1.2 million, or 20.4% of the total population in the Limpopo Province, with Vhembe being the most populous region in the Limpopo Province in 2018.

The increase in the population annual growth rate is attributed to the increasing number of the mining developments (particularly in the FGTM) which serve as an attraction of people for job opportunities, specially the male population.

5.2.1.8 Special Economic Zones (SEZs)

The Fetakgomo Tubatse SEZ is proposed in the province (Figure 5-27). The Fetakgomo Tubatse SEZ is in a mining zone area which has been designated for mineral beneficiation. Currently the Limpopo Economic Development Agency has secured 1200ha of land where the SEZ will be located and the processes such as EIA and licensing are being undertaken. The challenges affecting the smooth inception of the SEZ include amongst others, the licensing, Eskom capacity for electricity provision and water provision.³⁹

³⁸ Statistics South Africa. 2011 Census.

³⁹ SDM. District Development Plan 2020-2021.

PROPOSED SEZ UNDER CONSIDERATION

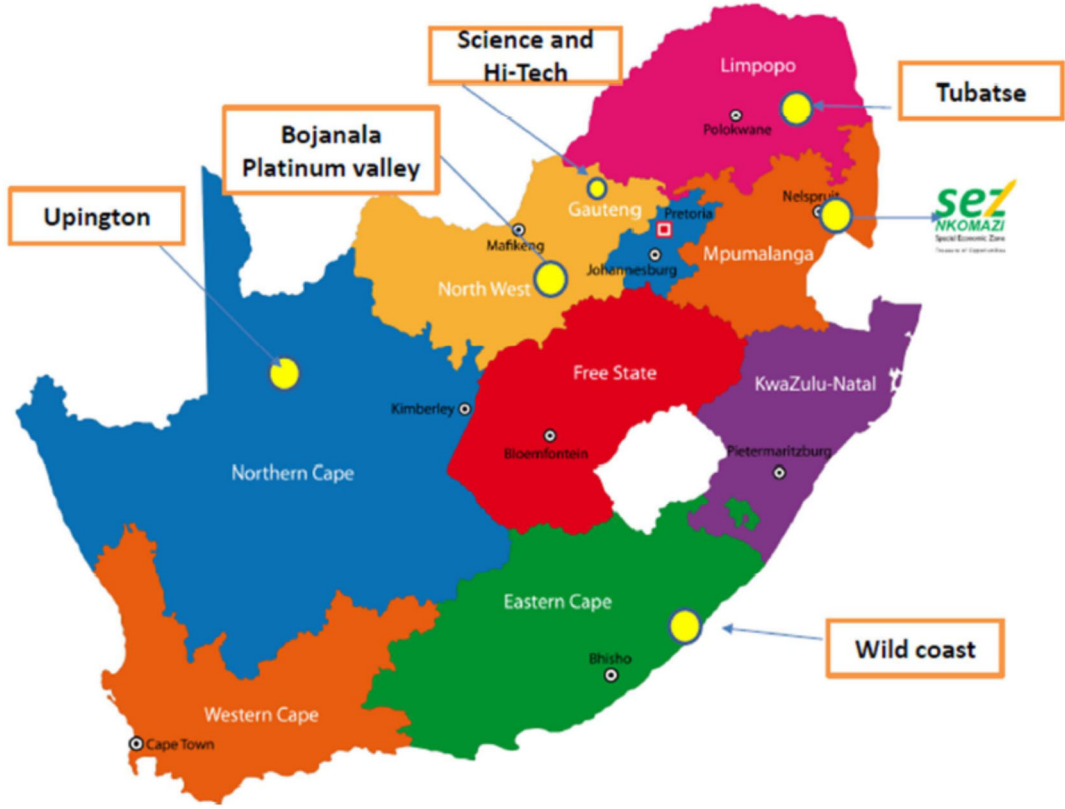


Figure 5-27: Map showing the proposed SEZs in South Africa⁴⁰

5.2.1.9 Identification of Sensitive Receptors

There are few formal serviced⁴¹ communities and a few un-serviced communities in the general vicinity of the five proposed development sites. Table 5-13 and Figure 5-28 below provides the location of communities and the direction and approximate distance from each site.

Table 5-13: Local sensitive receptors to sites

Name of Community	Type of Community	Nearest Proposed Site	Direction and Distance from Site
Mohlakwana	Primarily formal residential housing on small holdings	Site 1	North, 1.3km, across the Steelpoort River
Matholeng	Formal residential housing, some on small holdings	Site 1	North, 1km, across the Steelpoort River
Stocking	Formal residential housing	Site 1	North, 1.2km, across the Steelpoort River

⁴⁰ Department of Trade and Industry. 2018. Annual Performance Plan 2018/19.

⁴¹ 'Serviced' refers to the provision of municipal and basic services such as refuse removal, water, electricity, health and educational facilities and telecommunication options.

Name of Community	Type of Community	Nearest Proposed Site	Direction and Distance from Site
Pelaneng	Semi formal, formal housing	Site 5	North west, 170m across the Steelpoort River
Ga-Mapodila	Semi formal, formal housing	Site 4 and Site 5	West, 1km across the Steelpoort River, extending to almost 4km downstream. Has the only direct access road that crosses the Steelpoort River, linking to the R555.
Steelpoort (northern)	Formal residential	Site 1	North, 400m from Site 1.
Steelpoort Town (central)	Formal and business	Site 1 and Site 2	West, 200m from Site 1 and 430m north-west from Site 2, across the R555 (north).
Steelpoort (southern)	Formal residential, and business	Site 2	North-west 200m from Site 2, across the R555 (south).
Business District	Light industrial	Site 1 and Site 2	West 200m from Site 1, and north-west 200m from Site 2, along the R555.

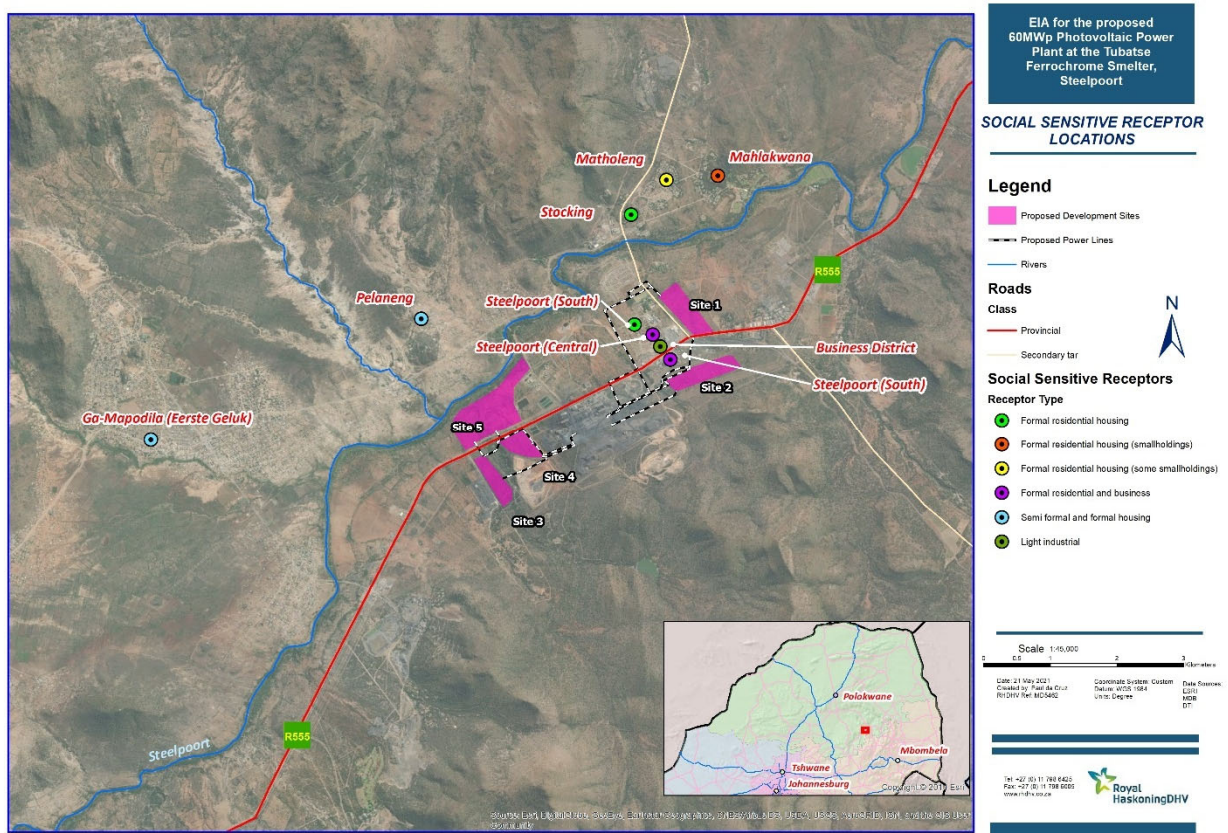


Figure 5-28: Sensitive receptors location in relation to the potential sites

5.2.2 Land Use

Land use within the larger region is rural, characterised by commercial agriculture and extensive livestock farming. Numerous small villages are sprawled across the landscape, notably along the Steelpoort River and major roads, characterised by deteriorated and transformed areas in the immediate surrounds. Mining and associated beneficiation industries account for major industrial type of land uses of the immediate region, which is particularly prevalent in the Steelpoort area. The Steelpoort town comprises mainly mining (inclusive of mineral processing and beneficiation plants) and other industrial land use types as well as medium density housing (peri-urban) and a small retail/ commercial component.

Aerial imagery of the immediate region (<2 km, Figure 5-29) reflects the severity of habitat transformation and deterioration that are typically associated with intensive industrial and mining land use activities around Steelpoort (south and south-west), as well as loss of habitat and associated impacts that are evident from rural villages and intensive utilisation of natural resources for subsistence purposes (north-west and west). Impacts associated with subsistence agriculture and persistent and high grazing pressure to the north of the site is evident from the absence of a woody component of the area and a poorly developed and degenerated herbaceous layer is often present.

The proposed sites comprise mostly natural (woodland) habitat, but because of proximity to the Steelpoort town area, exhibit a moderate level of habitat deterioration that stems from typical and surrounding land use activities, including severe and persistent grazing pressure as well as the effects from surrounding industrial land uses, such mining and industrial activities, mining infrastructure (ponds, artificial impoundments, spoils heaps, etc.), roads and railway lines, informal and illegal sand mining activities and residential areas and rural townships.

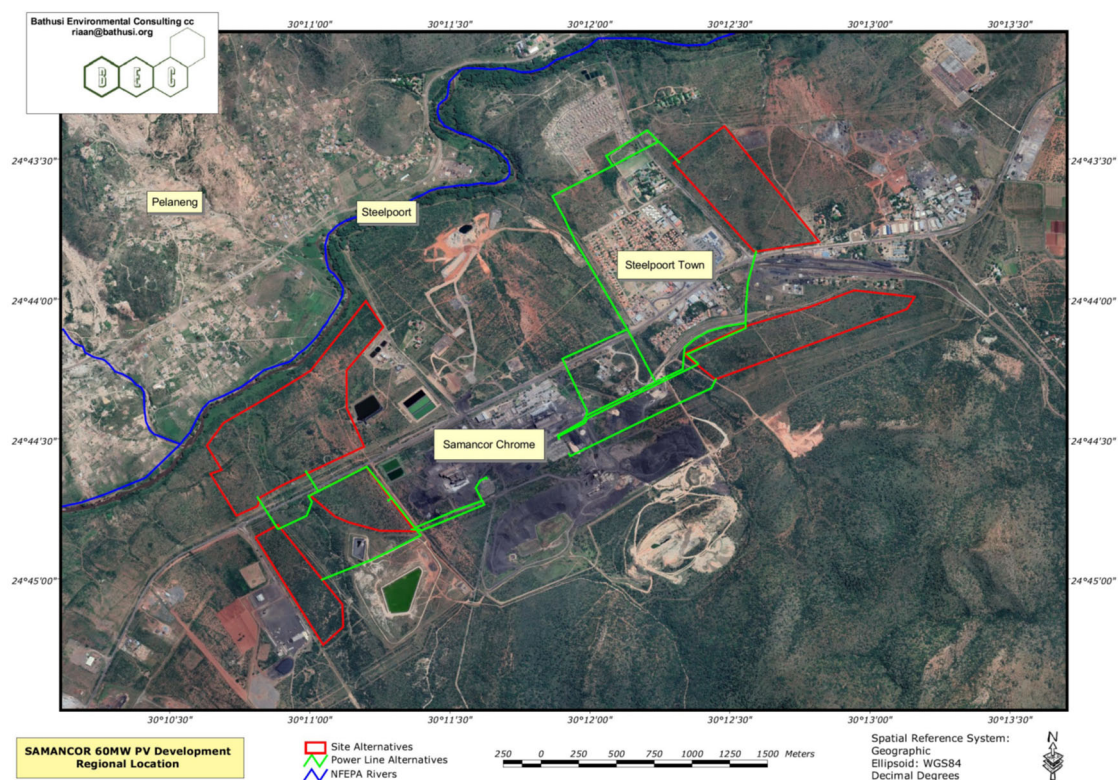


Figure 5-29: Aerial imagery of the site and immediate surrounds

5.2.3 Cultural Heritage and Palaeontology

Heritage resources are unique and non-renewable and as such, any impact on such resources must be seen as significant. The Heritage Impact Assessment (HIA) has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries.

Site significance classification standards used is based on the heritage classification of Section 3 in the National Heritage Resources Act and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this assessment (Table 5-14).

Table 5-14: Rating system for archaeological and built environment resources

Grading	Description of Resource	Heritage Significance
Archaeological Resources		
I	Heritage resources with qualities so exceptional that they are of special national significance. Current example: Mapungubwe Cultural Landscape	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current example: Schoemansdal, Louis Trichardt, Soutpansberg District	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.	
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Koni ruins, Lydenburg	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Medium Significance
IIIC	Such a resource is of contributing significance.	Low Significance
Not Conservation Worthy (NCW)	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No research potential or other cultural significance
Built Environment Resources		
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: Moorddrift Monument, Potgietersrus	Exceptionally High Significance
III	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.	
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Medium Significance

Grading	Description of Resource	Heritage Significance
	These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement, or community.	
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No research potential or other cultural significance

During the field work several heritage features and resources were identified and logged. A total of fifty-seven (57) points of interest were logged that resulted in the delineation and identification of twenty-four (24) separate heritage sites. These consist of five (5) burial grounds (Site 1-1, 1-7, 2-1, 2-2 and 2-3 this is indicated as a stone feature that could possibly be a grave) with a High heritage significance and a heritage grading of IIIA. The nine (9) historic recent structures. These are 1-2, 1-3, 1-4, 1-5, 1-6, 2-4, 2-5, 5-5 and 5-7, vary in significance from medium to low and a grading of IIIB. The archaeological finds consisting of nine (9) archaeological sites (Site 3-1, 3-2, Site 4-1, 4-2, and Sites 5-1, 5-2, 5-3, 5-4 and 5-6) has in most cases a rating of Medium significance and a grading varying between IIIC and IIIA at the highest. Site 5-8 represents a possible memorial now in disuse it was rated as having a Low heritage significance but with a possible local significance⁴².

The following sections (Table 5-15 - Table 5-19) provides a breakdown of the different heritage resources identified and provides a heritage significance grading for each site.

⁴² The site numbering convention is done by grouping the sites per alternative development areas. Site 1 in development area 1 is thus numbered: Site 1-1

Table 5-15: Sites identified during the heritage survey for Site 1

Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 1-1	24°43'30.81"S 30°12'22.39"E	<p>Large cemetery situated within site 1 of the study area. The cemetery contains more than 120 graves of which the oldest is dated to the 1940.</p> <p>The graves are a combination of packed stone, granite, and brick packed graves.</p>	High	IIA
Site 1-2	24°43'40.40"S 30°12'27.94"E 24°43'49.07"S 30°12'34.52"E 24°43'48.96"S 30°12'38.44"E	<p>Packed stone feature. Site 1-2 forms part of a large series of low packed stone features that resemble stone walling. These features are however degraded, and half buried making any substantial interpretation difficult.</p>	Medium	IIIB



Figure 5-30: Site 1-1 a large cemetery containing 120 graves



Figure 5-31: Packed stone feature



Project related

Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 1-3	24°43'46.97"S 30°12'46.82"E	Cement water trough located on the eastern edge of the study area at Site 1. Probably part of a past farmstead.	Low	NCW
Site1-4	24°43'42.35"S 30°12'37.73"E	Series of broken-down structures and foundations. These structures were built using brick, cement and packed stone elements. Site 1-4 seems historical in age.	Low	IIC





Figure 5-32: Cement water trough at Site 1-3



Figure 5-33: A series of broken-down structures and foundations



Project related

Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 1-5	24°43'36.91"S 30°12'38.41"E	Site 1-5 marks a packed stone feature of possible foundation.  <p><i>Figure 5-34: Packed stone feature or foundation at Site 1-5</i></p>	Low	IIC
Site 1-6	24°43'27.28"S 30°12'29.81"E	Broken down foundation hidden among tall grass cover.  <p><i>Figure 5-35: Broken down foundation hidden among tall grass at Site 1-6</i></p>	Low	IIC



Project related



Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 1-7	24°43'37.01"S 30°11'52.61"E	<p>Site 1-7 marks a small cemetery located directly underneath the proposed powerline alignment. The cemetery contains about 20 graves of various styles including granite and packed stone graves. Some graves are enclosed by metal bars. The oldest date located was 1966. The cemetery is divided into two separate sections on either side of a small stream.</p>  <p>Figure 5-36: Small cemetery at Site 1-7</p>	High	IIIA

Table 5-16: Sites identified during the heritage survey for Site 2

Site Number	Latitude	Description	Heritage Significance	Heritage Rating
Site 2-1	24°44'16.08"S 30°12'20.28"E	<p>Cemetery situated along proposed route of the powerline west of Site 2. This cemetery contains about 18 graves of various styles including packed stone and granite graves. The oldest marked grave dates to 1952.</p>  <p>Figure 5-37: Cemetery at Site 2-1</p>	High	IIIA



Project related

Site Number	Latitude	Description	Heritage Significance	Heritage Rating
Site 2-2	24°44'18.22"S 30°12'26.44"E	Possible graves at Site 2-2. These packed stone features are hidden and overgrown.  <p><i>Figure 5-38: Possible graves</i></p>	High	IIIA
Site 2-3	24°44'8.82"S 30°12'29.99"E	Site 2-3 marks a packed stone feature that could possibly be an historical grave location.  <p><i>Figure 5-39: Packed Stone feature at Site 2-3</i></p>	Medium	IIIA



Project related

Site Number	Latitude	Description	Heritage Significance	Heritage Rating
Site 2-4	24°44'18.81"S 30°12'25.76"E	Site 2-4 marks an area with multiple packed stone features. These features are degraded making any identification difficult.  <p><i>Figure 5-40: Packed stone feature</i></p>	Low	IIC
Site 2-5	24°44'3.70"S 30°13'1.78"E	Site 2-5 marks two large cement features. The first is a rectangular brick and cement structure with multiple small reservoirs built into the centre. The second is a large cement water reservoir that is still half filled with water. These structures are not being used anymore but probably relates to the mining activity within the area.  <p><i>Figure 5-41: Cement structure at Site 2-5</i></p>	Low	NCW

Table 5-17: Sites identified during the heritage survey of Site 3


Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 3-1 and 3-2	24,7438924S 30,18716E 24,74595S 30,18650E	<p>The area is characterised by several low stone wall foundations, grain bin platforms and a general background scatter of ceramics. The ceramics herringbone decoration is indicative of the material identified on Site 4 and 5. Although a small sample the motives can be associated with the Doornkop faeces of the Iron Age.</p>  <p>Figure 5-42: Herringbone decoration</p>	Medium	IIIB

Table 5-18: Sites identified during the heritage survey of Site 4


Site number	Latitude	Description	Heritage Significance	Heritage Rating
Site 4-1 and 4-2	24,75067S 30,18457E 24,75069S 30,18317E 24,74860S 30,18148E	<p>The site covers an area of approximately 300-400m on the eastern section of Site 4. The archaeological remains are characterised by low stone walling, numerous grain bin platforms. A few huts out lines could be discerned in the thick undergrowth.</p> <p>A low-density ceramic scatter is present over the site with numerous decorative shards found. Most of these shards have a herringbone motive in single and double bands.</p>  <p>Figure 5-43: Well defined grain bin platforms</p>	Medium to High	IIIA

Table 5-19: Sites identified during the heritage survey of Site 5

Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 5-1	<p>24°44'34.11"S 30°10'40.10"E</p> <p>24°44'32.51"S 30°10'39.99"E</p>	<p>This cluster is located on the north-west corner of the study area of Site 5. The area sits near a natural drainage line and can be described as a rocky area due to the consistent erosion taking place around this area. A widespread moderate density scatter of Middle Stone Age lithic material was identified within this area.</p>	Low	IIIC
Site 5-2	<p>24°44'42.14"S 30°10'49.10"E</p> <p>24°44'42.85"S 30°10'50.11"E</p> <p>24°44'42.11"S 30°10'42.88"E</p> <p>24°44'43.22"S 30°10'44.71"E</p>	<p>The site is situated towards the south-west corner of the study area at Site 5. This area is dominated by multiple series of low packed stone features including what seems to be remnants of stone walling, circular features, and possible grain bin stands. The area is overgrown and makes identifying the full extent of these features difficult. Remnants of low packed stone features among the tall grass as well as an open area devoid of stone features indicative of a cattle byre.</p>	Medium	IIIB






Figure 5-44: Lithic assemblage



Figure 5-45: Packed stone feature among aloes



Project related

Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
		 <p data-bbox="168 676 683 703"><i>Figure 5-46: Site 5-2 - Low packed stone feature</i></p>		
Site 5-3	24°44'38.61"S 30°10'42.15"E	<p data-bbox="488 810 976 1082">Situated near the southern edge of the study area close to the main road running towards Burgersfort. Site 5-3 is characterised as a similar pattern to the other clustered areas where a combination of low packed stone features together with a concentration in aloes indicate the presence of archaeological material. marks an area with multiple packed stone features. These features resemble grain bin stands.</p>  <p data-bbox="976 1142 1599 1169"><i>Figure 5-48: Packed stone feature, possible grain bin stand</i></p>	Medium	IIIB
		 <p data-bbox="976 667 1500 694"><i>Figure 5-47: Upper grindstone located at Site 5-2</i></p>		





Project related

Site Number	Coordinates	Description	Heritage Significance	Heritage Rating
Site 5-4	24°44'21.79"S 30°10'57.93"E	 <p data-bbox="996 710 1489 742"><i>Figure 5-49: General site around drainage line</i></p>	Medium	IIIB
	24°44'21.04"S 30°11'0.09"E			
	24°44'20.22"S 30°10'58.99"E			
	24°44'18.62"S 30°10'59.63"E			
	24°44'16.99"S 30°11'3.37"E			
	24°44'22.47"S 30°10'57.00"E			
		<p data-bbox="488 718 974 885">This cluster of sites are all located within the large drainage line that runs downstream towards the Steelpoort River. This area is dominated by a moderate scatter of MSA Lithic artefacts. The highest density scatter was with 10-15 lithic artefacts per m².</p>  <p data-bbox="974 1284 1518 1308"><i>Figure 5-50: Sample Lithic assemblage for Site 5-4</i></p>		





Project related

Site Number	Coordinates	Description		Heritage Significance	Heritage Rating
Site 5-5	24°44'21.77"S 30°11'7.16"E	Recent historic stone-built weir and drainage line is in an overgrown gully area.	 <p data-bbox="978 746 1341 775"><i>Figure 5-51: Watergate at Site 5-5</i></p>	Low	NCW
Site 5-6	24°44'26.03"S 30°11'6.95"E	The position in Site 5-6 indicates a small number of ceramic sherds that were located next to the small gravel road. Some of the ceramics have indicative decoration associated with the Doornkop faeces of the Iron Age.	 <p data-bbox="978 1291 1480 1319"><i>Figure 5-52: Ceramic sherds located at Site 5-6</i></p>	Medium	IIIB



Project related

Site Number	Coordinates	Description		Heritage Significance	Heritage Rating
Site 5-7	24°44'31.96"S 30°11'5.76"E	<p>Site 5-7 marks a dumping area that seems to contain historical material. The material found was extremely fragmented therefore an estimated age could not be obtained.</p>	 <p><i>Figure 5-53: Waste dump</i></p>	Low	IIIC
Site 5-8	24,74151S 30,18555E	<p>The Site 5-8 seems to be a former local monument or grave that was exhumed. The memorial plinth and headstone are still present, but a large hole is left where the possible burial was done. Research on SAHRIS could not show any permits or registration of a memorial in the vicinity of this site.</p>	 <p><i>Figure 5-54: View of remains of the grave dressing</i></p>	Low	IIIC

According to the PalaeoMap of the South African Heritage Resource Information System (SAHRIS), the palaeontological sensitivity of the proposed area of the project footprint occurs (Figure 5-55) there is a low chance of finding fossils in this area.

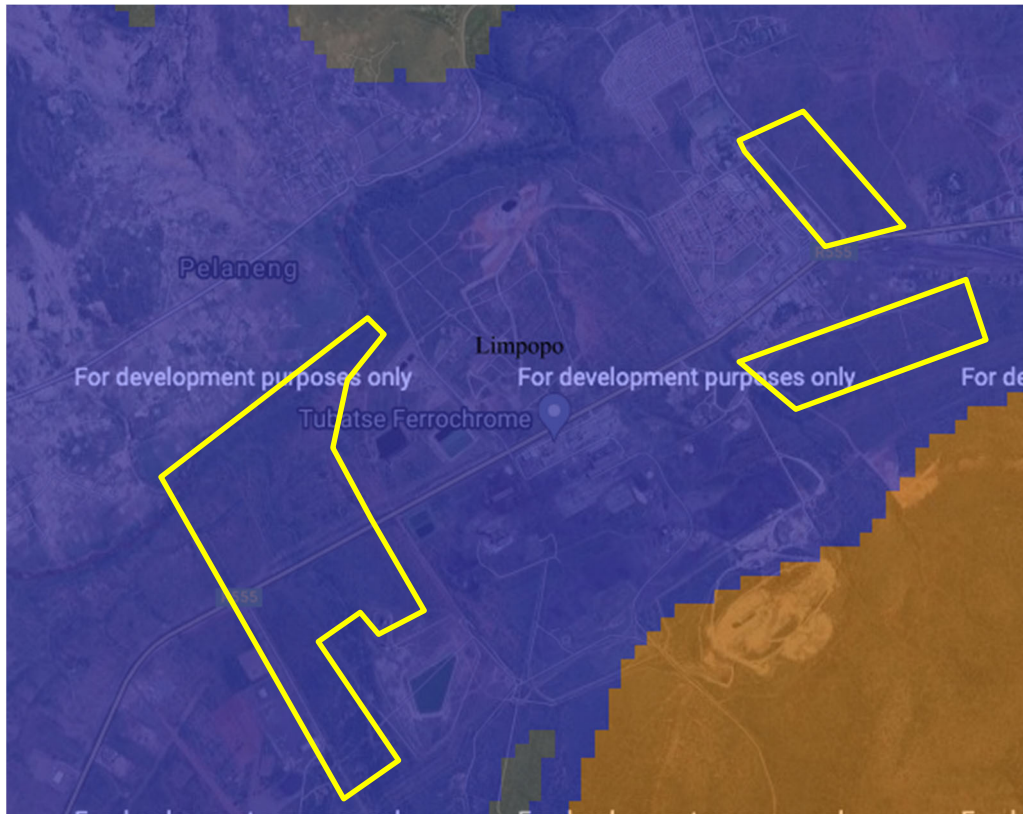


Figure 5-55: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) Approximate location of the proposed development is indicated in yellow

5.2.4 Visual Landscape

The portion of the Steelport Valley in which the proposed development is located has a strong industrial component to the visual environment but is also characterised by rural settlement and natural visual landscape influences. The proposed solar development would thus occur in a context of the strong industrial visual influences of the TFC Smelter, especially if developed on sites located in close proximity to the smelter.

There are however a number of visual receptor locations in close proximity to certain of the development sites, in particular Site 1. The development of a solar plant on the sites would result in a degree of overall landscape change and could potentially be perceived as a visual impact by receptors that are located close to certain of the development sites. The strong industrial influences are however likely to strongly ameliorate perceptions of visual impact by receptors in the project location, with potential mitigating factors (such as retention of natural vegetation buffers for vegetative screening) being a further ameliorating factor.

6 PUBLIC PARTICIPATION

The Public Participation Process (PPP) is a process that is designed to enable all interested and affected parties (I&APs) to voice their opinion and/ or concerns which enables the EAP to evaluate all aspects of the proposed development, with the objective of improving the project by maximising its benefits while minimising its adverse effects.

The primary aims of the PPP are:

- to inform I&APs and key stakeholders of the proposed application and environmental studies;
- to initiate meaningful and timeous participation of I&APs;
- to identify issues and concerns of key stakeholders and I&APs with regards to the application for the development (i.e. focus on important issues);
- to promote transparency and an understanding of the project and its potential environmental (social and biophysical) impacts (both positive and negative);
- to provide information used for decision-making;
- to provide a structure for liaison and communication with I&APs and key stakeholders;
- to ensure inclusivity (the needs, interests and values of I&APs must be considered in the decision-making process);
- to focus on issues relevant to the project, and issues considered important by I&APs and key stakeholders; and
- to provide responses to I&AP queries.

The PPP must adhere to the requirements of Regulations 41 and 42 (GNR 326) as amended in 2017. Further, a Public Participation guideline in terms of NEMA was issued by the DFFE in 2017, of which provisions will also be implemented.

The PPP for proposed project will be undertaken according to the steps outlined in Figure 6-1 below.

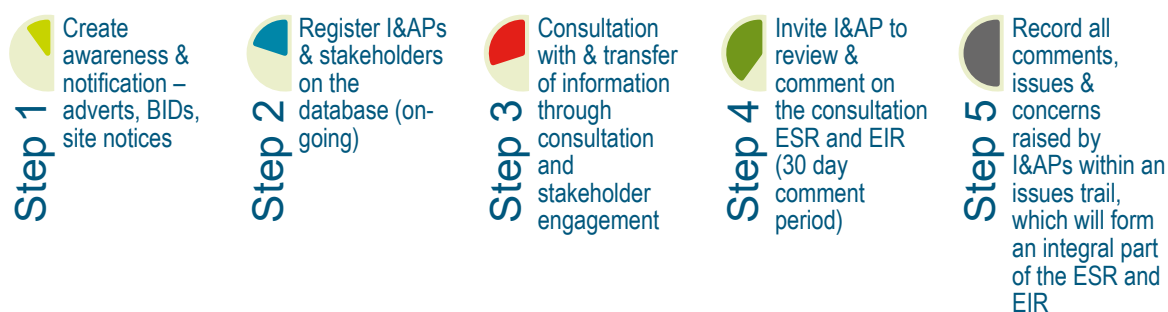


Figure 6-1: Steps in the public participation process

In order to achieve a higher level of engagement, a number of key activities have taken place and will continue to take place. These included the following:

- The identification of stakeholders is a key deliverable at the outset, and it is noted that there are different categories of stakeholders that must be engaged, from the different levels and categories of government, to relevant structures in the non-governmental organisation (NGO) sector, to the

communities of wards of residential dwellings as well as Traditional Authorities which surround the study area;

- The development of a living and dynamic database that captures details of stakeholders from all sectors;
- The fielding of queries from I&APs and others, and providing appropriate information;
- The convening of specific stakeholder groupings/ forums as the need arises; and
- The preparation of reports based on information gathered throughout the EIA study via the PPP and feeding that into the relevant decision-makers;

The proposed project PPP has entailed the following activities.

6.1 Authority Consultation

The Competent Authority, the DFFE, is required to provide an Environmental Authorisation (whether positive or negative) for the project. The DFFE was consulted from the outset of this study and has been engaged throughout the project process. The Limpopo Department of Economic Development, Environment and Tourism (LDEDET) will be the commenting authority.

Authority consultation included the following activities:

- Pre-application meeting held on 11 June 2021 and approval of PP plan; and
- Submission of an application for environmental authorisation in terms of Section 26 of the EIA Regulations 2014 (as amended in 2021).

6.2 Consultation with Other Relevant Stakeholders

Consultation with other relevant key stakeholders will be undertaken through telephone calls and written correspondence in order to actively engage these stakeholders from the outset and to provide background information about the project during the Scoping and EIA process.

All relevant stakeholders will be allowed an opportunity to comment on the draft consultation ESR.

6.3 Site Notification

The EIA Regulations 2014 (as amended in 2021) require that a site notice be fixed at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates and at points of access or high through traffic. The purpose of this is to draw people's attention to the project and make them aware that they are able to play a role in the project.

Royal HaskoningDHV erected a number of notices at various noticeable locations (i.e. Tubatse Chrome Golf Club, Steelpoort Primary School, Post Office and the proposed Site 3) in the study area on 05 May 2021. (*Appendix E*).

6.4 Identification of Interested and Affected Parties

I&APs were identified utilising an existing database developed as a result of previous environmental studies undertaken in the study area and this database is being updated on an on-going basis. E-mails were sent to key stakeholders and other known I&APs on 02 June 2021, informing them of the studies for the project and indicating how they could become involved in the project.

The contact details of all identified I&APs are updated on the project database, which is included in *Appendix E*.

6.5 Briefing Paper

A Background Information Document (BID) for the proposed project was compiled in English (**Appendix E**) and distributed to key stakeholders and prospective I&APs.

The aim of this document is to provide a brief outline of the application and the nature of the development. It is also aimed at providing preliminary details regarding the environmental study, and explains how I&APs could become involved in the project.

The BID was distributed to all identified I&APs and stakeholders, together with a registration/ comment sheet inviting I&APs to submit details of any issues, concerns or inputs they might have with regards to the project.

6.6 Public Meeting

A public meeting and two Focus Group Meetings will only be conducted in the EIA study, the venue will be chosen taking into consideration the Covid-19 Regulations as stipulated in the Disaster Management Act, 2002.

6.7 Advertising

In compliance with the EIA Regulations 2014 (as amended in 2021), notification of the commencement of the study and review of the draft consultation ESR for the project was advertised in a local newspaper as follows:

- *Steelburger* on 25 June 2021 (**Appendix E**).

The primary aim of this advertisement was to ensure that the widest group of I&APs possible was informed and invited to provide input and questions and comments on the project.

6.8 Comments and Responses Report

A Comments and Response Report (CRR) will be compiled with any comments and issues received and responded to which will form part of the submission of the final consultation ESR.

6.8.1 Key Issues Raised by the Public

The key issues raised by the public will be summarised in the final ESR.

6.9 Public Review of the draft Consultation ESS

The draft consultation ESR is being made available for authority and public review for a total of 30 days from 25 June – 26 July 2021.

The report will be made available at the following public locations within the study area, which are all readily accessible to I&APs:

- Fetakgomo Tubatse Municipality Public Library and Municipal Offices;
- The TFC Smelter offices; and
- Electronically on the Royal HaskoningDHV Website: <https://www.royalhaskoningdhv.com/en/south-africa/projects/environmental-reports>.

6.10 Final Consultation ESR

The final stage in the ESR entails the capturing of responses and comments from I&APs in order to refine the ESR and ensure that all issues of significance are addressed. An electronic copy of the final ESR will be sent to all registered I&APs.

7 POTENTIAL IMPACTS

This section addresses environmental impacts and is an important step in managing and improving environmental and social performance associated with the project as well as informing the Plan of Study for EIA. The construction and operational phases of the project are considered in the subsequent sections and mitigation measures have been proposed (albeit at a high level) to enable the project to meet the local regulatory requirements. Decommissioning has not been considered as the PV plant is expected to be in operation for the next 20 years.

The risk/ aspect and impact identification are consistent with the internationally accepted mitigation hierarchy (Figure 7-1) to avoid or prevent impacts, or where avoidance is not possible, minimise and finally to rehabilitate or offset/ compensate.

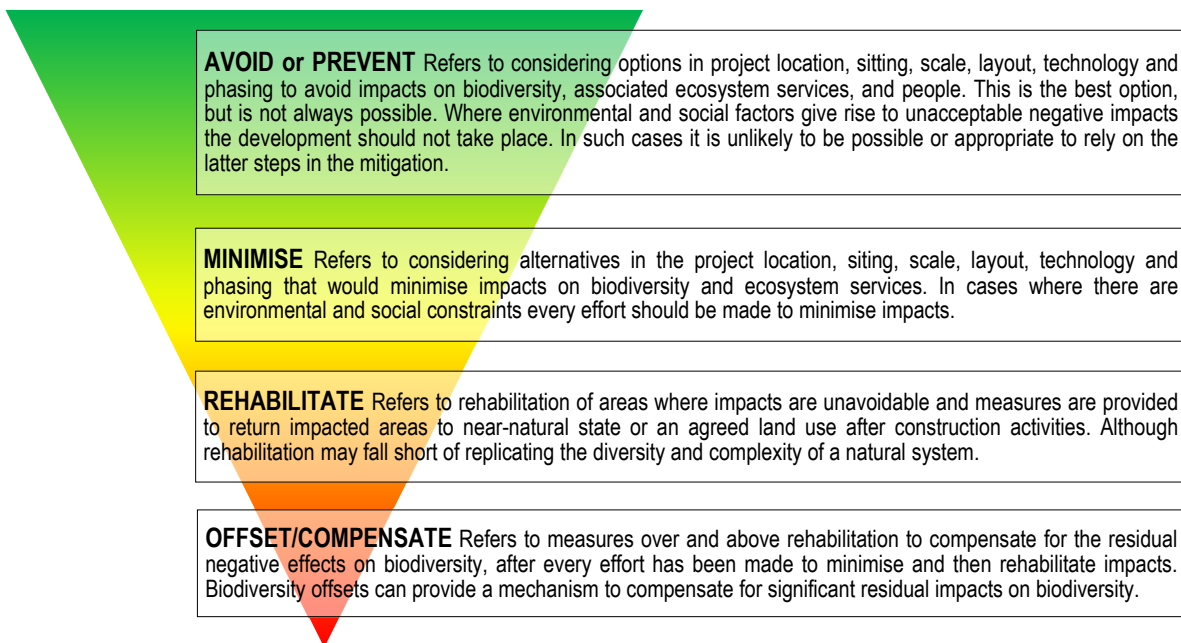


Figure 7-1: Mitigation hierarchy

7.1 Pre-construction and Construction Phase Risks/ Aspects and Impacts

Table 7-1: Pre-construction and construction phase risks/ aspects, impacts, mitigation and recommendations

Risk/ Aspect	Impact	Mitigation and / or Recommendation
Site preparation activities	<ul style="list-style-type: none"> Soil degradation through erosion and topsoil loss - erosion 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 like panels and roads. Loss of topsoil can result from poor topsoil management during construction-related excavations. Disturbing the vadose zone during soil excavations/ clearing activities. 	<ul style="list-style-type: none"> Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. Implement an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.
Inadequate stormwater management	<ul style="list-style-type: none"> Surface water contamination (due to spillage of fuel, chemicals, dumping of construction material into or close to watercourses) and sedimentation. Erosion of watercourses. Alteration of drainage lines which may lead to ponding or increased run-off patterns. 	<ul style="list-style-type: none"> Management of stormwater on the site during and after construction must be undertaken in accordance with a SWMP. Run-off generated from cleared and disturbed areas/ slopes that drains into watercourses must be controlled using erosion control and sediment trapping measures like silt fences and sandbags.
Vegetation clearing for site development	<ul style="list-style-type: none"> Direct impacts on loss of conservation important and protected plant species (individuals, stands, populations) as well as habitat that is associated with these plant species. Direct losses and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ restricted habitat types. Direct impacts on local diversity patterns and local loss of floristic diversity. 	<ul style="list-style-type: none"> A detailed walk-through must be conducted prior to site clearance to ascertain the number, abundance and physical conditions of all protected tree species as well as protected plant species and the relevant permits/ licences must in place for the removal, relocation or for destroying these species. Areas proposed for vegetation clearance must be clearly marked and no heavy vehicles should travel beyond the marked area.

Project related

Risk/ Aspect	Impact	Mitigation and / or Recommendation
	<ul style="list-style-type: none"> ▪ Deterioration and changes to untransformed habitat in the surrounds, with specific reference to sensitive habitat types and habitat types of limited representation on a local scale. ▪ Disruption of important ecological processes, services and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat. ▪ Introduction of exotic and invasive species to the area. ▪ Exacerbated decline in the aesthetic appeal of the landscape. ▪ Exacerbation of existing levels of habitat fragmentation and isolation, considering past, present and reasonably foreseeable future anthropogenic disruptive activities in the immediate region. 	<ul style="list-style-type: none"> ▪ The retention of a vegetated buffer zone between the edge of the proposed infrastructure footprint and the outer boundary of the facility to offer screening as well as a buffer against the dust that is generated through the smelter operations. ▪ An Alien and Invasive Management Programme must be developed and implemented. ▪ A Biodiversity Offset Strategy/ Plan is most likely required and must be compiled in line with applicable guidelines and policies.
Faunal habitat destruction	<ul style="list-style-type: none"> ▪ Direct and permanent loss of natural fauna habitat within the development footprints during the construction phase. ▪ Direct loss of fossorial fauna taxa, taxa of low mobility and/ or habitat specialists (e.g. flightless invertebrates). ▪ Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction. ▪ Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc. ▪ Indirect ecological impacts during construction pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated with negative impacts on population viability. ▪ Increased poaching of wildlife due to increased human encroachment and accessibility to the site. 	<ul style="list-style-type: none"> ▪ Prior to site clearance, conduct targeted searches for faunal SCC with high probability of occurring within the project footprint to allow relocation to take place where necessary, and avoid mortalities of these species. ▪ Prior to construction, an Avifaunal specialist must conduct a site walk-through, covering the final access and powerline routes as to identify any nests/ breeding/ roosting activity of sensitive species, as well as any additional sensitive habitats. If sensitive species are found, the sites may need to be buffered or time construction activities to avoid nesting (generally winter for raptors that are priority species). ▪ No threatened or protected faunal species as listed according to LEMA may be removed and/ or relocated without appropriate authorisations/ permits. ▪ No wild animal may under any circumstance be hunted, snared, captured, injured, killed, harmed in any way. ▪ A construction phase bird monitoring programme must be implemented.

Risk/ Aspect	Impact	Mitigation and / or Recommendation
<p>Working in or in close proximity to watercourses e.g. Steelpoort River and unnamed non-perennial watercourses</p>	<ul style="list-style-type: none"> ▪ Impacts associated with the construction activities include potential encroachment of the proposed development into watercourses, their associated zones of regulation along with edge effects and potentially affecting watercourses. ▪ With site clearing for the PV panels/ modules there is a risk of reduced surface roughness, which will increase the risk of erosion and sedimentation of the non-perennial watercourses and the Steelpoort River. ▪ Alterations to stormwater run-off within the area, altering the hydrological processes of the systems and increased sedimentation. ▪ The potential loss of biodiversity as a result of construction-related activities within the watercourses. Decrease in the provision of watercourse ecoservices due to the potential degradation of the watercourses. ▪ Damage and/ or removal of vegetation as part of an edge effect leading to a loss in freshwater ecological habitat. 	<ul style="list-style-type: none"> ▪ The project footprint, in terms of watercourse crossings, must be limited as much as possible (this includes clearing of vegetation which must be restricted to what is essential). All contractor laydown and storage areas must remain outside of the 32m NEMA ZOR, and only essential personnel must be permitted within this zone. ▪ Adequate stormwater management must be incorporated into the design of the PV plant in order to prevent erosion, bank incision and streambed scouring and the associated sedimentation of the watercourses. ▪ Construct temporary silt traps at drainage points to allow sediment settlement from run-off. ▪ Edge effects (impacts on areas beyond the construction footprint due to ineffective care and management) during construction need to be strictly controlled through ensuring good housekeeping and strict management of activities near the riparian areas. ▪ Existing roads should be used as far as practical to gain access to the sites and crossing the watercourses in areas where no existing crossing is apparent, should be avoided, but if it is essential, crossings should be made at right angles. ▪ All disturbances caused by the construction activities must ensure that all alien vegetation is eradicated and that ongoing alien vegetation control is implemented.
<p>Loss of heritage and palaeontological resources</p>	<ul style="list-style-type: none"> ▪ Impact on burial ground and graves. ▪ Impact on archaeological sites. ▪ Impact on palaeontological resources. 	<ul style="list-style-type: none"> ▪ Burial grounds have a high heritage rating and a heritage grading of IIIA. A buffer of at least 30m, must be demarcated around the burial grounds and graves and marked as a No-Go area. These burial grounds and graves must be marked as a matter of urgency. ▪ The identified archaeological sites have a low to high heritage significance. Sites 2, 3 and 5 will have the least impact on identified archaeological sites, although mitigation work will be required for Sites 3 and 5. The

Risk/ Aspect	Impact	Mitigation and / or Recommendation
		<p>archaeological site identified on Site 4 will require extensive mitigation work to mitigate the impact before any development. If any of the identified archaeological sites are to be disturbed, a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under Section 35 of the National Heritage Resources Act will be required to conduct such work. On completion of the mitigation work the Developer can apply for a destruction permit with the backing of the mitigation report.</p> <ul style="list-style-type: none"> ▪ If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations, a Chance Find Protocol must be implemented by the responsible person in charge of the development.
<p>Storage of fuels and chemicals, construction camp establishment, poor maintenance of equipment and vehicles</p>	<ul style="list-style-type: none"> ▪ Hydrocarbon spillages from construction activities can contaminate soil and water resources. 	<ul style="list-style-type: none"> ▪ Provision of secondary containment (e.g. bunds), drip trays or other overflow containment measures for hazardous material storage containers. ▪ Equipment (e.g. spill kits) for dealing with spills of fuels/ chemicals must be available at the site in suitable quantities. Spills must be cleaned up immediately and contaminated soil / material disposed of appropriately at a registered / licensed site. ▪ An Emergency Preparedness and Response Plan (EPRP) must be developed prior to construction commencement and must be implemented as soon as an incident occurs. ▪ Immediate reporting and rectification of any incident that might lead to pollution.
<p>General construction activities</p>	<ul style="list-style-type: none"> ▪ Increase in noise pollution from site preparation, earthworks, construction vehicles and construction staff. 	<ul style="list-style-type: none"> ▪ Noisy operations must be scheduled appropriately and conducted after notifying sensitive receptors. ▪ All mobile plant and equipment must be regularly maintained to ensure their integrity and reliability.

Project related

Risk/ Aspect	Impact	Mitigation and / or Recommendation
	<ul style="list-style-type: none"> ▪ Ambient pollutant concentrations and nuisance dustfall rates may increase during the construction period. The impact is likely to be localised near construction activities. ▪ Generation of waste (general and hazardous) and rubble during the construction phase. Builders' rubble, packaging and other waste generated in the construction process can contaminate surface water resources. ▪ Generation and disposal of sewage waste from temporary construction toilets. 	<ul style="list-style-type: none"> ▪ Noise levels must be kept within prescribed limits. All noise and sounds generated must adhere to SANS 10103 specifications for maximum allowable noise levels. ▪ Construction staff working in an area where the 8-hour ambient noise levels exceed 85 dBA must have the appropriate Personal Protective Equipment - PPE (earmuffs). ▪ Appropriate mitigation to be included in the EMPr including but not limited to dust suppression through water spraying, coverings on trucks and appropriate traffic management of construction vehicles. ▪ Suitable handling and disposal of waste protocols to be included in the EMPr. Waste management hierarchy (reduce, re-use, recycle) to be followed. ▪ Waste to be separated and stored in skips/ bins and moved off site to suitable, licensed facilities to receive the waste. Proof of disposal must be retained.
<p>Health and safety risks (accidents and injuries working with hazardous substances, chemical exposure, noise, influx of people etc.)</p>	<ul style="list-style-type: none"> ▪ Inconvenience and danger to proximate residents through increased road traffic, dust and noise. ▪ Contractors, the influx of people and potential job creation will result in the proliferation of social ills. ▪ Potential public safety risk - unauthorised entry of the general public into the construction site may result in potential accidental injury or death. ▪ Contractor's staff safety during construction. 	<ul style="list-style-type: none"> ▪ Members of the public adjacent to the construction site should be notified of construction activities in order to limit unnecessary disturbance or interference. ▪ Construction activities must be undertaken during daylight hours and of a defined duration over weekdays and/ or weekends. ▪ A Traffic Management Plan must be compiled for the construction phase. ▪ Ensure the appointment of a Health and Safety Officer to continuously monitor the safety conditions during construction. ▪ All construction staff must have the appropriate PPE. ▪ The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the consequences of incidents.

Risk/ Aspect	Impact	Mitigation and / or Recommendation
Potential loss of land or property	<ul style="list-style-type: none"> Loss of land due to powerline route. 	<ul style="list-style-type: none"> A formal grievance management system should be put in place (and should remain in place throughout the life of the PV plant). Should the routing affect private property, a deviation is recommended or the acquisition of the servitude.
Access to development sites	<ul style="list-style-type: none"> Restricted access (to people) over the development site (specific to burial sites). 	<ul style="list-style-type: none"> With intensive negotiation, understand the willingness of families of the buried to relocate their loved ones. The alternative location to be secured by Samancor Chrome and agreed on by families. Grave relocation costs to be borne by Samancor Chrome.
Employment expectations	<ul style="list-style-type: none"> Potential for temporary job creation. Job creation during the construction phase could result in the influx of people to the area, boosting the local economy. 	<ul style="list-style-type: none"> Job creation expectations will have to be well managed via management systems and communication mechanisms that regularly informs the local community (on-site and at local community centres) of the progress and job/ skills needs at the development site. A formal job application process must be communicated (should this be a requirement). It is expected that the Contractor will have a Human Resource Procedure/ Policy in place in order to respond to local labour legislation.

7.2 Operational Phase Risks/ Aspects and Impacts

Table 7-2: Operational phase risks/ aspects, impacts, mitigation and recommendations

Risk	Impact	Mitigation and / or Recommendation
Inadequate management of stormwater during operations	<ul style="list-style-type: none"> Sediment-laden stormwater run-off entering the Steelpoort River, leading to smothering of biota and potentially altering surface water quality is a potential impact that might occur during the operational phase of the PV plant. Water quality impacts due to chemical spills, vehicle pollutants, fuel and oil spillages and leaks. 	<ul style="list-style-type: none"> Management of stormwater on the site must be undertaken in accordance with the SWMP. Release structures for stormwater run-off from the site should dissipate energy and disperse flow to ensure minimal impact to the receiving environment. Vehicles and equipment must be regularly maintained and cleaned.

Risk	Impact	Mitigation and / or Recommendation
Storage of fuels and chemicals and integrity and operability of infrastructure and equipment (plant, powerlines, battery storage systems etc.)	<ul style="list-style-type: none"> ▪ Spillages from operations can contaminate soil and water resources. 	<ul style="list-style-type: none"> ▪ Inspection and maintenance procedures must be developed and documented to ensure integrity of the PV plant and associated infrastructure. ▪ BESS must have systems (containment, automatic alarms and shut-off systems) to monitor and protect cells from overcharging or damaging conditions. ▪ Immediate reporting and rectification of any incident that might lead to pollution. ▪ All necessary equipment for dealing with spills of fuels/chemicals must be available at the site in suitable quantities. Spills must be cleaned up immediately and contaminated soil/ material disposed of appropriately at a registered/ licensed site.
Abstraction of water for cleaning of panels	<ul style="list-style-type: none"> ▪ Abstraction of water either from the Steelpoort River or from boreholes could lead to the loss of recharge (loss of catchment yield) within the Steelpoort River. 	<ul style="list-style-type: none"> ▪ All abstraction points or boreholes must be registered with the DHSW&S and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis. ▪ The water demand from the project will be limited and the impact can be mitigated by adhering to the specific ecological water requirements for the Steelpoort River and the associated groundwater regime.
Proliferation of alien invasive species	<ul style="list-style-type: none"> ▪ Secondary encroachment of alien vegetation in disturbed areas during operation. 	<ul style="list-style-type: none"> ▪ Remove any alien plants that colonise disturbed areas. ▪ The Alien and Invasive Management Programme developed during the construction phase must be implemented.
Operation of PV plant and overhead powerlines impacting avifauna	<ul style="list-style-type: none"> ▪ Bird trauma or mortality that is caused by collisions with PV panels. ▪ Electrocutions. ▪ Collisions with overhead wires, leading to bird mortalities. 	<ul style="list-style-type: none"> ▪ Any new powerline/ s must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' monopole structures, with clearances between live components of 2m or greater and which provide a safe perch for bird. ▪ Install bird flight diverters or bird flappers on the earth wires of all new powerline sections, for the full span.

Project related

Risk	Impact	Mitigation and / or Recommendation
		<ul style="list-style-type: none"> ▪ An operational phase Bird Monitoring Programme must be implemented.
Visual exposure, glare and albedo	<ul style="list-style-type: none"> ▪ Visibility of the PV panels to the receptor locations ▪ Potential glare associated with the PV panels as well as reflectivity (albedo). ▪ Lighting at the PV plant could create a visual impact on the night-time environment. 	<ul style="list-style-type: none"> ▪ The retention of a vegetated buffer zone between the edge of the proposed infrastructure footprint and the outer boundary of the facility to offer screening. ▪ Lighting of the plant at night should be limited to security lighting (where this is necessary), and emergency operational lighting must only be lit when required. ▪ All lighting should be downward, and inward facing (towards the plant), to avoid light spill into surrounding areas.
Potential contribution of the project to climate change and the PV plants vulnerability to climate change	<ul style="list-style-type: none"> ▪ The PV plant performance may be affected by extreme weather events (e.g. increased temperatures, heavy rainfall and flooding, drought, wind) that may reduce the efficiency of the panels and could potentially result in an increase in maintenance costs. ▪ Potential contribution of the project will contribute to the national GHG emissions mitigation target, along with the added benefit of having lower embodied emissions as compared to fossil fuel-based electricity generation options. 	<ul style="list-style-type: none"> ▪ A Climate Change assessment is recommended, that will: <ul style="list-style-type: none"> - Provide an assessment of the extent to which the proposed project will contribute to climate change over its lifetime by quantifying its GHG emissions during the PV plant operations. - Determine the resilience of the project to climate change, taking into account how climate change will impact on its operation, through factors such as rising temperatures, diminishing water supply, and extreme weather patterns; and - Assess how these impacts may be avoided, mitigated, or remedied.

7.3 Potential Cumulative Impacts

7.3.1 Renewable Energy Projects within a 30km Radius

Figure 7-2 provides an indication of solar projects within a 30km radius of the study area as obtained from the Renewable Energy EIA Application Database for South Africa (2020).⁴³ There are no solar projects within a 30km radius, with the closest project situated to the south-east of the study area consisting of five hydropower stations to be established on the farms: Doornhoek 535LT, Tambotieboom 686 KS, De Hoop 886 KS, Loskop 81 JS and Blyderivierpoort 595 KS.

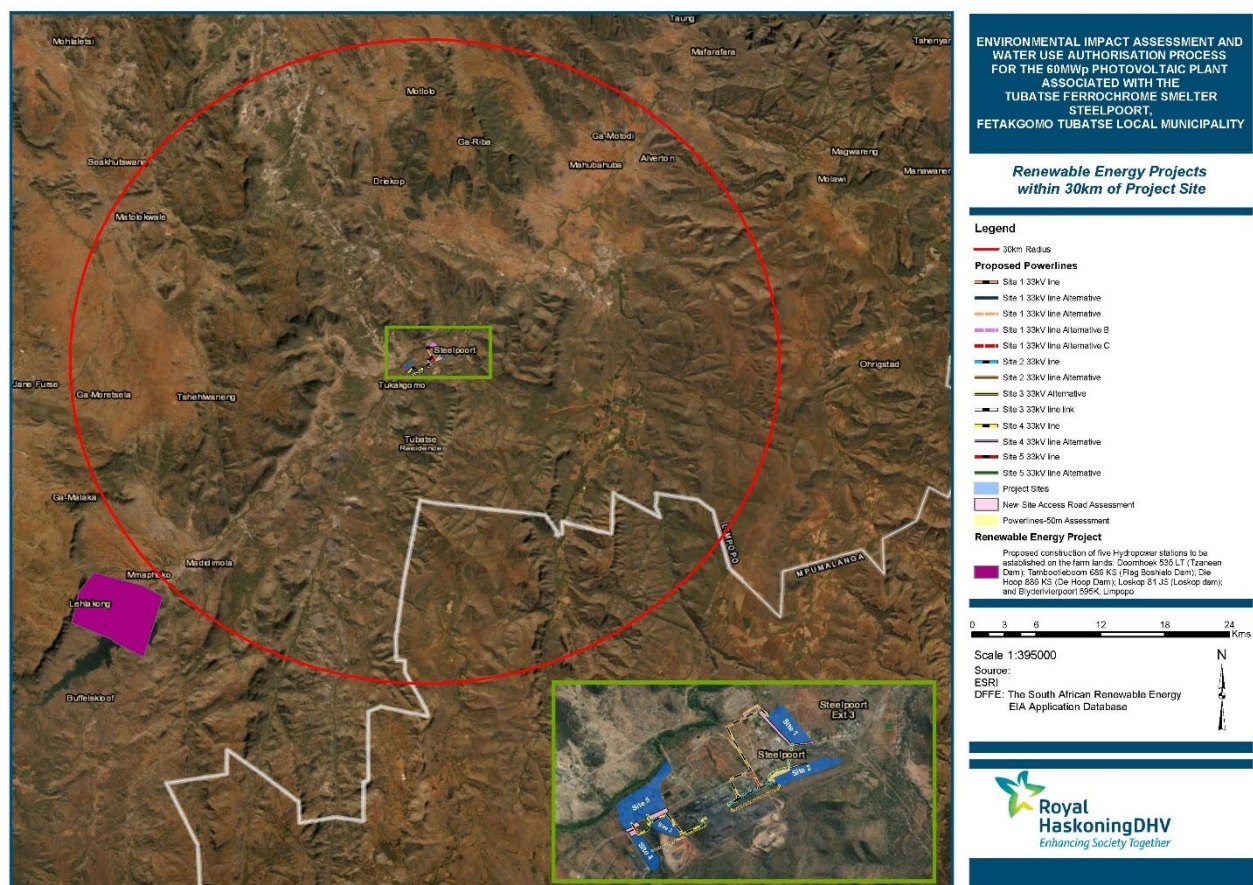


Figure 7-2: Renewable energy projects within 30km of the study area

7.3.2 Other Potential Cumulative Impacts

Anticipated cumulative impacts include:

- Impacts on local/ regional and national conservation targets and obligations (loss of natural woodland habitat). A Biodiversity Offset Strategy/ Plan is most likely required for this project, given the potentially large extent of permanent transformation of threatened vegetation type involved.
- Regional loss or degradation of agricultural land, with a consequent decrease in agricultural production.
- The proposed development will be located immediately adjacent to the TFC Smelter, so when viewed from the surrounds it will form part of a visual environment that is already transformed from a natural context.

⁴³ https://egis.environment.gov.za/renewable_energy

8 PLAN OF STUDY FOR EIA

Potential environmental risks, aspects and impacts (biophysical and social) associated with the proposed PV plant, have been identified in the ESS. No 'red flags' or highly significant impacts have been identified to date. All potentially significant and cumulative impacts will be further investigated and assessed within the EIA study. The EIA study will aim to adequately assess and address all potentially significant environmental issues in order to provide the DFFE with sufficient information to make an informed decision regarding the proposed project.

8.1 Objectives of the EIA Study

The objective of the EIA study is to, through a consultative process:

- a. determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- b. describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted ESR;
- c. identify the location of the development footprint within the approved site as contemplated in the accepted ESR based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- d. determine the –
 - i. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - ii. degree to which these impacts can be reversed; may cause irreplaceable loss of resources, and can be avoided, managed or mitigated;
- e. identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted ESR based on the lowest level of environmental sensitivity identified during the assessment;
- f. identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted ESR through the life of the activity;
- g. identify suitable measures to avoid, manage or mitigate identified impacts; and
- h. identify residual risks that need to be managed and monitored.

8.2 Description of Alternatives to be Considered in the EIA Study

A description of alternatives is provided in Chapter 4. The following alternatives will be assessed in the EIA study:

- Site alternatives – subsequent to the ESI, five (5) sites were selected for further assessment in the EIA study. It is proposed that the PV plant be developed over these 5 potential sites, therefore, these sites are not considered alternatives.
- Fixed and tracking system alternatives.
- Monofacial and bifacial solar panel alternatives.
- Grid infrastructure (overhead powerline) alternatives.
- BESS – either lead-acid or lithium-ion.

8.3 Description and Specialist Assessment of Aspects to be Assessed in the EIA Study

A description of the aspects as well as the assessment by specialists is included in Table 8-1.

Table 8-1: Specialist assessment to be undertaken in the EIA study

Discipline and Aspect	Organisation	Terms of Reference
<p>Agricultural Compliance Statement</p> <p>Aspect: Construction of the PV plant leading to the loss of agricultural potential by soil degradation.</p>	<p>Johann Lanz</p>	<p>The proposed sites have high sensitivity for impacts on agricultural resources as a result of it having land capability values of 9 and 10 across much of its area. This land capability reflects the suitability of the climate, terrain and soils for the production of cultivated crops, however, factors related to the ownership and industrial activity on the site prevent it from being used for agriculture and so effectively limit its agricultural potential.</p> <p>The Agricultural Specialist will therefore compile an Agricultural Compliance Statement as the high agricultural sensitivity is disputed. The Agricultural Compliance Statement must contain, as a minimum, the following information:</p> <ul style="list-style-type: none"> ▪ A map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool; ▪ Calculations of the physical development footprint area for each land parcel as well as the total physical development footprint area of the proposed development including supporting infrastructure; ▪ Confirmation that the development footprint is in line with the allowable development limits contained in Table 1 of the protocol; ▪ Confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimize fragmentation and disturbance of agricultural activities; ▪ A substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development; ▪ Any conditions to which this statement is subjected; ▪ In the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;

Discipline and Aspect	Organisation	Terms of Reference
		<ul style="list-style-type: none"> ▪ Where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMP; and ▪ A description of the assumptions made and any uncertainties or gaps in knowledge or data.
<p>Hydrology</p> <p>Aspect: Working in or in close proximity to primary surface water receivers e.g. Steelpoort River and unnamed non-perennial watercourses</p>	<p>GCS Water and Environmental Consultants</p>	<p>The Terms of Reference for the Hydrological Assessment includes:</p> <ul style="list-style-type: none"> ▪ Data collection and literature review. ▪ Baseline hydrology update. ▪ Floodline delineation. ▪ Conceptual water balance. ▪ Conceptual Stormwater Management Plan. ▪ Hydrological risk assessment including site walkover and application of the DSW&S Risk Assessment Matrix. ▪ Surface water monitoring plan. ▪ Compilation of a comprehensive hydrological report, to include the abovementioned components.
<p>Freshwater</p> <p>Aspect: Working in or in close proximity to watercourses e.g. Steelpoort River and unnamed non-perennial watercourses may increase the erosion and sedimentation of the non-perennial watercourses and the Steelpoort River, alteration of the hydrological processes, sedimentation may lead to the smothering of biota and potentially altering surface water quality is a potential impact that might occur during the operational phase.</p>	<p>Scientific Aquatic Services</p>	<p>Based on the project concept (envelope) design and proposed layout plan as provided by the Proponent, a detailed impact assessment on all identified significant risks will take place including cumulative impacts on watercourse assemblages in the region.</p> <p>Aspects regarding watercourse drivers and receptors as required by the DSW&S Chief Directorate Instream Water Use will be reported on, including the following:</p> <ul style="list-style-type: none"> ▪ Watercourse drivers: hydrology; water quality; and sediment balance and the geomorphological regime. ▪ Watercourse receptors: habitat; and biota. <p>Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the development/ operation or decommissioning of the proposed development in order to improve manage and mitigate impacts on the freshwater ecology of the area will be provided. These analyses will include water conservation and demand planning. All results will be compiled into a specialist impact assessment report. In addition, a conceptual rehabilitation and landscaping plan will be developed in support of the WULA.</p>

Discipline and Aspect	Organisation	Terms of Reference
<p>Biodiversity</p> <p>Aspects: Vegetation clearing activities for the construction and development of the PV plant would like result in the loss of protected and conservation important faunal and floral species, loss of natural and sensitive habitat types, disruption of important ecological processes, services and infrastructure and altered ecological functionality of surrounding areas and natural habitat as well as cumulative impacts on local/ regional and national conservation targets and obligations (e.g. loss of natural woodland habitat).</p>	<p>Bathusi Environmental Consultants</p>	<p><u>Proposed study objectives for the Botanical (floral) EIA:</u></p> <p>Vegetation is often described at various hierarchical levels from biome scale and down to plant community and variation level with associated local habitat conditions. To accurately evaluate the significance of impacts associated with the planned activity on the botanical receiving environment, the following EIA objectives are recommended:</p> <ul style="list-style-type: none"> ▪ Provide a review and description of relevant biophysical habitat attributes pertaining to floristic developmental drivers; ▪ Provide a review of the local and regional importance of the site in terms of threatened ecosystems, biodiversity conservation planning, etc.; ▪ Collect and evaluate floristic data to accurately describe broad-scale habitat types, determine floristic diversity and compositional patterns, also with particular reference to plant taxa of conservation consideration; ▪ Establish the variety and estimated abundance of plant species of conservation importance/ concern that might be affected by the proposed development; ▪ Determine the presence and abundance of exotic and invasive plant species; ▪ Provide for a suitable analysis and appraisal of diversity patterns from collected data; ▪ Broadly describe structural and compositional aspects of the flora and fine-scale variations that might be present with associated biophysical attributes, including rockiness, main soil characteristics, slopes, aspects, topography, moisture, etc. (where relevant); ▪ Map and delineate broad habitat types that typifies the receiving environment; ▪ Subjectively assess the floristic sensitivity, based on an interpretation of vegetatal attributes; ▪ Provide an impact assessment (including cumulative impacts) for the floristic receiving environment, with the objective of demonstrating the anticipated effect of the proposed project; ▪ Provide pertinent recommendations, based on results from the botanical assessment; and ▪ Development of a suitable mitigation approach, a botanical monitoring plan, contributions to the EMPr and <u>compilation of a Biodiversity Offset Strategy/ Plan.</u>

Discipline and Aspect	Organisation	Terms of Reference
		<p>Proposed study objectives for the Faunal EIA: The main objectives of the Faunal EIA will consist of the following (<i>inter alia</i>):</p> <ul style="list-style-type: none"> ▪ A review of the local and regional importance of the site in terms of threatened ecosystems, biodiversity conservation planning, etc. pertaining to faunal diversity patterns; ▪ To provide a description of the faunal assemblages on the proposed study areas; ▪ Conduct a survey of threatened, near threatened, protected, endemic and conservation important fauna species in the study area; ▪ To provide a general overview of the mammal assemblage and richness on the study site through an inventory of observed and expected species; ▪ To provide an indication (opinion) on the occurrence of threatened, near threatened, endemic and protected invertebrate taxa in the study area; ▪ To provide a habitat description of the study site and an indication of the occurrence of suitable habitat (e.g. foraging, breeding or roosting habitat) for animal taxa of conservation concern; ▪ To provide an indication on the relative conservation importance and ecological function of the study site (to be incorporated into a sensitivity map); ▪ To provide an assessment of potential and likely impacts (including cumulative impacts) on the faunal receiving environment; and ▪ To provide recommendations regarding the proposed development activities, where ecologically viable, that will result in the amelioration of anticipated impacts.
<p>Avifauna</p> <p>Aspect: construction and operation of the PV plant and overhead lines will have an impact on the habitat for threatened species, ecological linkages/ connection utilised by birds, bird mortality and trauma caused by collisions, electrocutions and disturbance.</p>	<p>Royal HaskoningDHV</p>	<p>The BirdLife South Africa (BLSA) Birds and Solar Best Practice Guidelines have developed criteria for determining the type of avifaunal assessment regime that must be undertaken for solar power developments. The criteria are based on based on the proposed technology, the size of the development footprint, the amount of available data, and the estimated sensitivity of the receiving environment.</p> <p>The recommended avian assessment regimes in relation to proposed solar energy technology, project size, and known impact risks⁴⁴ are presented below:</p>

⁴⁴ Jenkins. A.R., Ralston-Paton. S and Smit-Robinson. H. 2017. *Birds & Solar Energy – Best Practice Guidelines - Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa.* BirdLife South Africa. Johannesburg

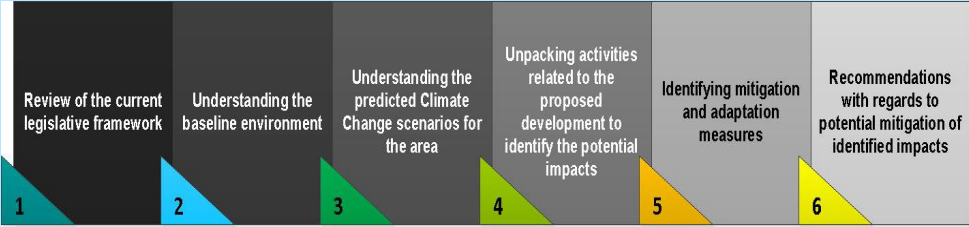
Discipline and Aspect	Organisation	Terms of Reference																																
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	Large (>150 ha)	Regime 2	Regime 3	Regime 3																														
CSP power tower	All	Regime 3																																
<p>The avifaunal sensitivity of the site has been assessed to be medium, and as the combined size of the development sites is less than 150ha, assessment Regime 2 would apply to the site. The site assessment protocol for Regime 2 as specified for the guidelines are proposed to be followed.</p>																																		
<p><u>The EIA-phase avifaunal assessment would consist of the following elements:</u> In line with the BLSA Guidelines for sites of medium avifaunal sensitivity, the Regime 2 assessment will be applied – the guidelines state that at Regime 2 sites, two to three site visits should be conducted over a period of 6 months, with at least one survey timed to include the likely peak in avian abundance.⁴⁵ A minimum of two (2) EIA phase site visits will be undertaken. These site visits are proposed to be a mid-winter site visit and a spring site visit (as allowed by the EIA timeframes, and in order to represent seasonal variability in bird species occurrence and abundance in the study area) The focus of the site visits would be to:</p> <ul style="list-style-type: none"> ▪ Gather data relating to species composition and bird abundance on each of the five development sites with a focus on areas of higher avifaunal sensitivity on, and in the immediate vicinity of the development sites This would be undertaken by means of walked transects and fixed point counts, along with checklist surveys (as undertaken through the SABAP2 protocol that utilises the reporting rate to determine relative density of species).⁴⁶ ▪ Undertake observations to confirm the presence of the bird movement corridors (flyways) identified in the ESS. 																																		

⁴⁵ Ibid.

⁴⁶ Such data gathering on the sites will focus on small passerines. Although these are not priority species, the loss of relatively common but ecologically pivotal species from the vicinity of a solar energy development through loss of habitat may also have a substantial, knock-on effect. Quantitative surveys of small bird populations may be the only way in which to adequately test for impact phenomena such as displacement, considering the very low likely occurrence of larger bird species in the environment that would entail that it may not be possible to submit density or abundance estimates to rigorous statistical examination. Hence, some level of monitoring of small passerines and other ecologically pivotal bird populations will be required at all sites where additional survey and monitoring work is a pre-condition.

Project related

Discipline and Aspect	Organisation	Terms of Reference
		<ul style="list-style-type: none"> ▪ Walk-through of powerline servitudes in the study area to determine utilisation by bird species and to record any bird fatalities. ▪ Undertake observations to determine the presence of priority species in the study area, focussed on habitats/ locations in which these species are most likely to occur. This would likely be undertaken utilising methods such as census counts or road counts. ▪ Undertake observations at relevant water bodies in the wider study area (including those water bodies close to the sites and important waterbodies located more distant from the sites, e.g. the Tubatse Dam). <p>The field visits would be followed by the compilation of an Avifaunal report, which would contain:</p> <ul style="list-style-type: none"> ▪ Analysis of the findings of (data collected during) the site assessment. ▪ Maps showing a refined assessment of avifaunal and habitat-based sensitivity and all other relevant factors as pertaining to the data collected during the field assessments. ▪ Detailed assessment of avifaunal impacts, including assessment of impacts on bird species and communities (with regards to potential disturbance, displacement, habitat loss and mortality), including consideration of the spatial and temporal extent of these impacts. ▪ The identification of all relevant mitigation measures, including all exclusion/ buffer areas to inform the final layout of solar panel arrays. ▪ A determination of any required post-construction and/ or construction and operational monitoring and a concomitant recommendation that such monitoring be undertaken. ▪ A reasoned opinion as to whether the development should proceed and any conditions that should be included in the environmental authorisation.
<p>Heritage and Palaeontology</p> <p>Aspect: construction activities on heritage, archaeological and palaeontological resources</p>	<p>PGS Heritage</p>	<p>The HIA will aim to identify possible heritage sites and finds that may occur in the proposed development area. The HIA aims to inform the EIA in the development of a comprehensive EMP to assist the Applicant in responsibly managing the identified heritage resources in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999).</p> <p>The National Heritage Resources Act is utilized as the basis for the identification, evaluation, and management of heritage resources and in the case of Cultural Resource Management those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under Section 38(8) and requires comment from the relevant heritage resources authority that includes the SAHRA and the Limpopo Heritage Resources Authority.</p>

Discipline and Aspect	Organisation	Terms of Reference
<p>Climate Change</p> <p>Aspects:</p> <ul style="list-style-type: none"> How will climate change influence the project? How will climate change influence the project's impacts on the environment? How will the project affect South Africa's ability to mitigate climate change? 	<p>Royal HaskoningDHV</p>	<p>The climate change impact assessment for the proposed 60MW PV facility will consider the three areas following the methodology proposed below:</p>  <ul style="list-style-type: none"> The impacts of climate change on the project - As for any infrastructure projects, solar PV installations need to recognise how climate change is likely to play out in terms of patterns of climate variability and extreme weather events, and the risks posed by climate and weather events to the project i.e. the climate resilience of the project. Specifically, projections of future climates need to be consulted and interpreted in terms of likely threats to the physical infrastructure and operations of the plant. Indirect impacts must also be considered. The project's impacts on the environment - the immediate and direct impacts of the PV plant on the local or regional integrity of environmental conditions i.e. climate resilience through the project, will be assessed through the specialist assessments detailing ecological, air quality and water resources impacts. However, one also has to consider how a future climate will affect the availability of operational resources requirements in consideration of potentially variable biophysical and socio-economic conditions. Mitigation of climate change - the assessment of the project's impacts on the environment is supplemented by a quantification of the potential GHG emissions from the PV plant, within the context of the national GHG emissions reduction commitments. The emissions footprint will be limited to 'territorial' emissions, i.e. those generated within the project boundaries and excluding the emissions related to materials and product sourcing. Recommendations will be made with regards to non-territorial emissions.

8.4 Impact Assessment Methodology

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- Nature: A brief written statement of the environmental aspect being impacted upon by a particular action or activity;
- Extent (Scale): The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- Duration: Indicates what the lifetime of the impact will be;
- Intensity (Magnitude): Describes whether an impact is destructive or benign;
- Probability: Describes the likelihood of an impact actually occurring; and
- Cumulative: In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity (Table 8-2), which are further sub-divided into probability and duration of occurrence and scale/ extent and magnitude of the impact.

Table 8-2: Aspects of the assessment of occurrence and severity

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude (severity) of impact

To assess each of these factors for each impact, the following four ranking scales (Table 8-3) are used:

Table 8-3: Criteria for ranking of impacts

Probability		Duration	
5 - Definite/ don't know		5 – Permanent	
4 - Highly probable		4 - Long-term	
3 - Medium probability		3 - Medium-term (8 - 15 years)	
2 - Low probability		2 - Short-term (0 - 7 years) (impact ceases after the operational life of the activity)	
1 - Improbable		1 – Immediate	
0 – None		0 – None	
Scale		Magnitude	
5 - International		10 - Very high/ don't know	
4 - National		8 – High	
3 - Regional		6 – Moderate	
2 - Local		4 – Low	
1 - Site only		2 – Minor	
0 – None		0 – None	

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Once these factors have been ranked for each impact, the significance of the two aspects, occurrence and severity, must be assessed using the following formula:

$$SP \text{ (significance points)} = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$$

The maximum value is 100 significance points (SP). The impact significance is then categorised into high, moderate and low positive and negative impacts (Table 8-4). Impacts will be assessed and rated before and after mitigation.

Table 8-4: Description of impact significance

SP >75	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 75	Indicates moderate Environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that constitutes an improvement over pre-project conditions

8.5 Authority and Stakeholder Consultation

Ongoing consultation with DFFE (Competent Authority), LDEDET (Commenting Authority), the SDM, FGTM, Ward Councillors, SAHRA and all other authorities identified during the ESS (and further ones that may be identified during the EIA study) will continue throughout the duration of the project. Authority and stakeholder consultation are therefore, seen as a continuous process that takes place until completion of the environmental investigations.

8.6 Public Participation during the EIA Study

8.6.1 Identification of I&APs

The identification of I&APs and key stakeholders will continue into the EIA study as the public participation process is a continuous process that runs throughout the duration of an environmental study. An I&AP database is already available due to previous projects undertaken. The I&AP database will be updated with new I&APs requesting to be registered and will be maintained throughout the duration of the project. All registered I&APs on the database will be informed of the project, review period as well as outcome of the decision issued by DFFE.

8.6.2 Advertisement

In compliance with the EIA Regulations 2014 (as amended in 2021), notification of the draft consultation EIR will be advertised in the local newspaper (*Steelburger*) in the Steelport area in English.

8.6.3 Public Review of the Draft Consultation Environmental Impact Report (EIR) and Environmental Management Programme (EMPr)

The draft consultation EIR and EMPr will be made available electronically for a public review period of 30-days, via the Royal HaskoningDHV Website:

<https://www.royalhaskoningdhv.com/en/south-africa/projects/environmental-reports>.

Hard copies of the draft consultation EIR and EMPr be made available at the Fetakgomo Tubatse Municipality Public Library and Municipal Offices and the TFC Smelter offices.

Limited electronic copies will be distributed to stakeholders who specifically request a copy.

8.6.4 Meetings

A public meeting and two Focus Group Meetings will be conducted during the EIA study, the venue will be chosen taking into consideration the Covid-19 Regulations as stipulated in the Disaster Management Act, 2002. Minutes of all meetings held will be compiled and forwarded to all attendees.

8.6.5 Comments and Responses Report (CRR)

A CRR will be compiled with any comments and issues received and responded to which will form part of the submission of the final EIR.

8.7 Environmental Impact Assessment Report

The EIR will be compiled in accordance with Appendix 3 of the EIA Regulations, 2014 (as amended in 2021) and will contain the following:

- Details of the EAP who compiled the report and their expertise to carry out an EIA;

- Detailed description of the activity(ies);
- A description of the environment that might be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;
- Details of the public participation process conducted during the Scoping Phase and the ongoing consultation during the EIA phase;
- Description of the need and desirability of the activity including advantages and disadvantages that the activity may have on the environment and the community that may be affected by the activity;
- An indication of the methodology used in determining the significance of potential environmental impacts;
- A summary of the findings and recommendations of any specialist report or report on a specialised process;
- A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- An assessment of each identified potentially significant impact, including cumulative impacts, the nature of the impact, the extent and duration of the impact, the probability of the impact occurring, the degree to which the impact can be reversed, the degree to which the impact may cause irreplaceable loss of resources and the degree to which the impact can be mitigated;
- A description of any assumptions, uncertainties and gaps in knowledge;
- An opinion as to whether the 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;
- An environmental impact statement which contains a summary of the key findings of the environmental impact assessment; and a comparative assessment of the positive and negative implications of the activity;
- A draft EMPr; and
- A summary of any specialist reports and findings and how these have been incorporated into the report.

8.8 Draft Environmental Management Programme

During the compilation of the EIR, a draft EMPr will be compiled in accordance with Appendix 4 of the EIA Regulations 2014 (as amended in 2021). The EMPr will provide the actions for the management of identified environmental impacts emanating from the project and a detailed outline of the implementation programme to minimise and/ or eliminate the anticipated negative environmental impacts. The draft EMPr will provide strategies to be used to address the roles and responsibilities of environmental management personnel on-site, and a framework for environmental compliance and monitoring.

The EMPr will include the following:

- Details of the person who prepared the EMPr and the expertise of the person to prepare an EMPr;
- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in the EIR, including environmental impacts or objectives in respect of operation or undertaking of the activities, rehabilitation of the environment and closure where relevant;
- A detailed description of the aspects of the activity that are covered by the draft EMPr;
- An identification of the persons who will be responsible for the implementation of the measures;
- Where appropriate, time periods within which the measures contemplated in the draft EMPr must be implemented;
- Proposed mechanisms for monitoring compliance with the EMPr and reporting thereon;
- An environmental awareness plan; and

- Procedures for managing incidents which have occurred as a result of undertaking the activity and rehabilitation measures.

8.9 Environmental Authorisation

On receipt of the Environmental Authorisation (positive or negative) for the proposed project, I&APs registered on the project database will be informed of this decision and its associated terms and conditions as well as the appeal process by email correspondence. An advert will be placed in the local newspaper (in the Steelpoort area (*Steelburger*) notifying I&APs of the decision.

9 CONCLUSION AND RECOMMENDATIONS

The ESS for the proposed 60MWp PV plant, has been undertaken in accordance with the EIA Regulations 2014 (as amended in 2021). The ESS aimed to identify and provide:

- A description of the proposed activity;
- A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, and economic aspects of the environment may be affected by the proposed activity;
- The identification of all legislation and guidelines applicable to the development;
- A description of environmental issues and potential impacts, including cumulative impacts, that have been identified;
- Details of the public participation process conducted to date; and
- A Plan of Study for EIA (Chapter 8) including the methodology that will be adopted in assessing the potential impacts that have been identified, including specialist studies or specialised processes that will be undertaken.

A summary of the key findings as indicated in this ESS is presented in Table 9-1.

Table 9-1: Summary of the key findings in the ESS

Discipline	Key Findings
Hydrology	<p>The sites were observed to be undeveloped; gently sloping towards the Steelpoort River; densely vegetated with loose, sandy soil and no flowing water or natural permanent surface water features. The floodline analysis identified two major drainage lines and three minor ones. The hydrology affecting each proposed site is summarized below:</p> <ul style="list-style-type: none"> ▪ There are no drainage lines affecting Site 1 and the entire area is suitable for development in terms of hydrology. ▪ There is a major drainage line with a large upstream contributing catchment adjacent to Site 2 and passing under the existing railway line. Floodline analysis indicated that flows from this channel will not affect the site or influence development thereof. ▪ Site 3 has a minor drainage line originating on it. There is no evidence of scour or a defined channel on the site and development of the entire site may go ahead with the SWMP making provision for this natural drainage of the topography. ▪ Site 4 is adjacent to a major drainage line with an extremely large contributing catchment. During flood events, the flows will encroach on the south-east corner of the site. It is therefore recommended that a flood protection berm be designed for the south-east corner of Site 4 where the floodline encroaches. The floodline is too large to be diverted as a whole. Otherwise, there are no local drainage lines on the site and the entire area is suitable for development. ▪ Site 5 has one major drainage line running through it and three minor drainage lines. The major drainage line is a deep valley in the topography and divides the site. Flooding in this zone will be significant and it will not be possible to develop the area within the floodlines. Two of the minor floodlines had small contributing catchments with negligible peak flows predicted for them. It is recommended that these drainage lines be formalized and managed by the SWMP. No floodlines were carried out for these drainage lines due to the Digital Elevation Model not having sufficient elevation data of the transects. <p>The hydrological impacts for the proposed development are small and can be mitigated with an effective SWMP to handle increased runoff emanating from the sites and surface water as it flows through the areas.</p>

Discipline	Key Findings
Freshwater	<p>According to the NFEPA database, the Steelpoort River is located approximately 150m north of the study area and the Tubatsane River confluences with the Steelpoort River approximately 150m west of the study area. The Steelpoort River is considered moderately modified (Class C) and a fish support area by the NFEPA. The National Biodiversity Assessment (NBA) dataset however indicates that the Steelpoort River is largely modified (Class D). The Present Ecological State (1999) classification indicates that the Tubatsane River is moderated modified (Class C), however the NFEPA database indicates the Tubatsane River as not intact (Class Z). Furthermore, according to the NBA dataset the Tubatsane River is seriously modified (Class E). These low PES scores may be mainly attributed to the mining activities and urban development, present within the catchment.</p> <p>The Steelpoort River is host to numerous fish and macro-invertebrate species all of which may potentially be affected should any further disturbance occur within the Steelpoort River or in the surrounding area.</p> <p>No wetlands were identified on site or within 500m of the planned infrastructure with the systems best defined as watercourses with associated riparian zones of varying degrees of development. These systems are associated with the proposed Site 3,4 and 5 as such these watercourses may potentially be impacted upon, should the PV plant be approved.</p>
Agriculture	<p>The proposed development is not expected to have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable as the proposed development will occupy land that cannot currently be utilised for agriculture and poses a low risk in terms of causing soil degradation.</p>
Biodiversity	<p>Impacts on the floristic environment is likely to be significant, with specific reference to the loss of protected and conservation important plant species. However, these impacts, when placed in context of the continued pressure on the remaining natural environment in proximity to peri-urban and industrial land use activities, as well as pressures from persistent and intensive use of natural resources by local communities, are inevitable. The application of a dedicated conservation and mitigation approach will likely ameliorate anticipated impacts to a more acceptable level. Despite the significant nature of anticipated impacts, no immediate 'red flag' is identified for the development.</p> <p>Drainage lines, including the nearby Steelpoort River and natural woodland provides for habitat of moderate sensitivity pertaining to the terrestrial faunal component of the sites. As a result of severe and unrelenting impacts from surrounding land use activities, the existing faunal component is anticipated to be of low to moderate diversity, despite the comparatively natural status of much of the natural woodland that characterise the respective sites. No immediate 'red flags' pertaining to the proposed activity is therefore identified at this stage of the assessment. None of the sites represents an immediate concern in terms of potential impacts on the faunal environment.</p>
Avifauna	<p>The habitat-based sensitivity assessment has identified certain areas of high-sensitivity avifaunal habitat located on, or in close proximity to certain of the development sites. This relates particularly to the presence of riparian habitat associated with certain rivers and watercourses, in particular the watercourse that drains from the hilly area to the east of the south-east of the development sites and which drains between Sites 3 and 4 and subsequently bisects Site 5. In a landscape setting of large-scale fragmentation of woody vegetation habitat (especially within the Steelpoort Valley), this watercourse is likely to represent an important landscape and altitudinal corridor linking the valley floor (and the Steelpoort riparian corridor) with the hilly areas to the east and south-east. The presence of a reach of this watercourse on Site 5 poses the risk that riparian vegetation along the watercourse could be cleared and that the watercourse could be transformed into an effective large-scale stormwater channel. The potential impacts of such clearing and the effects on</p>

Discipline	Key Findings
	<p>ecological connectivity in an avifaunal context will need to be further investigated and appropriate mitigation measures (e.g. exclusion of the watercourse from development and creation of a buffer along the watercourse) identified.</p> <p>The riparian vegetation along the larger watercourse should be retained to preserve sensitive habitat and to retain ecological connectivity. The smaller watercourses on Site 5 are not characterised by such distinctive riparian habitat and are much less sensitive from an avifaunal habitat connectivity and bird movement perspective. Clearing of the vegetation within these watercourses would be associated with less significant impact than the clearing of vegetation along the larger watercourse.</p> <p>Similarly, to the larger watercourse on Site 5, the riparian corridor of the Steelpoort River is located directly adjacent to the northern boundary of Site 5. The riparian vegetation on the southern bank of the river located close to the Site 5 boundary is in a much more intact state than that on the northern bank, from which the larger trees have largely been removed. The southern part of the riparian corridor is thus likely to constitute the most important residual part of this locally important movement corridor for birds, with direct linkages to the woodland and thicket that remains in the northern parts of Site 5. The impacts of the proposed transformation of Site 5 will need to be further investigated and mitigation measures identified in this context.</p> <p>Both the riparian corridors of the Steelpoort River and larger watercourse on Site 5 must be considered as highly sensitive habitats that would likely comprise development exclusion areas for solar panel arrays, which will thus affect the micro-siting of PV panels on Site 5 in particular. The stipulation of development exclusion areas, including buffers beyond the outer boundaries of the riparian corridor will be based on the investigation and analysis that will be undertaken in the EIA study.</p>
Heritage Palaeontology	<p>Several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of 5 burial grounds (Site 1 and 2) with a High heritage significance and a heritage grading of IIIA. A buffer of at least 30m, must be demarcated immediately around the burial grounds and graves and marked as a No-Go area.</p> <p>and The archaeological finds consisting of 9 archaeological sites (Sites 3, 4 and 5) has in most cases a rating of Medium significance and a grading varying between IIIC and IIIA at the highest. Sites 2, 3 and 5 will have the least impact on identified archaeological sites, although mitigation work will be required for Sites 3 and 5. The archaeological sites identified on Site 4 will require extensive mitigation work to mitigate the impact before any development. If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations, a Chance Find Protocol must be implemented by the responsible person in charge of the development.</p>
Visual Landscape	<p>The portion of the Steelpoort Valley in which the proposed development is located has a strong industrial component to the visual environment but is also characterised by rural settlement and natural visual landscape influences. The proposed solar development would thus occur in a context of the strong industrial visual influences of the TFC Smelter, especially if developed on sites located in close proximity to the smelter.</p> <p>There are however a number of visual receptor locations in close proximity to certain of the development sites, in particular Site 1. The development of a solar plant on the sites would result in a degree of overall landscape change and could potentially be perceived as a visual impact by receptors that are located close to certain of the development sites. The strong industrial influences are however likely to strongly ameliorate perceptions of visual impact by</p>

Discipline	Key Findings
	receptors in the project location, with potential mitigating factors (such as retention of natural vegetation buffers for vegetative screening) being a further ameliorating factor.

Based on the ESS undertaken, it can be concluded that there are no 'red flags' associated with the project. Potential environmental impacts and sensitivities have been highlighted and will be further investigated in the EIA study. A graphical representation of the preliminary environmental sensitivities is provided in Figure 9-1.

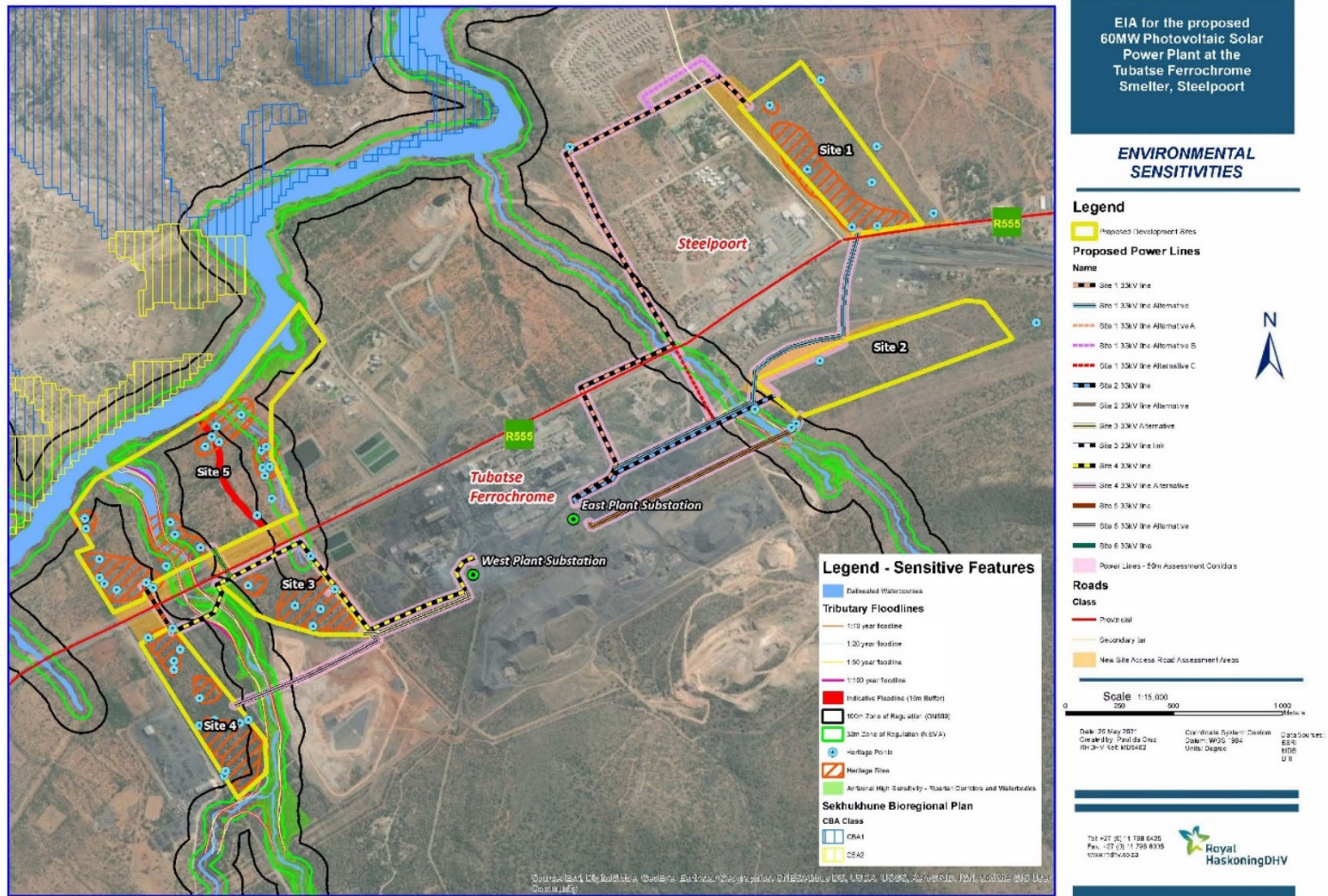


Figure 9-1: Preliminary environmental sensitivity map

9.1 Assumptions and Limitations

Discipline	Assumption and Limitations
EAP	<ul style="list-style-type: none"> All information provided by Samancor Chrome to the EAPs was correct and valid at the time it was provided. The EAP does not accept any responsibility in the event that additional information comes to light at a later stage of the process. All data from unpublished research is valid and accurate. The scope of this investigation is limited to assessing the potential environmental impacts associated with the proposed development of a 60MWp Photovoltaic Plant associated with the TFC Smelter at the sites discussed in this document. Detail design will need to provide the layouts (including PV panels; powerlines; pipelines; access roads; transformers; BESS; on-site substation; laydown areas; camp areas; storage tanks; etc.).
Hydrology	<ul style="list-style-type: none"> The floodlines presented in this report may not be suitable for engineering purposes and is intended for the WULA process only. Should the client require engineering quality floodlines for design purposes, this will need to be procured separately.
Freshwater	<ul style="list-style-type: none"> Freshwater Assessment Scoping Study was undertaken as a desktop assessment with field verification of some aspects, as such, the information gathered must be considered with caution, as inaccuracies and data capturing errors are often present within these databases. The PES of the watercourses associated with the study area will be assessed in further detail in the EIA study. The determination of the watercourse boundaries and the assessment thereof, is confined to the watercourses situated directly within the study area and within the 500m investigation area. The watercourses were delineated in fulfilment of Government Notice 509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), using desktop methods and augmented with historical and current digital satellite imagery and aerial photographs. The general surroundings were however, considered in the desktop assessment of the study area. These watercourses were then ground-truthed during the field assessment undertaken in April 2021. Wetland, riparian and terrestrial zones create transitional areas where an ecotone is formed as vegetation species change from terrestrial to obligate/ facultative species. Within this transition zone, some variation of opinion on the watercourse boundary may occur.
Ecology	<ul style="list-style-type: none"> In order to obtain a comprehensive understanding of the dynamics of terrestrial faunal assemblages and local floristic diversity patterns, with particular reference to endemic, rare, or threatened species in any area, biodiversity assessments should always consider investigations at different time scales (across seasons/ years) and through replication. However, such long-term studies are not part of the terms of reference for EIA assessments, in general.
Avifauna	<ul style="list-style-type: none"> The avifaunal assessment has complied with the BLSA Birds and Solar Energy Guidelines as far as possible. It should be noted that the guidelines stipulate as the first stage of an avifaunal assessment for a solar power development should be a pre-EIA application preliminary desktop-based assessment that produces a preliminary avifaunal assessment report. Although an Environmental Screening Investigation was undertaken for the proposed development that considered biological sensitivities, a preliminary avifaunal assessment was not undertaken. As such the preliminary assessment has been undertaken as part of the Scoping-phase avifaunal study.
Heritage Palaeontology	<ul style="list-style-type: none"> Heritage resources located during the desktop research and fieldwork do not necessarily represent all the possible heritage resources present within the area. Such observed or located heritage features and/ or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make

Discipline	Assumption and Limitations
	<p>an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.</p> <ul style="list-style-type: none"> ▪ The overall visibility for fieldwork was hampered by dense vegetation on all 5 potential sites, with Site 4 and 5 extremely overgrown.

9.2 Declaration by the EAPs

The following is hereby affirmed by the EAPs to be included in this report:

- the correctness of the information provided in the report;
- the inclusion of all comments and inputs from stakeholders and I&APs (when received);
- the inclusion of all comments and inputs from stakeholders and I&APs on the Plan of Study for EIA;
- the inclusion of all inputs and recommendations from the specialist reports where relevant; and
- any information provided by the EAPs to I&APs and any responses by the EAPs to comments or inputs made by interested and affected parties.

Signed: Prashika Reddy (*Pr Sci Nat*, *EAPSA*)

Signed: Seshni Govender (*Pr Sci Nat*)



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