

DRAFT ENVIRONMENTAL IMPACT REPORT

KADOMA INVESTMENTS (PTY) LTD

**UTILITY SERVICES DEVELOPMENT : PROPOSED
SOLAR ENERGY GENERATION PLANT AND WATER
& WASTEWATER TREATMENT PLANTS AND
ASSOCIATED INFRASTRUCTURE ON PORTIONS OF
PORTION 15 OF THE FARM TWEEFONTEIN 360-KT,
STEELPOORT AREA FETAKGOMO TUBATSE
LOCAL MUNICIPALITY SEKHUKUNE DISTRICT**

**ENVIRONMENTAL INVESTIGATION IN TERMS OF THE
NATIONAL ENVIRONMENTAL MANAGEMENT ACT
1998**

**SUBMITTED TO THE LIMPOPO DEPARTMENT OF ECONOMIC
DEVELOPMENT, ENVIRONMENT & TOURISM**

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NOVEMBER 2022

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
FOR THE PROPOSED**

UTILITY SERVICES DEVELOPMENT : PROPOSED SOLAR ENERGY GENERATION PLANT AND WATER & WASTEWATER TREATMENT PLANTS AND ASSOCIATED INFRASTRUCTURE ON PORTIONS OF PORTION 15 OF THE FARM TWEEFONTEIN 360-KT, STEELPOORT AREA FETAKGOMO TUBATSE LOCAL MUNICIPALITY SEKHUKUNE DISTRICT

COMPILED BY

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ENVIRONMENTAL ASSESSMENT PRACTITIONER

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M (Environmental Management) UFS, 2001

EIR REPORT NO: DRAFT

DATE: 3 November 2022

ECO8 PROJECT NO: E/414.1

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LIST OF APPENDIXES “G”

App No.	Title of Specialist or Technical Study	Compiled by	Date
G1	<i>Agricultural Impact Assessment Report</i>	<i>Dr. A. Gouws</i>	<i>07/2022</i>
G2	<i>Archaeological: Heritage Impact Assessment</i>	<i>A Pelser Consulting</i>	<i>10/2022</i>
G3	<i>Paleontological : Verification Report</i>	<i>Prof. M. Bamford</i>	<i>22/03/2022</i>
G4	<i>Ecological : Terrestrial Biodiversity Verification & Compliance Report</i>	<i>AEB Consulting</i>	<i>07/07/2022</i>
G5	<i>Ecological: Aquatic Biodiversity Verification & Compliance Report</i>	<i>AEB Consulting</i>	<i>07/07/2022</i>
G6	<i>Ecological: Plant Species Verification and Compliance Report</i>	<i>AEB Consulting</i>	<i>07/07/2022</i>
G7	<i>Ecological: Animal Species Verification and Compliance Report</i>	<i>AEB Consulting</i>	<i>07/07/2022</i>
G8	<i>Geo-technical Report</i>	<i>Louis van Rooyen</i>	<i>10/2022</i>
G9	<i>Geo-hydrological Report</i>	<i>Insitu Consulting</i>	<i>07/06/2022</i>
G10	<i>Geo-hydrological Risk Assessment Report</i>	<i>Insitu Consulting</i>	<i>21/10/2022</i>
G11	<i>Electrical Engineering Services Report</i>	<i>Pienaar & Erwee Eng.</i>	<i>06/04/2022</i>
G12	<i>Civil Engineering Services Report</i>	<i>Nico Swanepoel Eng</i>	<i>10/2022</i>

(i) ACRONYMS & DEFINITIONS

The following definitions apply to this report in line with the relevant Acts and Regulations.

Phrase	Definition Description	Ref
Activity	An activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the Act as a listed activity or specified activity.	NEMA
Baseline information/data	Information derived from data that; records the existing elements and trends in a given environment; records the characteristics of a given project proposal.	IEMGS
Biophysical environment	That part of the environment that did not originate with and is not dependent on human activities (e.g. biological, physical and chemical objects and processes).	IEMGS
Buffer area	means, unless specifically defined, an area extending 10 kilometres from the proclaimed boundary of a world heritage site or national park and 5 kilometres from the proclaimed boundary of a nature reserve, respectively, or that defined as such for a biosphere.	NEMA
Channel	An excavated hollow bed for running water.	NEMA
Climate Change	This means a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable periods.	DEA
Climate Change Vulnerability Assessment	<i>"Vulnerability to climate change is the degree to which geophysical, biological and socio-economic systems are susceptible to and unable to cope with, adverse impacts of climate change".</i> A vulnerability assessment lets you identify these adverse impacts of climate change that are most important to an area.	SDM CCVRP
Construction	According to the regulations this term is defined as – “the building, erection or expansion of a facility, structure or infrastructure that is necessary for the undertaking of activity but excludes any modification, alteration or upgrading of such facility, structure or infrastructure which does not result in a change to the nature of the activity being undertaken or an increase of the production, storage or transportation capacity of that facility, structure or infrastructure.	NEMA
Cumulative impact	In relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.	NEMA
Development	Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, 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, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.	NEMA
Development footprint	This means any evidence of physical alteration as a result of the undertaking of any listed activity as part of a development. Also referred to a “Site”.	NEMA
Ecosystem	Means a system of relationships between animals and plants and their environment.	DEA
Environment	The external circumstances, conditions and objects affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historic, cultural and political aspects.	IEMGS
General waste	Is waste that does not pose an immediate threat to man or the environment, i.e. household and garden waste, builders’ rubble and some dry industrial and business waste? It may, however, with decomposition and rain infiltration, produce leachate, which is unacceptable.	NEMWA
Hazardous waste	Is waste containing or contaminated by poison, corrosive agents, flammable or explosive substances, chemicals or any other substance which may pose detrimental or chronic impacts on human health and the environment.	NEMWA
Land	Any erf, agricultural holding or farm portion, and includes any improvement or building on the land and any real right in land.	SPLUMA

Continue in overleaf

Land development	The erection of buildings or structures on land, or the change of use of land, including township establishment, the subdivision or consolidation of land or any deviation from the land use or uses permitted in terms of an applicable land use scheme.	SPLUMA
Land use	The purpose for which land is or may be used lawfully in terms of a land use scheme, existing scheme or in terms of any other authorisation, permit or consent issued by a competent authority, and includes any conditions related to such land use purposes.	SPLUMA
Land use management system	The system of regulating and managing land use and conferring land use rights through the use of schemes and land development procedures.	SPLUMA
Linear activity	An activity that is arranged in or extending along with one or more properties and which affects the environment or any aspect of the environment along the course of the activity, and includes railways, roads, canals, channels, funiculars, pipelines, conveyor belts, cableways, power lines, fences, runways, aircraft landing strips, firebreaks and telecommunication lines.	NEMA
Mitigate	The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.	IEMGS
Project area	Refers to the application property and the combined area or development footprint of the selected sites.	SPLUMA
Riparian habitat	The physical structure and associated vegetation of the areas associated with a watercourse are commonly characterised by alluvial soils, which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with composition and physical structure distinct from those of adjacent land areas.	NWA
Run-off water	Excess surface water resulting from rain.	CARA
Servitude	Means a servitude registered against a title deed of land.	SPLUMA
Significant impact	An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.	NEMA
Site	A selected area identified for purpose of implementing the development.	
Sustainable development	NEMA defines it as "Sustainable development means the integration of social, economic and environmental factors into planning, implementation and decision-making to ensure that development serves present and future generations."	NEMA
Waste	Any undesirable or superfluous by-product, emission, residue or remainder of any process or activity, any matter, gaseous, liquid or solid, or any combination thereof." The formal classification of waste is made according to the human health or environmental risk that it may pose, and consequently requirements for safe handling and disposal.	NEMWA
Wastewater	Any water whose pristine or potable quality has been altered by domestic, industrial or other use or process. Water containing waste, or water that has been in contact with waste material.	DWA
Watercourse	Is a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, pan, lake or dam into which, or from which, water flows; and 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.	NWA
Waterway	An artificial flow path is constructed on land to carry away run-off water without causing excessive soil loss.	CARA
Zone	A defined category of land use is shown on the zoning map of a land use scheme.	SPLUMA

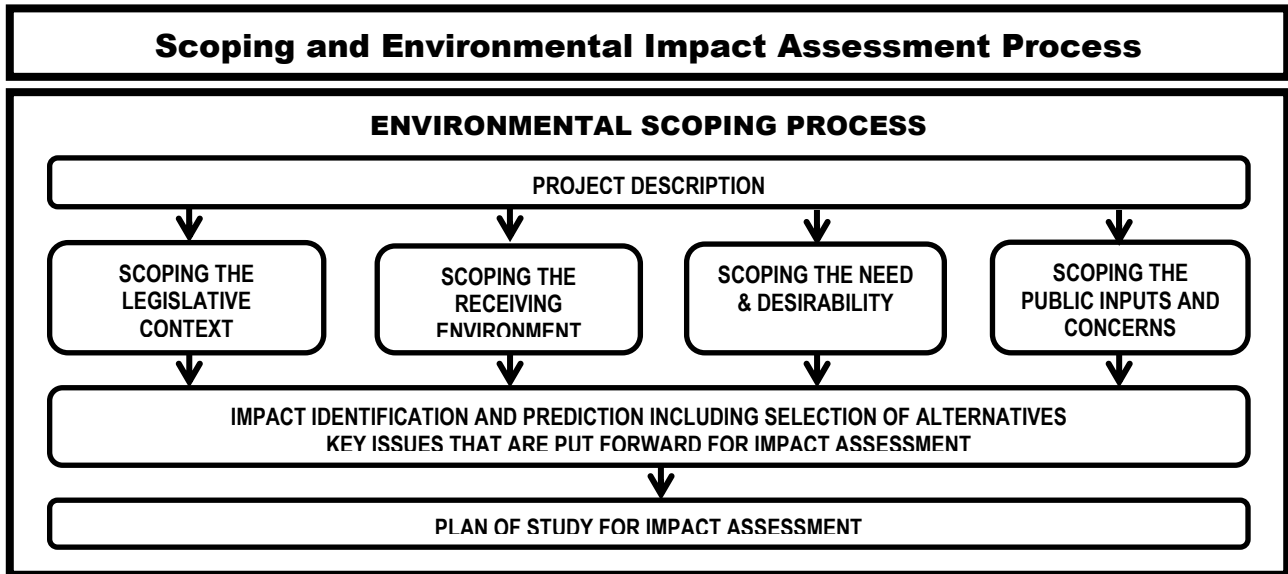
The following Acronyms apply to this report in line with the relevant Acts and Regulations.

Acronym	Description
CARA	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
CBA	Critical Biodiversity Area (a biodiversity classification)
CBR	Critical Biodiversity River
CBW	Critical Biodiversity Wetlands
CSIR	The Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries (changed to DFFE or DALRRD)
DFFE	Department of Forestry, Fisheries and the Environment (National)
DALRRD	Department of Agriculture, Land Reform and Rural Development (National)
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
DWS	Department of Water & Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMPr	Environmental Management Program report
EN	Endangered Ecosystem
ESA	Ecological Support Area (a biodiversity classification)
FEPA	Freshwater Ecosystem Priority Assessment
FTLM	Fetakgomo Tubatse Local Municipality
GHG	Greenhouse Gasses/Emissions
GIS	Geographic Information System
GNR	Government Notice Regulation
IDP	Integrated Development Plan
IEMGS	Integrated Environmental Management Guideline Series
IPAP	Industrial Policy Action Plan
LEDET	Limpopo Economic Development, Environment and Tourism (Limpopo province)
LNCA	Limpopo Nature Conservation Act, 1998 (Act 117 of 1998)
LUMS	Land Use Management Scheme (municipal)
MAP	Mean Annual Precipitation
MAT	Mean Annual Temperature
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMAQA	National Environment Management: Air Quality Act, 2004 (Act 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)
NEMWA	National Environmental Management: Waste Act, 2003 (Act 59 of 2008)
NFA	National Forests Act, 1998 (Act 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Assessment
NGP	New Growth Path
NHRA	National Heritage Resource Act, 1999 (Act 25 of 1999)
NNR	No Natural Habitat Remaining
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act, 1998 (Act 36 of 1998)
OLEMF	Olifants and Letaba Rivers Environmental Management Framework
ONA	Other Natural Areas (a biodiversity classification)
PA	Protected Area
PES	Present Ecological State
RCIA	Rapid Cumulative Impact Assessment

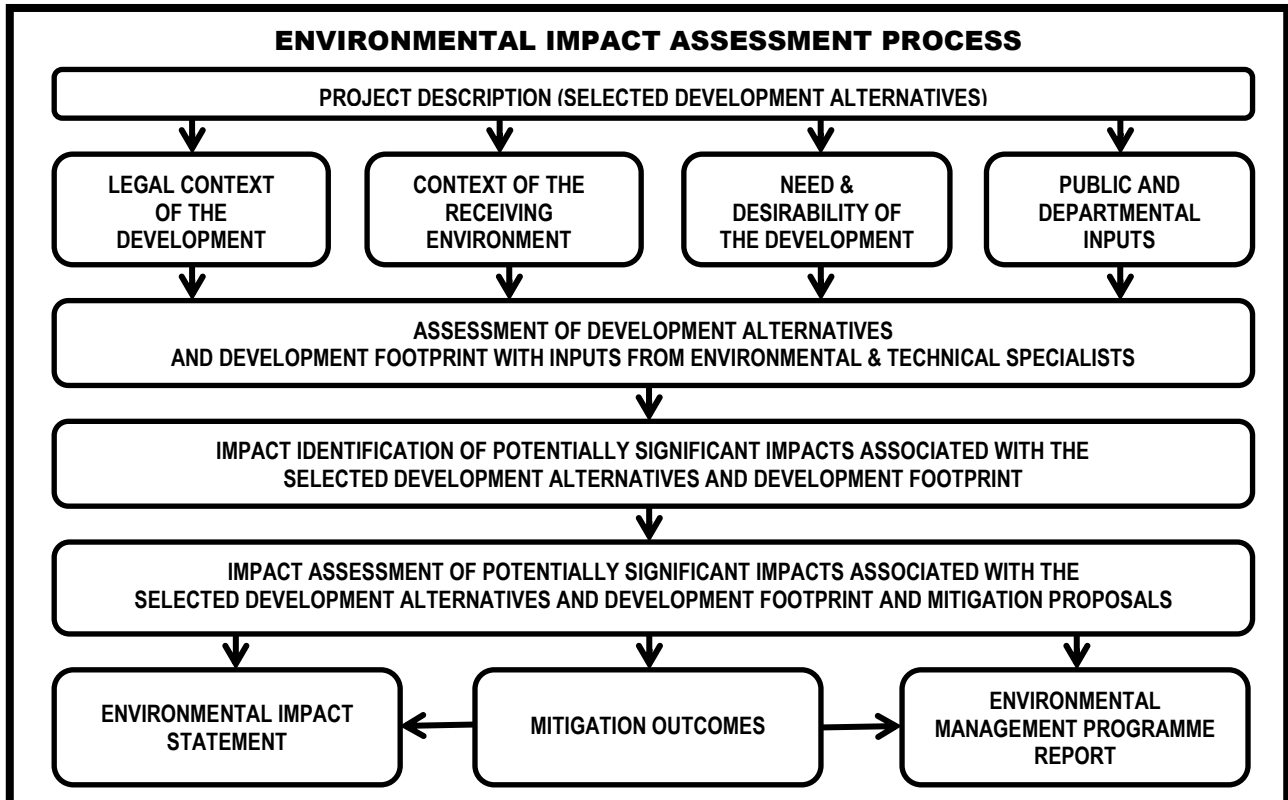
Acronym	Description
SA	South Africa
SAACA	South African Atlas for Climatology and Agro-hydrology
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard
SEGP	Solar Energy Generation Plant
SDF	Spatial Development Framework (municipal)
SDM	Sekhukhune District Municipality
SBP	Sekhukhune District Bioregional Plan 2019
SPLUMA	Spatial Planning Land Use Management Application
SSA	Statistics South Africa
SRTM	Shuttle Radar Topography Mission
VAC	Visual Absorption Capacity
VEESC	Valued Environmental and Social Components
VU	Vulnerable Ecosystem
WWTP	Wastewater treatment plant

(ii) EIA PROCESS DIAGRAM

The Scoping Process was finalised and was approved by the Department of Economic Development, Environment & Tourism with regard to an application for Environmental Authorisation of the proposed utility services development on Portion 15 of the farm Tweefontein 360-KT.



An environmental impact assessment process follows the Scoping Process in support of the decision-making process by the Department of Economic Development, Environment & Tourism with regard to an application for Environmental Authorisation of the proposed utility services development on Portion 15 of the farm Tweefontein 360-KT.



Environmental Decision in terms of NEMA

APPLICANT & EAP DETAILS

This section complies with GN R326 of 17 April 2017, Appendix 3, Section 3(1)(a).

A.1 APPLICATION REGISTRATION

File Reference No.:	12/1/9/2-GS75
Project Title:	UTILITY SERVICES DEVELOPMENT ON PORTION 15 OF TWEEFONTEIN 360 KT
Responsible Official:	Ms. TA Kubayi

A.2 APPLICANT

Project applicant:	Kadoma Investments (Pty) Ltd		
ID / Reg No:	2008/000750/07 – 15 January 2008		
Contact person:	Willem Jansen van Rensburg		
Physical address:	c/ 3dr Floor Aria North Warf, 42 Hans Strijdom Str, Foreshore, Cape Towns, 8001		
Postal address:	PO Box 188, Paarl	Postal code:	7620
Telephone:	010 003 8451	Cell:	082 929 6516
E-mail:	willemvr@freedomprop.co.za	Fax:	-

A.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER WHO PREPARED THE SCOPING REPORT

Firm name:	ECO-8 Environmental Planners		
Contact person:	Mr. Riaan Visagie		
Postal address:	P.O. Box 12898, Nelspruit	Postal code:	1200
Telephone:	013-744 9468	Cell:	082 5200 461
E-mail:	eco8@vodamail.co.za	Fax:	086 66 44 070
Qualifications:	B(TRP), M(EM) Environmental Management		
Professional affiliations:	EAP: EAPASA IAIA _{SA}	Years experience:	22 years

A.4 EAP CONCISE CURRICULUM VITAE

Personal information	Name: Riaan Visagie Nationality: South African
Relevant Tertiary Education	M(EM) 2001 : Master's Degree in Environmental Management (post-graduate) Faculty of Natural and Agricultural Sciences, University Free State - Bloemfontein
Professional Affiliation	Registered as Environmental Assessment Practitioner (EAPASA reg. No. 2019/1069) Member of the International Association of Impact Assessment (SA)
Employment Record	1998 to current: Self-employed as Environmental Assessment Practitioner and practising as Principal of the firm ECO-8 ENVIRONMENTAL PLANNERS in Nelspruit, Mpumalanga.
Experience	More than 22 years experience in environmental impact assessment and project management with direct involvement in more than 420 individual development projects that include residential, commercial and industrial township developments, hotels and resorts developments, wildlife and agriculture developments as well as services and infrastructure projects. (A list of projects can be provided on request).
Specialisation	Environmental Planning for sustainable developments by way of incorporating sustainable process and design aspects into urban layout and services infrastructure planning.
Experience in the field of this specific project	Special experience in impact assessment of urban land uses and utility infrastructure developments (A list of projects can be provided on request).

SCOPING: PROJECT LOCALITY

The aim of this Section is to indicate the locality of the land / site as required in terms of GN R326 App.3, Sec.3(1)(b)(i)-(iii).

B.1 SURVEYOR-GENERAL REFERENCE NUMBER

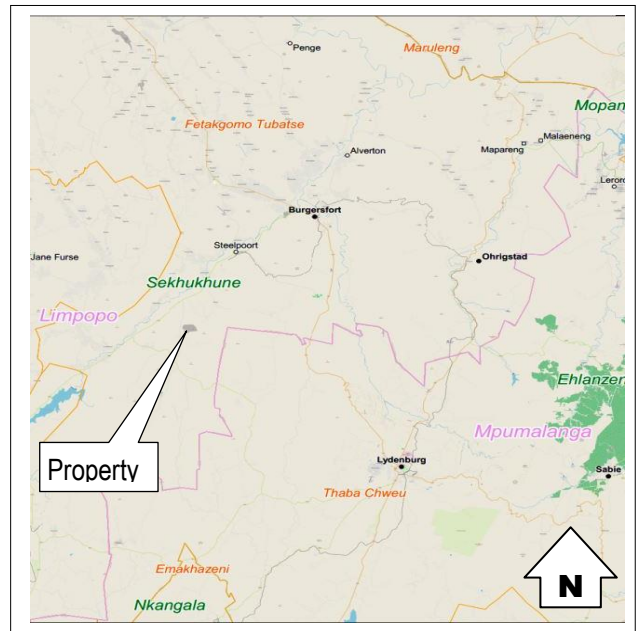
The 21 digit land identification number of the application property.

T	0	K	T	0	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	1	5
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B.2 REGISTERED PROPERTY DESCRIPTION

Erf/ Portion Number	Portion 15
Township/ Farm Name	Tweefontein 360
Registration division	KT

DISTRICT LOCALITY MAP



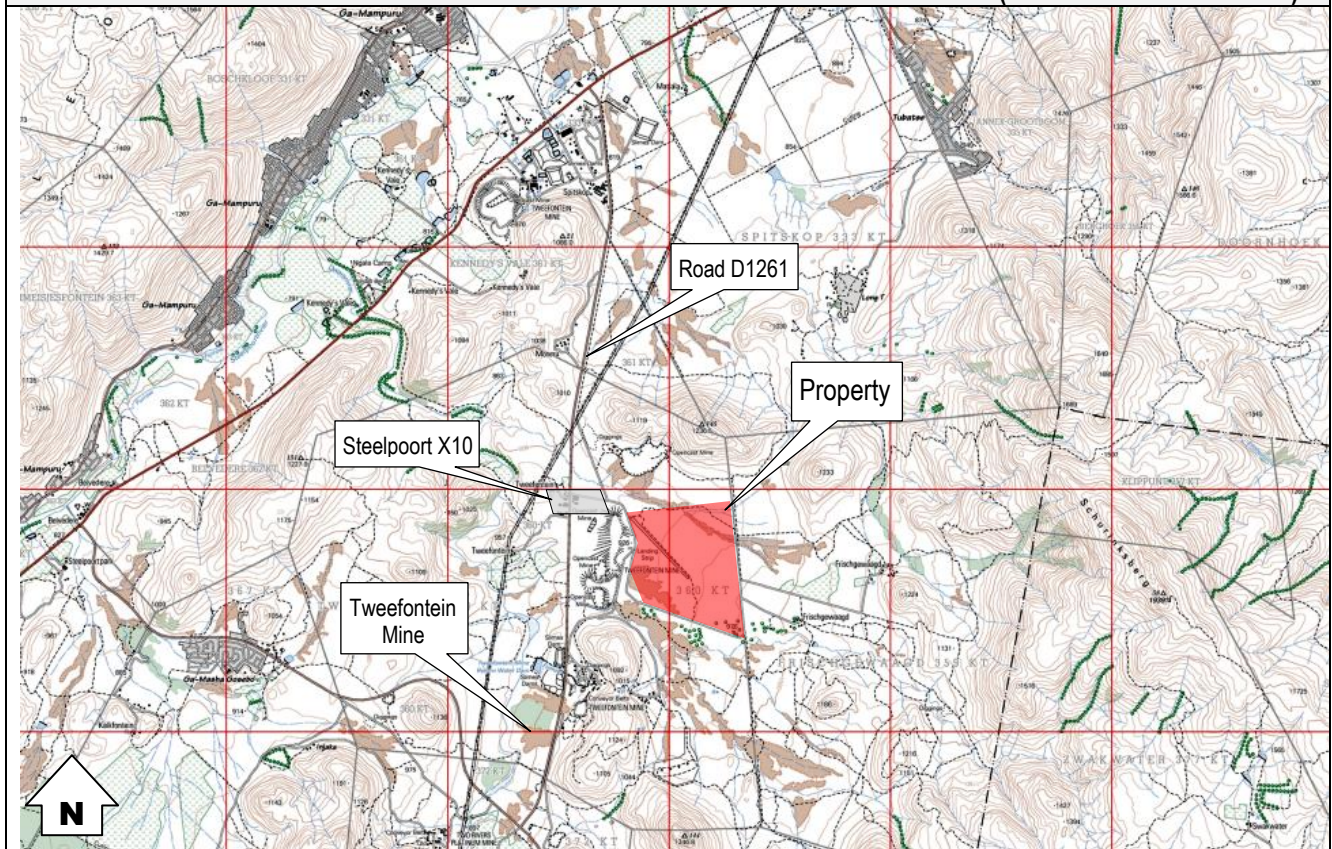
B.3 PHYSICAL ADDRESS OF THE PROPERTY

Street name & number	Road D1261 between Steelpoort and Dwarsrivier
Town / distance from town	±18 km from Steelpoort

B.4 PROPERTY CENTRE COORDINATES

Projection	(WGS84)
Longitude (DDMMSS)	24°52'15.87"S
Latitude (DDMMSS)	30° 8'11.73"E

B.5 PROPERTY LOCALITY MAP (MAP SHEET NO. 2430CC)



SCOPING: THE PROJECT DESCRIPTION

The aim of this Section is to provide a description and plan of the project to be undertaken including associated structures and infrastructure as required in terms of GN R326 Appendix 3, Section 3(1)(d).

C.1 SCOPE OF THE PROJECT

C1.1 DEVELOPMENT OBJECTIVE

The property was historically used for agricultural purposes (crop production and livestock farming) and as such the property holds an "Agriculture" land use zoning in terms of the Fetakgomo Tubatse Local Municipal Land Use Scheme (2019). Despite the primary land use zoning, agricultural activities ceased due to increasing mining activities in the surrounding area since the mid 1990's and therefore the property laid vacant and unused for the past 25 years.

The objective is to provide a range of utility services to surrounding industrial and mining land uses by developing the following utility infrastructure on a portion, 155.16 ha in size on Portion 15 of the farm Tweefontein 360 KT (the property):

- Solar (Photovoltaic) energy generation plant (SEGP) for local electricity supply and associated infrastructure.
- Wastewater treatment plant (WWTP) for local industrial water supply (re-use of treated wastewater).
- Raw water treatment works (WTW) and water reservoir for storage of treated water for local water supply.
- An in-stream storm water management system including storm water detention dam and erosion protection structures to prevent existing land degradation and potentially additional land degradation due to the proposed development.
- An off-stream storm water management system including collection and conveyance of storm water from the SEGP and roads towards two off-stream water storage dams to be constructed in an existing mine quarry.
- Land reclamation and rehabilitation of an existing mine quarry to make land available for future development.
- Internal roads, water pipelines and electricity distribution infrastructure in support of the main land uses.

C1.2 DESCRIPTION OF THE SELECTED PRIMARY LAND USES (UTILITY SERVICES)

Land Use 1 (LU1): Proposed Solar Energy Generation Plant (SEGP)

Portion A (± 79.25 ha) and the Remaining portion (± 40.91 ha) of the subdivided property are proposed for the development and operation of a solar energy generation plant :

- Planned electricity generation capacity: ± 40 MVA (MW).
- Development footprint comprising of four blocks of ± 12.5 ha, 16.2 ha, 28.2 ha and 11.06 ha, totalling 67.96 ha.
- Internal service roads, perimeter fencing and buildings for a control centre, electronic equipment and guards.

A detailed description of the SEGP is attached in Appendix G11.

Land Use 2 (LU2): Proposed Water Treatment Works (WTW) and Wastewater Treatment Plant (WWTP)

A portion of the Portion C (± 35 ha) of the subdivided property is proposed for the development and operation of a raw water treatment works, water storage reservoir and a wastewater treatment plant and associated infrastructure:

- Planned water treatment works capacity : $900\text{m}^3/\text{day}$.
- Planned water storage reservoir capacity: 1600m^3 .
- Wastewater treatment plant capacity: Initial capacity of $50\text{m}^3/\text{day}$ and planned future expansion of $150\text{m}^3/\text{day}$.
- Combined development footprint of the WWTP and WTW: $\pm 8000\text{m}^2$ and $\pm 2000\text{m}^2$ (totalling $\pm 10000\text{m}^2$).

A detailed description of the WTW and WWTP is attached in Appendix G12.

C1.3 DESCRIPTION ASSOCIATED INFRASTRUCTURE IN SUPPORT OF THE LAND USES

EXTERNAL ENGINEERING SERVICES / TECHNOLOGIES

ACCESS TO DISTRICT ROAD D1261

The property obtains access via a right-of-way gravel road from District Road D1261 which is located $\pm 900\text{m}$ west of the property. It is proposed to formalise this road of $\pm 7.5\text{m}$ wide by way of registering a servitude over this road with a road reserve of 15m and also to upgrade the intersection with road D1261 (this road and intersection is located outside the application property and the formalisation and upgrading does not require environmental authorisation).

BULK ELECTRICITY SUPPLY

The SEGP on portions A and Re of the property will require an electricity load estimate of 96kVA and the WTW and WWTP on Portion C will require 28kVA. The total electricity demand of 124kVA can be provided from an existing ESKOM electricity distribution connection at the adjacent Kadoma Industrial Park. The existing electricity network has sufficient capacity to provide in the demand. A 22kV medium voltage bulk supply will be installed from the existing Eskom connection to a switching station on Portion A for further distribution to the intended land uses.

BULK WATER SUPPLY

The project land uses are not dependent on raw water from the Lebalelo Water Supply Scheme, however adjacent mining and industrial land uses do require water from the scheme. The demand for water from the Scheme is thus determined by the end-user (mine or industry) that holds an allocation from the Lebalelo Water Supply Scheme. The aim is to channel the raw water through the proposed WTW on Portion C for supply of treated water to the relevant mine or industry. A new pipeline connection (200mm Ø) is planned from the existing Lebalelo underground raw water pipeline that runs along District Road D1261 (± 900m west of the property) to the proposed WTW on Ptn C.

WASTE REMOVAL SERVICES

The municipality does not provide external waste removal services to the area and such services will be outsourced to approved services providers for disposal at the Licenced Municipal Waste Site at Burgersfort.

INTERNAL ENGINEERING SERVICES/TECHNOLOGIES AND ENGINEERING WORKS

INTERNAL ROADS

Access roads with a reserve of 15m and road widths of 7.5m is planned to provide access to each of the proposed subdivided land portions. Internal service roads, ±7m wide is planned where necessary on each land portion.

STORM WATER SYSTEMS

The proposed storm water system consist of the following components (more detailed description in App G12):

- One in-stream storm water detention dam to buffer peak storm water flows from up-stream and off-site areas. Dam dimensions: Capacity : ±31000m³, Surface area ±12000m², dam wall length ±70m and dam wall height ±4.5m.
- Two off-stream storm water storage dams to be constructed within the existing quarry. One storm water storage dam with a dam wall height of ±4.5m, capacity of ±51800m³ and surface area of ±30000m². One storm water storage dam with a dam wall height of ±4.5m, capacity of ±62400m³ and a surface area of ±26000m².
- Surface run-off will be collected within the solar energy generation plant area by way of surface channels that discharge towards 12 field inlets and into an underground storm water pipe system (600mm Ø). The pipeline of ±1400m in length will discharge in the two of-stream storm water storage dams.
- Both dam basins will be lined with a HDPE geo-membrane liner to prevent sub surface seepage into underlying soil formation resulting in loss of water storage and possible contamination of sub surface groundwater.

INTERNAL WATER SUPPLY / RETICULATION

It is planned to supplement bulk raw water with groundwater from three on-site boreholes with a combined yield of 265 m³/d to be treated at the water treatment works (capacity of 900 m³/d) and to store the treated water in a concrete reservoir of 1600 m³. The internal water reticulation / distribution will follow the conventional method of underground piping (160 mm Ø) along the road reserves of internal service roads.

SEWER SYSTEM

Domestic wastewater generated at staff ablution facilities at the central control facilities of the SEGP and of the WWTP will be linked to a conventional water borne sewer system with a conservancy (suction) tank or by way of a gravity pipeline (depending on topography) towards the wastewater treatment plant on the proposed Portion C.














EROSION PREVENTION STRUCTURES AND LAND RECLAMATION

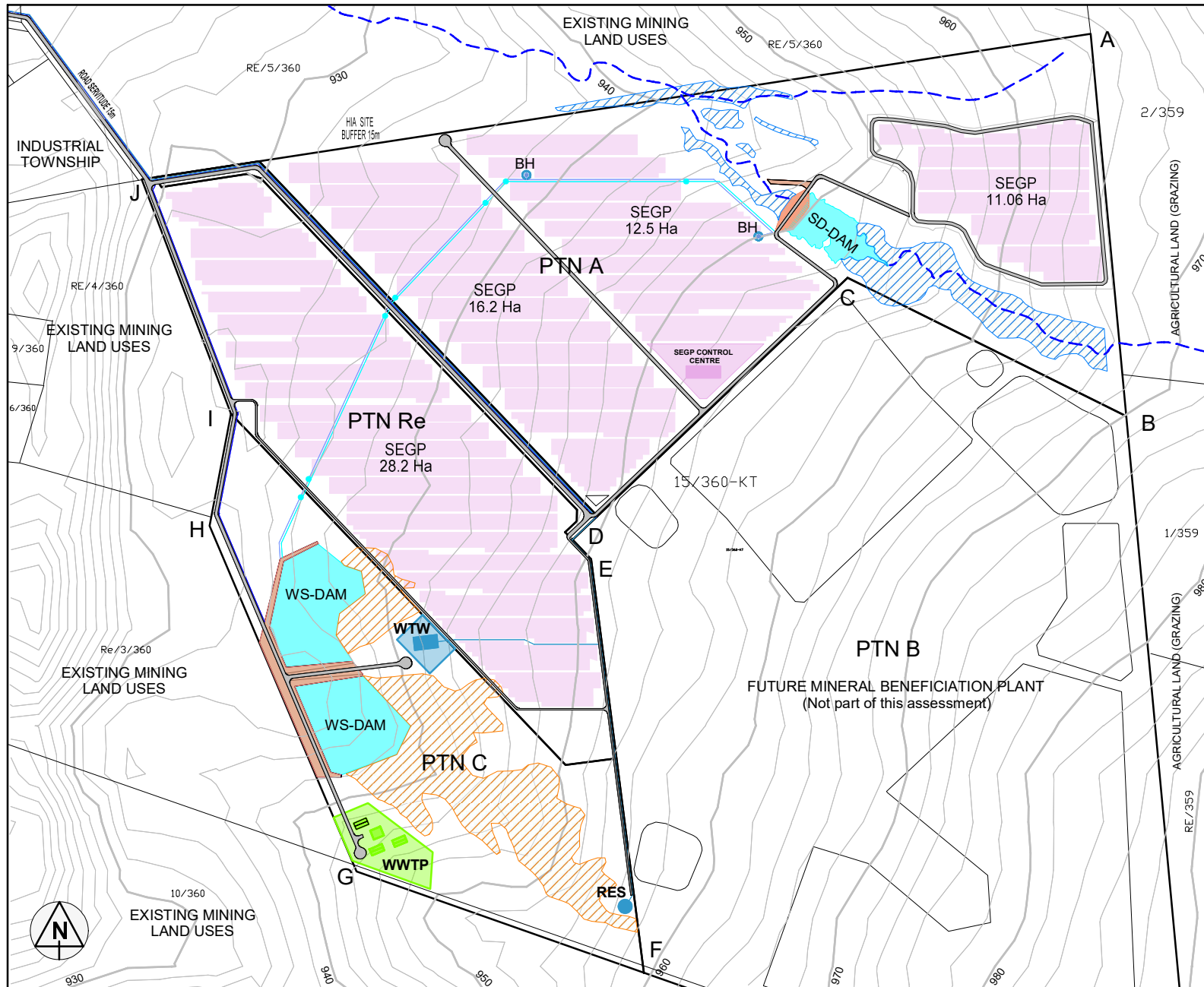
The existing degraded natural watercourse on Portion A and the old quarry on Portion C require significant intervention by way of erosion protection structures in order to prevent their ongoing erosion and degradation. An area of ±6ha in the watercourse and ±12ha of the quarry will require extensive earth works, infilling and soil conservation / erosion prevention structures to ultimately enhance and reclaim the currently degraded land.

Section C 1.4 PROJECT PLAN

FIGURE ABCDEFGIJ REPRESENTS THE DEVELOPMENT AREA / PROJECT SITE

LEGEND

-  SOLAR ENERGY GENERATION PLANT (40 MVA) ±68 Ha
-  WASTEWATER TREATMENT PLANT ±1 Ha.
-  WATER TREATMENT WORKS ±0.5 Ha.
-  BOREHOLES : COMBINED YIELD OF 265 kL/d.
-  RESERVOIR : WATER STORAGE CAPACITY 1,6 ML
-  ACCESS & SERVICE ROADS ROAD RESERVE 15m & 7m
-  BULK WATER PIPELINES
-  STORM WATER PIPELINE AND STORM WATER INLETS
-  STORM WATER DETENTION DAM 31000 CUBIC METERS
-  STORM WATER STORAGE DAMS 51800 & 64200 CUB M
-  EPHEMERAL WATERCOURSE
-  IN-STREAM REHABILITATION OF DEGRADED BED & BANKS
-  REHABILITATION AREA OF A MINE QUARRY



C2. THE EXTENT AND POSITION OF THE PROPOSED DEVELOPMENT

C2.1 The coordinates of the corner beacons of the project area as presented on the Project Plan (Figure A-J):

No.	Latitude (S)	Longitude (E)	No.	Latitude (S)	Longitude (E)
A	24° 52' 05.98"	30° 08' 35.36"	B	24° 52' 29.51"	30° 08' 37.59"
C	24° 52' 20.89"	30° 08' 18.87"	D	24° 52' 36.90"	30° 08' 00.23"
E	24° 52' 38.10"	30° 08' 01.47"	F	24° 53' 03.55"	30° 08' 04.84"
G	24° 52' 57.21"	30° 07' 45.53"	H	24° 52' 35.91"	30° 07' 35.77"
I	24° 52' 29.01"	30° 07' 37.27"	J	24° 52' 14.57"	30° 07' 31.35"

C2.2 The centre coordinates of the selected development sites and size of the development footprint:

Ptn	Map Ref	Activity Description	Area	Latitude (S)	Longitude (E)
A	SEGP	Solar Energy Generation	±11.06 ha	24° 52' 15.69"	30° 08' 29.81"
A	SEGP	Solar Energy Generation	±12.5 ha	24° 52' 18.43"	30° 08' 06.49"
A	SEGP	Solar Energy Generation	±16.2 ha	24° 52' 23.29"	30° 07' 55.66"
Re	SEGP	Solar Energy Generation	±28.2ha	24° 52' 30.77"	30° 07' 48.17"
C	WWTP	Wastewater Treatment Plant	±0.8 ha	24° 52' 54.81"	30° 07' 46.94"
C	WTW	Water Treatment Works	±0.15 ha	24° 52' 43.51"	30° 07' 50.80"
C	RES	Water storage reservoir	±0.5 ha	24° 52' 59.16"	30° 08' 03.63"
C	WS-DAM	Water storage dam (Off-stream)	±3 ha	24° 52' 41.22"	30° 07' 42.42"
C	WS-DAM	Water storage dam (Off-stream)	±2.6 ha	24° 52' 47.85"	30° 07' 45.12"
C	-	Quarry rehabilitation area	±12ha	24° 52' 49.64"	30° 07' 50.00"
A	SD-DAM	In-stream storm water detention dam	±1.2 ha	24° 52' 16.79"	30° 08' 15.49"
A	-	Upstream rehabilitation area	±6ha	24° 52' 25.84"	30° 08' 36.64"
A	-	Downstream rehabilitation area		24° 52' 10.12"	30° 08' 06.96"

D.2 IDENTIFICATION AND DESCRIPTION OF THE NEMA-EIA REGULATED PROJECT ACTIVITIES

The following table provides the full description of the identified regulated activities and relevance to the project as listed in the relevant Listing Notices under the EIA Regulations which requires Environmental Authorisation.

Acty. No.	REGULATED ACTIVITIES AS LISTED IN THE EIA REGULATIONS APPLICABLE TO THIS PROJECT	EXTENT OF ACTIVITIES TO BE UNDERTAKEN INCLUDING ASSOCIATED STRUCTURES AND INFRASTRUCTURE
D2.1 CHANGE OF LAND USE		
L1 / A28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur outside an urban area, where the total land to be developed is bigger than 1 hectares.	<i>The proposed project site is situated outside an urban area and has an "Agricultural" land use zoning. The proposed utility infrastructure services which fall within the land use definition of industrial and institutional land uses and will cover an area of ±154 ha. Activity 28 of Listing Notice 1 thus requires authorisation.</i>

D2.2 CIVIL INFRASTRUCTURE DEVELOPMENT		
L1 / A24	The development of a road (ii) with a reserve wider than 13,5 metres, or where no reserve exists where the road is wider than 8 metres, but excluding a road— (b) where the entire road falls within an urban area; or (c) which is 1 kilometer or shorter.	<i>A road with a reserve of 15m wide and with a length exceeding 1km, outside an urban area, is planned on Portions C and the Remaining Portion of the property to provide access to these proposed land portions. Activity 24 of Listing Notice 1 therefore requires authorisation.</i>
L3 / A4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. e. in Limpopo i. Outside urban areas. (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas	<i>Internal services roads wider than 4m and with a reserve of less than 13.5 m is planned around the solar energy generation plant and towards the wastewater treatment plant and water treatment works. These roads will be developed within ±9km from a national protected area namely the de Hoop Nature Reserve. Activity 4 of Listing Notice 3 therefore requires authorisation.</i>
L3 / A2	The development of reservoirs, [for bulk water supply] excluding dams, with a capacity of more than 250 cubic metres. e. Limpopo, ii. Outside urban areas: (ff) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	<i>The proposed water storage reservoir of 1600 m³ will be developed on the proposed Portion C of the property to store treated water for supply to mining and industrial land uses. The property is located within 9km from the De Hoop National Protected Area. Activity 2 of Listing Notice 3 therefore requires authorisation.</i>
L1 / A9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	<i>A piped storm water system of ±1400m with a pipe diameter of 0,60 meters is planned over Portions A, Re and C. Activity 9 of Listing Notice 1 therefore requires authorisation.</i>

Acty. No.	REGULATED ACTIVITIES AS LISTED IN THE EIA REGULATIONS APPLICABLE TO THIS PROJECT	EXTENT OF ACTIVITIES TO BE UNDERTAKEN INCLUDING ASSOCIATED STRUCTURES AND INFRASTRUCTURE
D2.3 SOLAR ELECTRICITY GENERATION PLANT (SEGP)		
L1/A17	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 275 kilovolts.	<i>The transmission of electricity from the SEGP will not exceed 33 kilovolts and therefore Activity 17 of Listing Notice 1 is not applicable.</i>

L2/A1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure	<i>A solar photovoltaic energy generation plant of 40 megawatt is planned outside an urban area on proposed Portion A and Re of the property, covering a development footprint area of ±68ha. Activity 1 of Listing notice 2 thus requires authorisation.</i>
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Acty. No.	REGULATED ACTIVITIES AS LISTED IN THE EIA REGULATIONS APPLICABLE TO THIS PROJECT	EXTENT OF ACTIVITIES TO BE UNDERTAKEN INCLUDING ASSOCIATED STRUCTURES AND INFRASTRUCTURE
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D2.4 WASTEWATER TREATMENT PLANT

L1/A25	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000m³ but less than 15000m³.	<i>A re-evaluation of the wastewater treatment demand indicates that a plant with a daily throughput capacity of 50m³/day will be developed on the proposed Portion C of the property, with opportunity for later expansion to 150m³ throughput capacity per day. Activity 25 of Listing Notice 1 is therefore not applicable.</i>
L1/A14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m ³ cubic metres or more but not exceeding 500m ³ .	<i>Sewerage is classified as a hazardous waste and the initial wastewater storage volume of the proposed wastewater treatment plant is planned at 170m³ (with opportunity for future expansion). Activity 14 of Listing Notice 1 thus requires authorisation.</i>
L2/A6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding— (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 m³ or less.	<i>A wastewater treatment plant will be developed with a daily throughput of ±50m³ which requires a Water Use License in terms of the National Water Act (1998). However, the throughput will be less than 2000m³ and therefore Activity 6 of Listing Notice 2 is not applicable.</i>
L1/A10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more.	<i>Pipelines for the bulk transportation of treated wastewater to local users will not exceed internal diameter of 0.36m or a peak through flow of 120 l/sec or more. Activity 10 of Listing Notice 1 is therefore not applicable.</i>

Acty. No.	REGULATED ACTIVITIES AS LISTED IN THE EIA REGULATIONS APPLICABLE TO THIS PROJECT	EXTENT OF ACTIVITIES TO BE UNDERTAKEN INCLUDING ASSOCIATED STRUCTURES AND INFRASTRUCTURE
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D2.6 STORM WATER DETENTION DAMS AND EROSION PROTECTION STRUCTURES

L1/A12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100m ² (ii) infrastructure or structures with a physical footprint of 100m ² or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) within 32 metres of a watercourse, measured from the edge of a watercourse.	<i>An in-stream storm water detention dam with as surface area of ±12000m² will be developed. Furthermore a degraded watercourse area of ±60000m² required rehabilitation by construction of erosion prevention structures such as rock-beds and gabion structures on Portion A, which requires environmental authorisation. Although the old mine quarry is not located within a natural watercourse the definition of a watercourse applies to the channels leading to a depression that is seasonally inundated. Therefore the two off-stream water storage dams with a combined surface area of ±56000m² and proposed land reclamation activities within the quarry requires environmental authorisation.</i>
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L3 / A14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 m ² ; or (ii) infrastructure or structures with a physical footprint of 10 m ² or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse. e. In Limpopo, i. Outside urban areas, in: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	<i>Similar to the above, storm water attenuation ponds and water storage ponds and erosion prevention structures are planned for development within an off-stream quarry on proposed Portion C and within a watercourse on the proposed Portion A of the property which will exceed a physical footprint of 10m² and which is located outside an urban area and within an Ecological support area (ESA1) and within 10km from the De Hoop National Protected Area. Activity 14 of Listing Notice 3 thus requires authorisation.</i>
A1 / A13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	<i>Two off-stream water storage dams with a combined capacity of ±114200m³ are planned within the existing quarry on Portion C. Activity 13 of Listing Notice 1 thus requires authorisation.</i>
L1 / A19	The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m ³ from a watercourse.	<i>It is proposed to construct erosion prevention structures, road crossings including storm water detention dams within a watercourse and within an eroded quarry on the property. The soil excavation and infilling volumes associated with these activities is expected to exceed 10m³. Activity 19 of Listing Notice 1 therefore requires authorisation.</i>
L2/A16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high water mark of the dam covers an area of 10 hectares or more.	<i>None of the proposed dams will have a dam wall with a height of of 5m or higher. Activity 16 of Listing Notice 2 is thus not applicable.</i>

Acty. No.	REGULATED ACTIVITIES AS LISTED IN THE EIA REGULATIONS APPLICABLE TO THIS PROJECT	EXTENT OF ACTIVITIES TO BE UNDERTAKEN INCLUDING ASSOCIATED STRUCTURES AND INFRASTRUCTURE
D2.8 ACTIVITIES ASSOCIATED WITH THE ABOVE-MENTIONED DEVELOPMENT		
L2 / A15	The clearance of an area of 20 ha or more of indigenous vegetation, excluding (i) where such clearance of indigenous vegetation is required for the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan	<i>Indigenous vegetation for purpose of the development of the utilities infrastructure will be cleared within a combined development footprint on both Portions A, C and the Remainder of ±140 ha.</i>
L3 / A12	The clearance of an area of 300m ² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. In (e). Limpopo, (i). Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004.	<i>The property is located within the Sekhukhune Mountainlands Ecosystem (MP9) which is listed as an endangered ecosystem. It is planned to clear indigenous vegetation of ±140ha within this ecosystem. Please note that Specialist Verification confirmed that this grassland ecosystem does not occur on the property. The Sekhukhune Bioregional Plan (2020) indicates more accurately that the occurring vegetation type is Sekhukhune Mountain Bushveld which has a conservation status of 'least concern'. However, Activity 12 of Listing Notice 3 still require authorisation as it remains a regulated activity.</i>

LEGISLATIVE CONTEXT

In compliance with GN R326 Appendix 3, Section 3(1)(e) this section describes the policy and legislative context within which the development is proposed including identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that apply to this development and which are to be considered in the assessment process.

E.1 LEGISLATION

Title of legislation	Authority	Relevance	Response
<i>National Environmental Management Act (1998) (NEMA)</i>	LEDET	<i>An Application for Environmental Authorisation in terms of section 24 of the NEMA applies to the proposed utilities infrastructure project.</i>	<i>The Scoping and Environmental Impact Report (S&EIR) fulfils the requirements of the NEMA Regulations, was submitted to LEDET, and is in process of review.</i>
<i>Environmental Impact Assessment Regulations 2014 (amended in 2017)</i>	LEDET	<i>Regulated activities that are as listed in GN R 983, 984 and 985 of the EIA Regulations (as amended) will be 'triggered' by the proposed utilities infrastructure project.</i>	<i>Section D of the report identifies applicable regulated activities in terms of the NEMA 2014 EIA Listing Notices that require environmental Authorisation.</i>
<i>National Environmental Management: Biodiversity Act 2004 (NEMBA)</i>	DEA	<ul style="list-style-type: none"> ▪ <i>The NEMBA requires authorisation for any activity, which may affect threatened or protected ecosystems and species as specified in terms of Section 52.</i> ▪ <i>The Threatened or Protected Ecosystem Regulations GN R 1002 of 9 December 2011 lists critically endangered, endangered, vulnerable ecosystems that require protection.</i> ▪ <i>The Threatened or Protected Species Regulations GN R 151 of 23 February 2007 (as amended) specify the legal obligations of landowners in respect of listed plant and animal species of conservation concern species that occur on their properties.</i> ▪ <i>The Alien and Invasive Species Regulations GN R 864 of 29 July 2016 (as amended) specify the legal obligations of landowners in respect of listed invasive plant and animal species that occur on their properties.</i> 	<ul style="list-style-type: none"> ▪ <i>GN R 1002 identifies the Sekhukhune Mountainlands (MP9) as an endangered ecosystem. The project area is located within this ecosystem (refer to Section F8.1). However, several discrepancies were identified between official sources and on-site land cover and Specialist Verification confirms that the project site is not located in an Endangered Ecosystem (see App G4).</i> ▪ <i>The screening assessment identified several plants and animal species that are listed under GNR151 that may potentially occur within the project area. A Specialist Site Verification confirms that no species of conservation concern occur on the site (see App G6 & G7).</i> ▪ <i>An on-site verification identified several listed indigenous and alien invader plant species within the project area, which requires eradication (refer to the EMPR for action to achieve this).</i>
<i>National Environmental Management Waste Act 2008 (NEMWA)</i>	LEDET	<ul style="list-style-type: none"> ▪ <i>The NEMWA requires authorisation for any listed waste activity that exceeds the stipulated threshold as identified in GN R 921 of 29 November 2013 (as amended).</i> ▪ <i>The utility activities are not expected to generate organic waste or general solid and liquid waste during the construction and operational phases in excess the stipulated thresholds.</i> ▪ <i>The utility activities are not expected to generate hazardous waste during the construction and operational phases in excess of the stipulated thresholds.</i> 	<i>The activities would not require a Waste Licence for the generation, storage, treatment, recycling or disposal of organic waste, general waste or hazardous waste.</i>

Title of legislation	Authority	Relevance	Response
<i>National Environmental Management Air Quality Act 2004 (NEMAQA)</i>	<i>SDM</i>	<i>The proposed utility services are not listed/regulated in terms of the Act. However, the National Dust Control Regulation under GN R 827 of 1 November 2013 specifies dust-fall rates for non - residential areas.</i>	<i>The development activities would not require an Air Emissions License. Precautionary measures must be employed by the applicant to minimise dust-fall during construction/preparation and this aspect is included in the EMPR.</i>
<i>National Water Act (1998) (NWA)</i>	<i>DWS</i>	<i>Section 21 (a)(b)(c)&(i) of the Act requires a water use authorisation for abstraction and storing water in a dam and altering the bed & banks and flow of a watercourse. Section 21(f)&(g) requires a water use authorisation for treatment and disposing of effluent waste.</i>	<i>The applicant is in process of applying for a Water Use License for the proposed new water uses.</i>
<i>National Health Act (2003)</i>	<i>DOH</i>	<i>This Act provides for the prevention of nuisance and offensive conditions and provides for municipal health services including water quality monitoring, waste management, and environmental pollution control. Activities that may potentially affect the health of any person, is required to comply with prescribed norms and standards as provided in the Act.</i>	<i>Environmental health norms and standards as prescribed by the Act must be integrated into the final planning and design of the proposed utilities infrastructure.</i>
<i>The National Forest Act (1998) (NFA)</i>	<i>DAFF</i>	<i>The Act provides for the protection of certain listed tree species.</i>	<i>A permit shall be obtained for the removal of listed tree species that were identified in the project area.</i>
<i>National Environmental Management Protected Areas Act 2003 (NEMPA)</i>	<i>LTA</i>	<ul style="list-style-type: none"> ▪ <i>The activity is not located in a protected area, although within 5 -10km of a National or Provincial Park.</i> ▪ <i>The activity is not located within the National and Provincial Protected Area Expansion Strategy Focus Area.</i> 	<i>It is not expected that the proposed utilities infrastructure would pose any negative visual impact on the De Hoop Dam Protected Area.</i>
<i>Conservation of Agricultural Resources Act (1983) (CARA)</i>	<i>DAFF</i>	<p><i>The Act regulates the :</i></p> <ul style="list-style-type: none"> ▪ <i>the responsibility of the landowner regarding the prevention of soil erosion, restoration of eroded land, protection of watercourses, and;</i> ▪ <i>responsibilities to combat weeds and invader plants and bush encroachment.</i> 	<ul style="list-style-type: none"> ▪ <i>The applicant shall implement soil conservation and vegetation control methods to combat weeds and invader plants, bush encroachment, and shall maintain riparian zones and watercourses in a healthy state in accordance with the Act.</i> ▪ <i>The EMPr contains more detailed plans actions to be implemented.</i>
<i>The National Heritage Resources Act (1999) (NHRA)</i>	<i>SAHRA</i>	<i>Provides for the protection of heritage resources.</i>	<i>An Archaeologist specialist report identified one HIA site of medium significance. However, the site is not located in the development footprint and would not affect the development. A permit shall be obtained for destruction only if necessary.</i>
<i>Limpopo Environmental Management Act (2003)</i>	<i>LEDET</i>	<i>Provides for the protection of certain plant and animal species.</i>	<i>A permit shall be obtained for the removal of listed plant and tree species that were identified in the project area.</i>
<i>Civil Aviation Act (2009)</i>	<i>SACAA</i>	<i>All proposed developments or activities that potentially could affect civil aviation military aviation or military areas of interest must be assessed by SACAA, in terms of the Civil Aviation Technical Standards.</i>	<i>The existing airfield on the property will be closed. Another private airstrip located ±2km due north of the SEGP will not be affected by glint or glare (see Section F14). CAA confirmed that no registered aerodrome is located nearby and the development would not constitute an aviation obstacle (see App F – public participation process).</i>

E.2 POLICIES AND PLANS

Title of policy or plan	Authority	Relevance	Response
National Development Plan (NDP)	-	The national policy recognises the potential of infrastructure development for job creation.	The NDP was considered in this assessment - refer to need and desirability assessment – Section G.
Industrial Policy Action Plan (IPAP) 2018/19 – 2020/21	DTI	The IPAP features industrial and services development as one of the key action programmes for the country.	The IPAP was considered in this assessment - refer to need and desirability assessment – Section G.
Fetakgomo Tubatse Municipal Integrated Development Plan (IDP) 2016-2021	FTLM	Relevant to this application, the IDP aims at strengthening the services sector to stimulate investment and economic growth.	The IDP was considered in this assessment - refer to need and desirability assessment – Section G.
Sekhukhune District Municipality (IDP) 2018/2019	SDM	The Sekhukhune District Municipal IDP identified the Steelpoort area a growth point for mining, industries and support services.	The proposed utilities infrastructure project is in line with the District IDP.
Sekhukhune District Bioregional Plan (SDBP) 2019	LEDET	The Limpopo Conservation Plan V3 and the Sekhukhune District Bioregional Plan (2019) classifies the biodiversity priority of the development site as Ecological Support Area (ESA) Level 1.	Specialist on-site verification confirms that the site is heavily modified and fragmented, and has mostly lost its original vegetation structure and composition and has lost its potential as habitat for species and its ability to provide ecological services nearby CBS'a

E.3 PROVINCIAL, MUNICIPAL & OTHER DEVELOPMENT PLANNING FRAMEWORKS AND INSTRUMENTS

Municipal Planning Frameworks	Authority	Relevance	Response
Municipal Land Use Management System (LUMS) 2020	FTLM	The LUMS specifies land use zones unique to each property. The property has an Agricultural land-use zoning.	The property's position in-between mining and industrial land uses limits the potential of the land to be used for agriculture. The municipality is reviewing the current agricultural zoning of the property.
Sekhukhune Distr. Municipality Spatial Development Framework (SDF) 2018 draft	SDM	The SDF indicates that the property is located within a mining area and earmarks land uses that are linked to or in support of the mining industry in this area.	The proposed utilities infrastructure project is in line with the SDF as it will provide support services to the surrounding mines and associated industries.
Olifants River Regional Environmental Management Framework	(DEA/DWS)	The property is located within the Environmental Management Framework for the Olifants and Letaba Rivers Catchment Areas (OLEMF Sub Catchment Zone B). The OLEMF states specific land use objectives for the development area in terms of water quality and quantity.	The proposed development will not pose a negative water quality or water quantity impact on the ecological reserve of any part of the river system in the EMF area. The watercourse rehabilitation proposal will in fact pose a positive impact on water quality.
World Heritage Convention Act, 1999	DEA	The project area is not located in a World Heritage Area or a UNESCO Man and the Biosphere Programme Area.	N/A
Protected Area Expansion Strategy	LEDET	The project area is not located in a National or Provincial area earmarked for the expansion of protected areas.	N/A

E.4 REGULATIONS, GUIDELINES, NORMS & STANDARDS

Title of guideline, norms or standard	Relevance	Response
<i>Guideline: A Primer on Soil Conservation (1984)</i>	<i>The document provides guidelines to agricultural engineers and landowners alike on measures to prevent soil erosion and measures to rehabilitate existing erosion on farms.</i>	<i>Basic methods derived from these guidelines are incorporated in the mitigation proposals of this assessment.</i>
<i>DEA (2017), Guideline on Need and Desirability</i>	<i>The EIA Regulations stipulates that “Need & Desirability” of a project must be considered in the EIA process. The Guideline aims to ensure that all the relevant sustainability considerations have been taken into account.</i>	<i>A full need and need & desirability assessment was included in the Scoping and EIR Process. The need and desirability motivation of the project is incorporated into Section G.</i>
<i>DEA (2010) IEM Guideline 7 Public Participation</i>	<i>The EIA Regulations stipulates that “Public Participation” must be incorporated in the EIA process. The Guideline aims to ensure that a fair Public Participation Process is followed.</i>	<i>A Public Participation Process according to the Guideline is incorporated into Appendix F of this report.</i>
<i>SANS 0103:2008 The measurement and rating of environmental noise.</i>	<i>The Standard provides a guiding method for environmental noise impact assessments and to predict noise impacts at a certain noise level distance from noise.</i>	<i>A basic noise assessment is incorporated in Section F15 of the Report. No noise impact is anticipated.</i>
<i>NEMAQA: Listed activities and minimum emission standards</i>	<i>Any development must incorporate the minimum emission standard if activity on the site can produce listed/regulated emissions.</i>	<i>No activity as part of the proposed utilities infrastructure will produce listed or regulated emissions.</i>
<i>NEMAQA: Ambient air quality standards 2009.</i>	<i>The development should not change the characteristics of the ambient air quality above the minimum air quality standards.</i>	<i>No component as part of the proposed utilities infrastructure is expected to change the ambient air quality above the listed standards.</i>
<i>NEMWA: National norms and standards for Organic waste Composting GN 561 (2021).</i>	<i>The proposed utilities infrastructure project must incorporate facilities and methods in the operational phase that need to comply with the minimum standards if organic waste composting will be conducted on site.</i>	<i>The are-activated sludge process of the WWTP avoids the production of sludge and thus the use of sludge for organic waste composting is excluded from this operation.</i>
<i>NEMWA: Norms and standards for the remediation of contaminated land and soil GN 331:2014.</i>	<i>The correct remediation procedures must be followed when soil is contaminated to ensure the prevention of further contamination and the correct method of disposal.</i>	<i>In the event of soil contamination due to accidental spillage of hazardous waste, wastewater or chemicals, these norms and standards shall apply.</i>
<i>NEMWA: National norms & standards for the storage of waste GN 926:2013</i>	<i>The correct procedures and facility designs must be followed when waste will be stored on site.</i>	<i>A small solid waste holding site for the temporary storage of in-organic solid waste that may emanate from WWTP will be developed on site according to the required norms and standards.</i>
<i>NHA: Norms and Standards for Premises GN 1229 (2015)</i>	<i>Acceptable standards premises for prevention of environmental conditions that may constitute a health hazard for protection of public health.</i>	<i>The design of the WTW and WWTP shall comply with the relevant norms and standards.</i>
<i>NEMA: Specialist protocols GN-R 320 & GN-R 1150:2020</i>	<i>Identified protocol guidelines for specialist has been identified accordingly in GN-R 320 & GN-R 1150</i>	<i>The Specialist Studies relevant to the protocol guidelines are attached to this report (see Appendix G1 – G7.</i>
<i>EIA Guideline for renewable energy Projects GN989:2015</i>	<i>To ensure that all potential environmental issues pertaining to renewable energy projects are adequately & timeously assessed & addressed.</i>	<i>The Guideline was considered in this EIA process...</i>

THE RECEIVING ENVIRONMENT

In compliance with GN R326 Appendix 3 Section 3(h)(iv), this section provides information on the environmental attributes associated with the development footprint alternatives. Where necessary, the information provided in the scoping report has been verified by specialist / technical professionals and this report is brought in line with the findings of such professionals (see attached reports Appendix G). This section thus highlights any potential impact that the selected development alternatives may pose on the receiving environment. The methods used to assess the environmental attributes of the site were done by way of specialist terrain survey; GIS map overlay analysis, and secondary verifiable data analysis.

F.1 PROPERTY AND LAND-USE ZONING

F1.1 STUDY AREA PROPERTY DESCRIPTION		Site 1	Site (2) Alternative
Property description or physical address of the study area	Province	<i>Limpopo</i>	<i>No alternative property/site forms part of this scoping assessment.</i>
	District Municipality	<i>Sekhukhune District</i>	
	Local Municipality	<i>Fetakgomo Tubatse</i>	
	Ward Number(s)	<i>27</i>	
	Farm name and number	<i>Twefontein 360-KT</i>	
	Portion number	<i>15</i>	
	Size of the study area	<i>±156 hectare</i>	
Other properties included in the study area	Farm name and number	<i>N/A</i>	
	Erf / Portion number	<i>N/A</i>	
	Size of the study area	<i>N/A</i>	

F1.2 PROPERTY LAND-USE ZONING	Selected site
Current zoning as per local municipality LUMS.	<i>Agricultural</i>
Earmarked zoning Local Municipality SDF	<i>Mining area.</i>
Change of land-use/consent use required?	<i>Yes, by way of a SPLUMA Rezoning Application</i>
Registered servitudes?	<i>A right of way and powerline servitude is registered over the property.</i>

F1.3 LOCALITY OF THE PROPOSED DEVELOPMENT SITE OF THE PROPERTY

The proposed utilities infrastructure development will cover some portions of the property as more clearly indicated on the Site Plan (Refer to Section C of this report). The property is also hereafter referred to as the "site" or the "development site".

F1.4 LAND-USE SUITABILITY, IMPACTS, AND RISKS

The property is vacant and has historically been used for formal agriculture following its zoning. Exponential growth of mining activities over the past 25 years in the surrounding area has changed the agricultural land use of the property and surrounding area. Extensive mining and industrial land uses now surrounds the property. The previous rural agricultural character of the area has been lost and aerial photo analysis confirms that no agricultural activity occurred on the property over past 25 years. The proposed utilities infrastructure development would therefore not impact any current land use and would also not compromise the earmarked land use of the property as indicated in the Municipal SDF.

F.2 TERRAIN

F2.1 BROAD LANDFORM(S) THAT BEST DESCRIBES THE AREA IN WHICH THE SITE IS LOCATED

Landform Description	Site	Comment
Plateau / Ridgeline	<i>No</i>	<i>Developments may be subject to uncompromising building restrictions.</i>
Side slope of mountain/valley	<i>No</i>	<i>Developments may be subject to cut-and-fill land stability limitations.</i>
Valley bottom	<i>No</i>	<i>Developments may be subject to flooding.</i>
Undulated low hill country	<i>No</i>	<i>Developments may be subject to local landscape limitations.</i>
Undulating plains country	<i>Yes</i>	<i>Developments may be subject to local landscape limitations.</i>

F.2 POSITION WITHIN THE LOCAL LANDSCAPE THAT BEST DESCRIBES THE SITE

Position of terrain units	Site	Comment
(1) Crest	No	N/A
(2) Upper mid-slope	No	N/A
(3) Mid-slope	Yes	The footslope is suitable for utilities development (see site attributes below).
(4) Foot-slope	No	N/A
(5) Valley bottom	No	N/A
(5) Floodplain	No	N/A

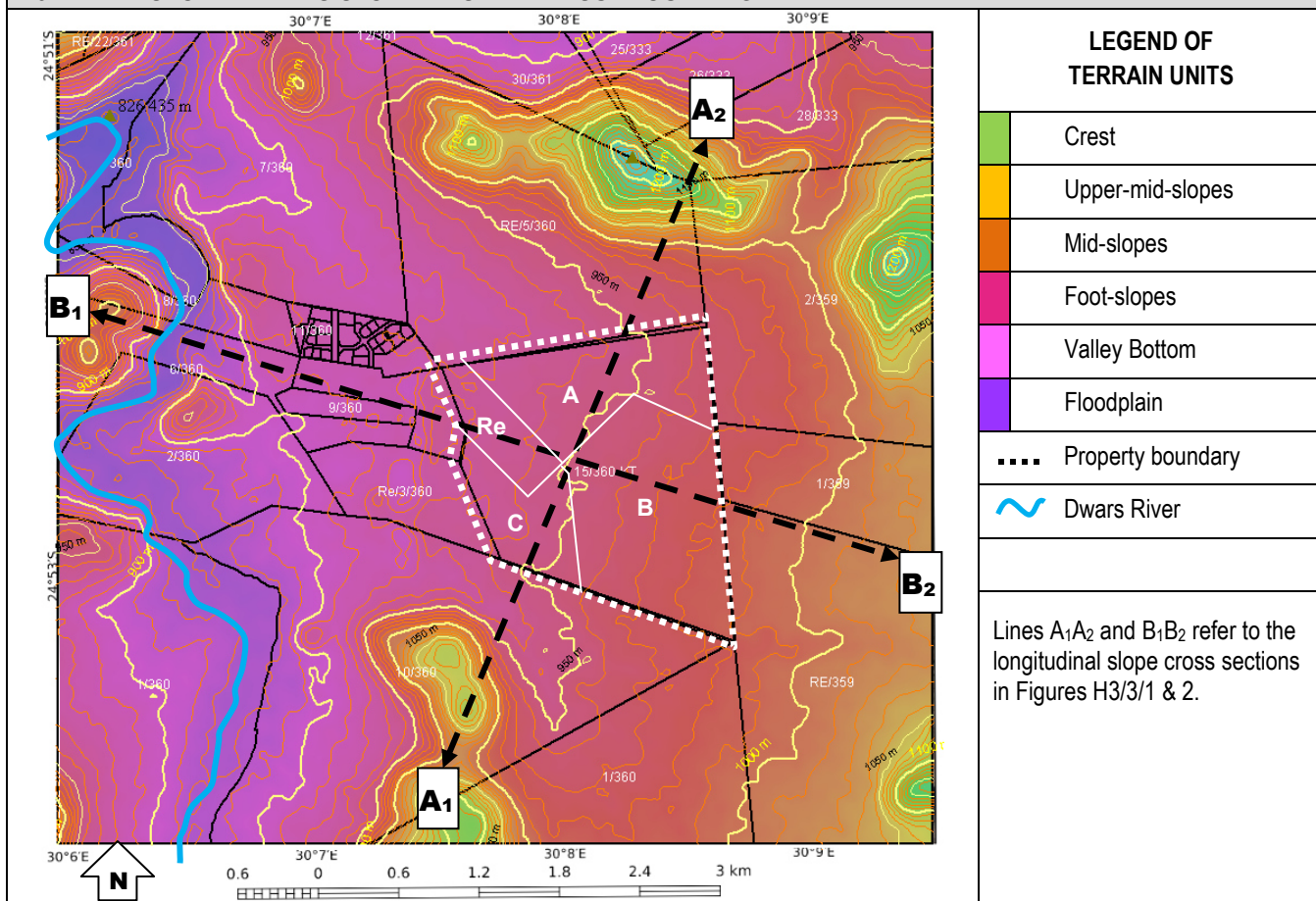
F.2.3 TERRAIN SUITABILITY IMPACTS AND RISKS

Regionally the development site is located in the undulated eastern middle-veld hill-country. The terrain position of the site within a footslope terrain unit within the local landscape would pose no impact or risk of land instability and flooding that can sometimes be associated with some of the other landforms and terrain units that occur in the area.

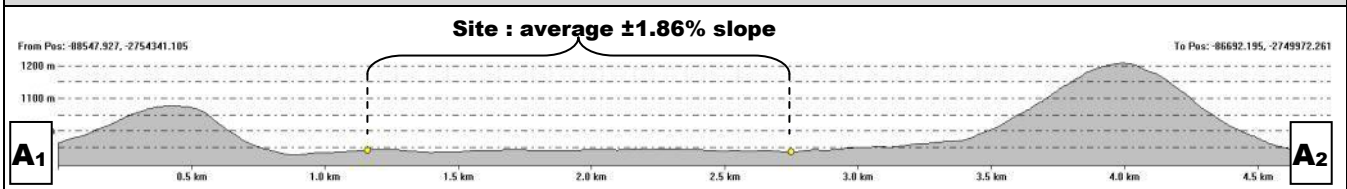
F.3 GRADIENT / SLOPE

F.3.1 SITE ALTITUDE		Terrain unit (1)		Terrain unit (2)		Comment	
Range – meters (m)		±930-952m		±940 -960m		NONE	
Elevation difference (E)		±22m		±20m		NONE	
Elevation distance (D)		±1180m (A ₁ A ₂)		±575m(B ₁ B ₂)		NONE	
Slope % (E/Dx100)		±1.86%		±3.47%		NONE	
Height : horizontal distance (m)	Slope % of gradient	Terrain unit		"Slope", is the vertical height difference between the highest and the lowest points of that portion of land, expressed as a percentage of the horizontal distance.			
		(1)	(2)				
1:20 – 1:15	1-5%	X	X			Overall highly suitable for utilities development	
1:15 – 1:10	5-10%	-	-			Overall good suitability for utilities development	
1:10 – 1:7,5	10-15%	-	-			Overall suitability for utilities development	
1:7,5 – 1:5	15 – 20%	-	-			Overall limited suitability for utilities development	
Steeper than 1:4	>25%	-	-	Overall poor suitability for utilities development			

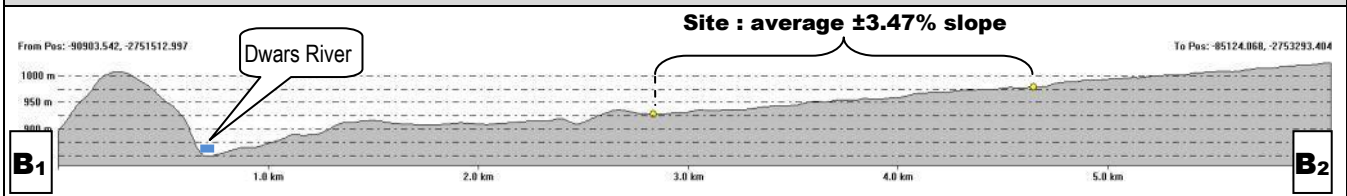
F.3.2 MAP: SLOPE ANALYSIS OF THE SITE AND SURROUNDING AREA



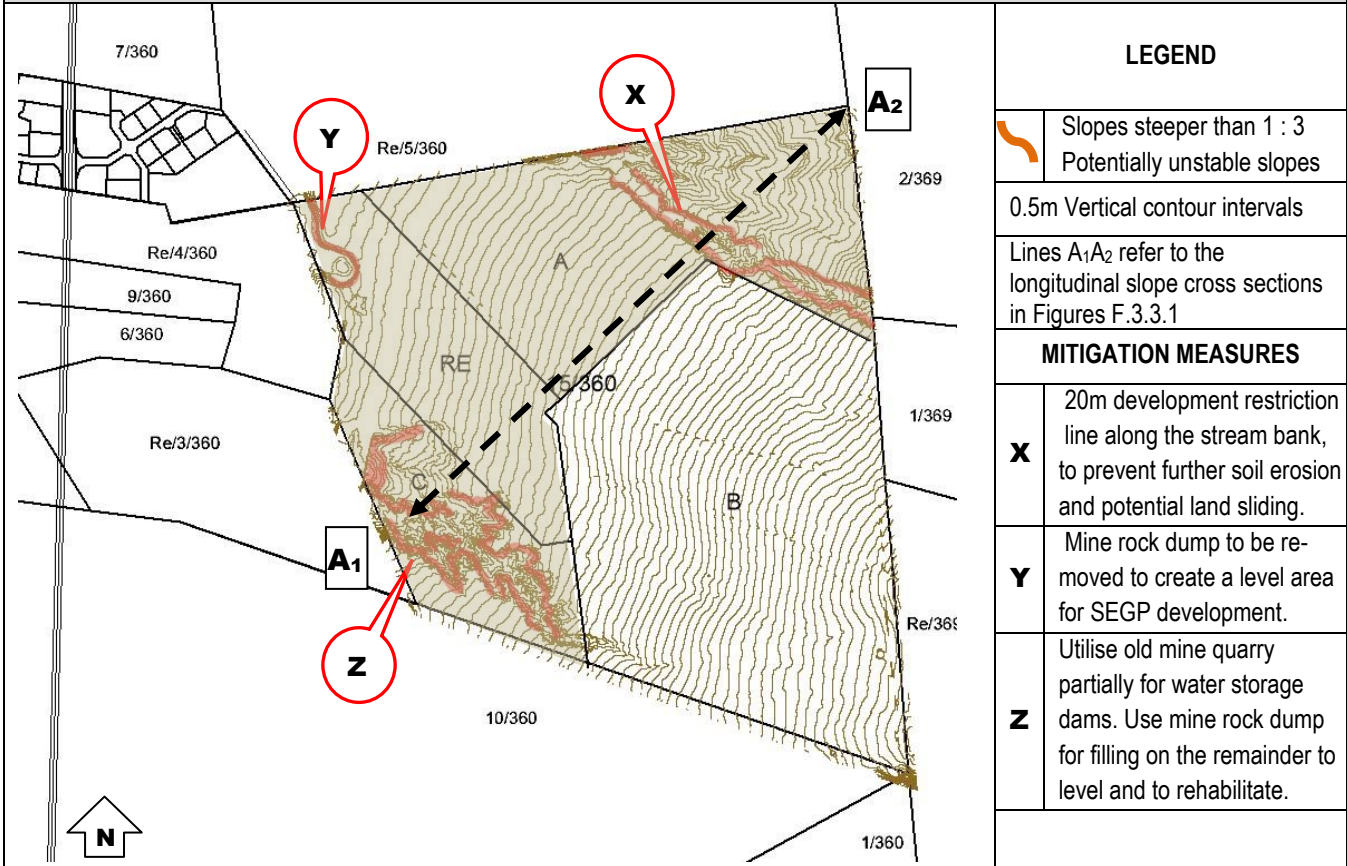
F3.2.1 LONGITUDINAL SLOPE CROSS-SECTION: TERRAIN UNIT A1-A2 (REFER TO MAP F3.2)



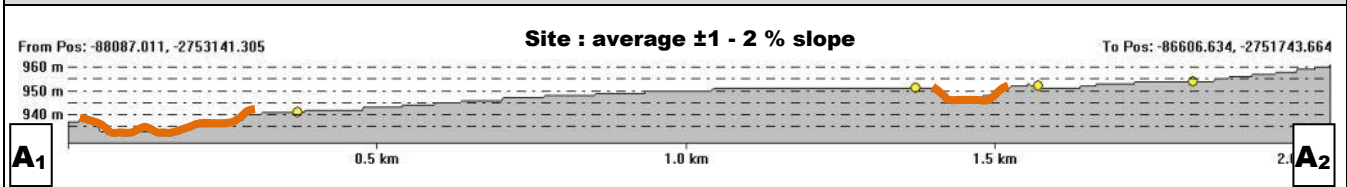
F3.2.2 LONGITUDINAL SLOPE CROSS-SECTION: TERRAIN UNIT B1-B2 (REFER TO MAP F3.2)



F3.3 MAP: SLOPE ANALYSIS OF THE SITE



F3.3.1 LONGITUDINAL SLOPE CROSS-SECTION: TERRAIN UNIT A1-A2 (REFER TO MAP F3.3)



F3.4 GRADIENT SUITABILITY, IMPACTS, AND RISKS

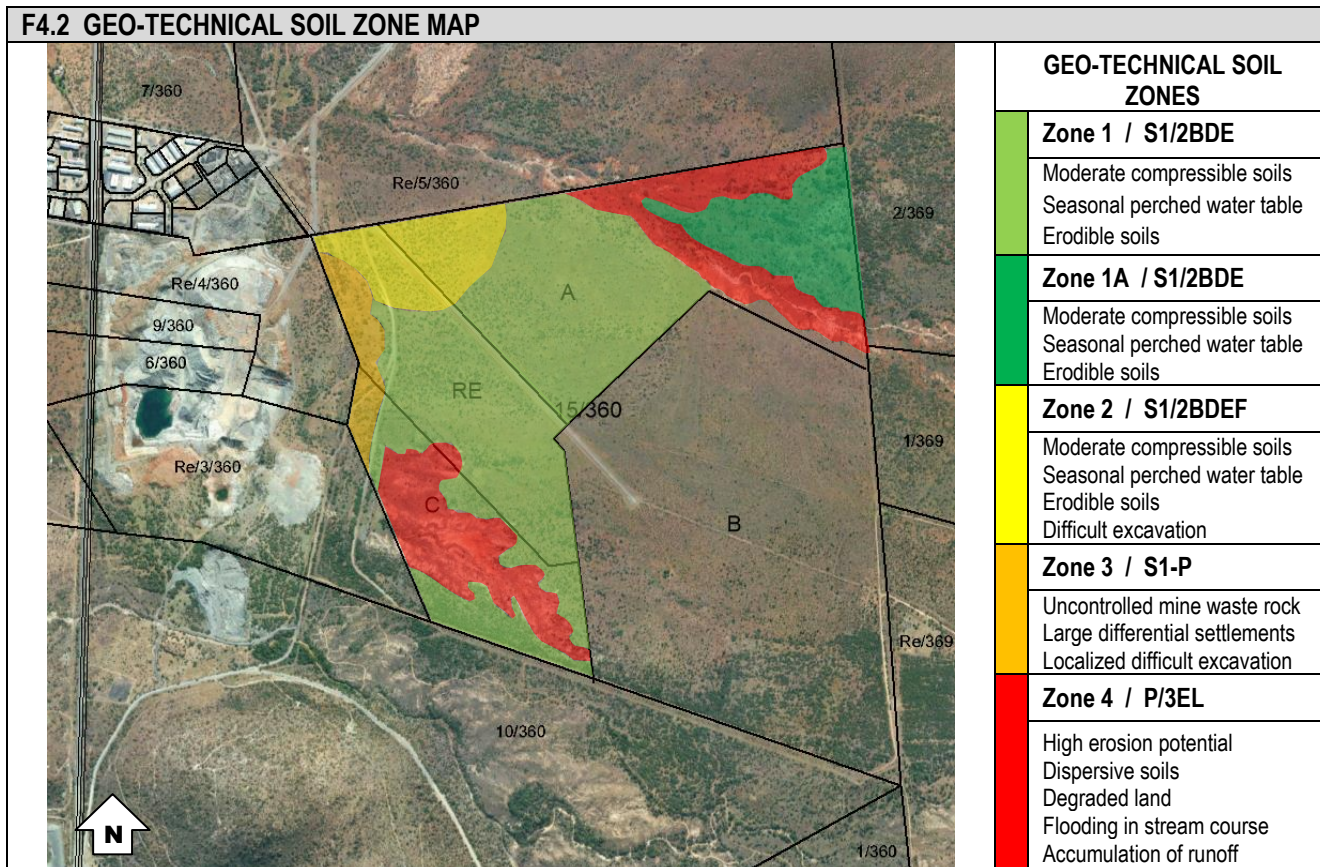
Short inclines steeper than 30% occur along the banks of a dry water course and at an old mining quarry that resulted in an erosion gully that are situated along the northern and southern boundaries of the property. An old mine rock dump of ±3m in height in the north-western corner of the site will be removed to create a flat development area. This material will be used for filling portions of the eroded quarry. The quarry is ±2.5m deep at some places and is suitable for development of two water storage dams. A 20m building restriction line is proposed along the edge of the northern stream bank to protect the bank of further soil erosion and potential land sliding. With exception of these areas, the overall slope of between 1 and 2% does not pose any limitation on the development of the proposed utilities infrastructure.

F4 GEOLOGY AND SOILS

A Geo-technical Report (See Appendix G8) describes the underlying geology of the site as rock of the Rustenburg Layered Suite, making up the bulk of the Bushveld Igneous Complex.

F4.1 GEO-TECHNICAL PROPERTIES OF THE SITE

Topsoil and colluvium is a dark brown loose to medium dense structureless silty sand with occasional calcrete and magnesite nodules and pyroxenite pebbles with roots. The upper residual horizon comprises residual pyroxenite consisting of dark brown to light brown medium dense unstructured silty sand. In some places calcified residual pyroxenite occurs with variations from dark brown to white, speckled and mottled white medium dense to dense structureless to voided silty sand with varying clay and gravel content. Moderately weathered pyroxenite bedrock occurs generally deeper than 2.5 m below surface although sporadic shallower weathered bedrock is exposed in localised areas. An area along the western boundary of the site, is covered by dumped coarse mine waste rock.

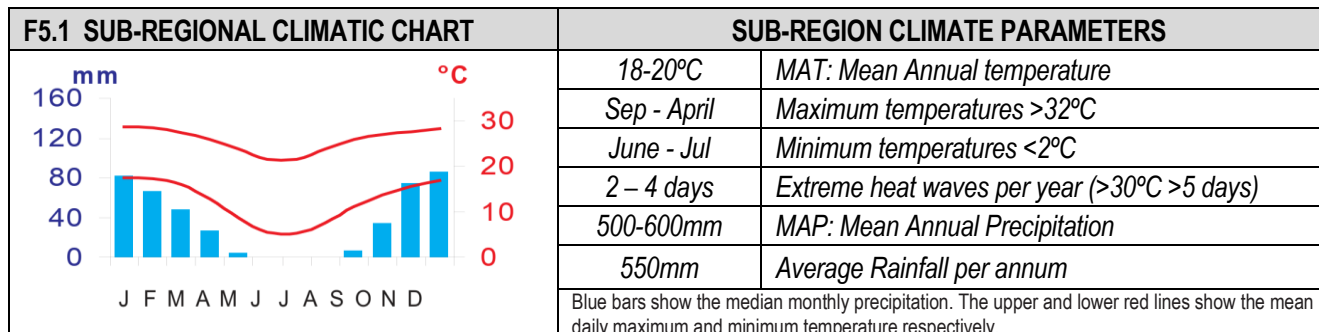


F4.3 SOIL ZONE SUITABILITY, IMPACTS, AND RISKS

- Soil zone 1 and 1A is suitable for roads & buildings subject to compaction of in situ soils below individual footings, soil raft foundations for buildings and improving subgrade and use imported materials.
- Soil Zone 1 is overall suitable for Solar PV-panels.
- Soil zone 1A is suitable for Solar PV-panels subject to site modification including acceptable grades, storm water management and erosion protection
- Soil Zone 2 is suitable for roads & buildings subject to improved subgrade and use imported materials.
- Soil Zone 2 is suitable for Solar PV however some excavation difficulty may be experienced at areas of shallow dense materials which may result in difficulty in the installation of piles (however not impossible).
- Soil Zone 3 is suitable for Solar PV and road development but will require significant soil improvement, e.g. dynamic compaction.
- Soil Zone 4 is not suitable for roads, buildings and Solar PV.
- Soil Zone 4 is suitable for wastewater treatment dams and water storage dams and dam walls but subject to suitable layering and compaction of imported material for dam walls and bank stabilisation and erosion protection.
- The geo-technical properties of the soils on the project site are overall suitable for the intended development purposes subject to the implementation of recommended mitigation measures (see Appendix G8 for more detail).

F.5 CLIMATE

This property is situated in the hill-country of the Middle-veld between the west-lying Highveld plains and the east-lying Lowveld Escarpment. The region receives 80% of its total annual rainfall during the period October to March with the highest rainfall in January and February. In terms of Koeppen Climate Classification, the area is classified as “BSh” (Arid Climate, Steppe, hot). Long-term climate information for this area was obtained from the South African Atlas for Climatology and Agro-hydrology (SAACA) and the South African Wind Atlas as indicated in the following diagram:



F5.2 LOCAL WIND CONDITIONS	Predominant wind direction	From the North-East
Sources: SA Wind Atlas GSDM Air Quality Management Plan 2008	Frequent winds	E-S-SW
	Annual mean wind speed	2-4 ms ⁻¹

F5.3 CRITERIA FOR IDENTIFYING POTENTIAL CLIMATE CHANGE IMPLICATIONS (GN 599:2021)	
The development will release /absorb greenhouse gasses and therefore exacerbate (or mitigate) climate change.	Yes
The development impacts on ecological/built infrastructure important for climate change adaptation or resilience.	No
The development is necessary in order to enable the future reduction of GHG emissions from other sources.	Yes
The development will likely be impacted (positively/negatively) by the future climate change implications such as heat stress, drought, flooding and fire.	No

F5.4 CLIMATE AND CLIMATE CHANGE IMPACTS AND PROJECT ADAPTABILITY
<ul style="list-style-type: none"> ▪ The current climatic conditions would not pose any limitation on the proposed development of utilities infrastructure. ▪ The light local wind conditions and prevailing wind direction would not pose any limitation on the proposed development. The predominant air movement will disperse any emissions generated by the construction and operation of the utilities infrastructure predominantly towards a south-westerly direction which is void of human habitation and therefore emissions should not pose any negative impact on human health. ▪ Climate change variabilities (temperature and rainfall) pose low risks which are not expected to pose limitations or adverse effects on the proposed utilities infrastructure. ▪ Extreme rainfall events should not affect the Solar PV Plant as all critical structural components will be elevated above ground level and not within any area that is subject to flooding. ▪ Extreme rainfall events may result in run-off accumulation within the existing erosion gully, however mitigation structures such as storm water attenuation ponds can be incorporated in the design. ▪ The project holds potential for rainwater harvesting for use / supply to the demand of surrounding water users. ▪ Although the proposed wastewater treatment plant holds potential for emitting greenhouse gasses [carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄)], the latest efficient technology, design and operating methods of the wastewater treatment process is incorporated in the design which greatly reduce such emissions to very low levels. ▪ The benefit of recycling of wastewater at the WWTP outweighs the potential of low levels of GHG emissions. ▪ The proposed renewable energy generation will also indirectly contribute to the cumulative reduction in GHG's. ▪ Overall the development will not be adversely impacted by local climatic conditions or by climate change implications.

F.6 HYDROLOGY (SURFACE WATER RESOURCES)

F6.1 REGIONAL HYDROLOGY

The site is located within quaternary catchment B41H of the Steelport River catchment which is located within the greater Olifants Water Management Area. The National Freshwater Ecological Priority Assessment (2012) assigns an ecological

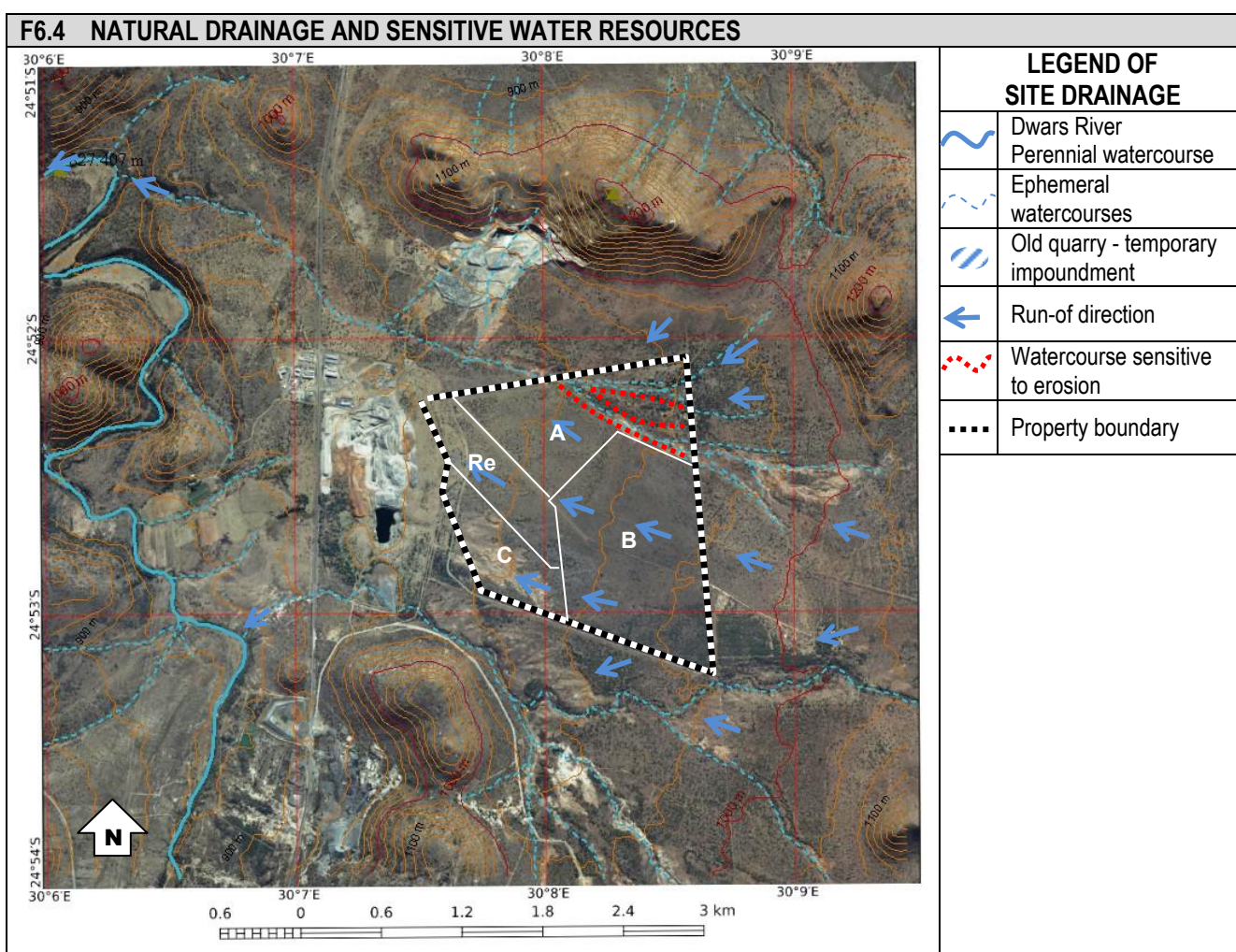
sensitivity status to the Dwars River of “Class D” which indicates a highly modified ecological state with high environmental sensitivity and importance.

	Catch. Name	Catch. Code	Drainage order	Flow Class	*PES	*EIS
Management Area	Olifants	B	N/A	Perennial	N/A	N/A
Main catchment	Steelpoort	B41	N/A	Perennial	D	High
Quaternary	Dwars	B41H	2	Perennial	D	High

*PES: Present Ecological State / *EIS : Environmental Importance and sensitivity

F6.2 TERRAIN HYDROLOGY

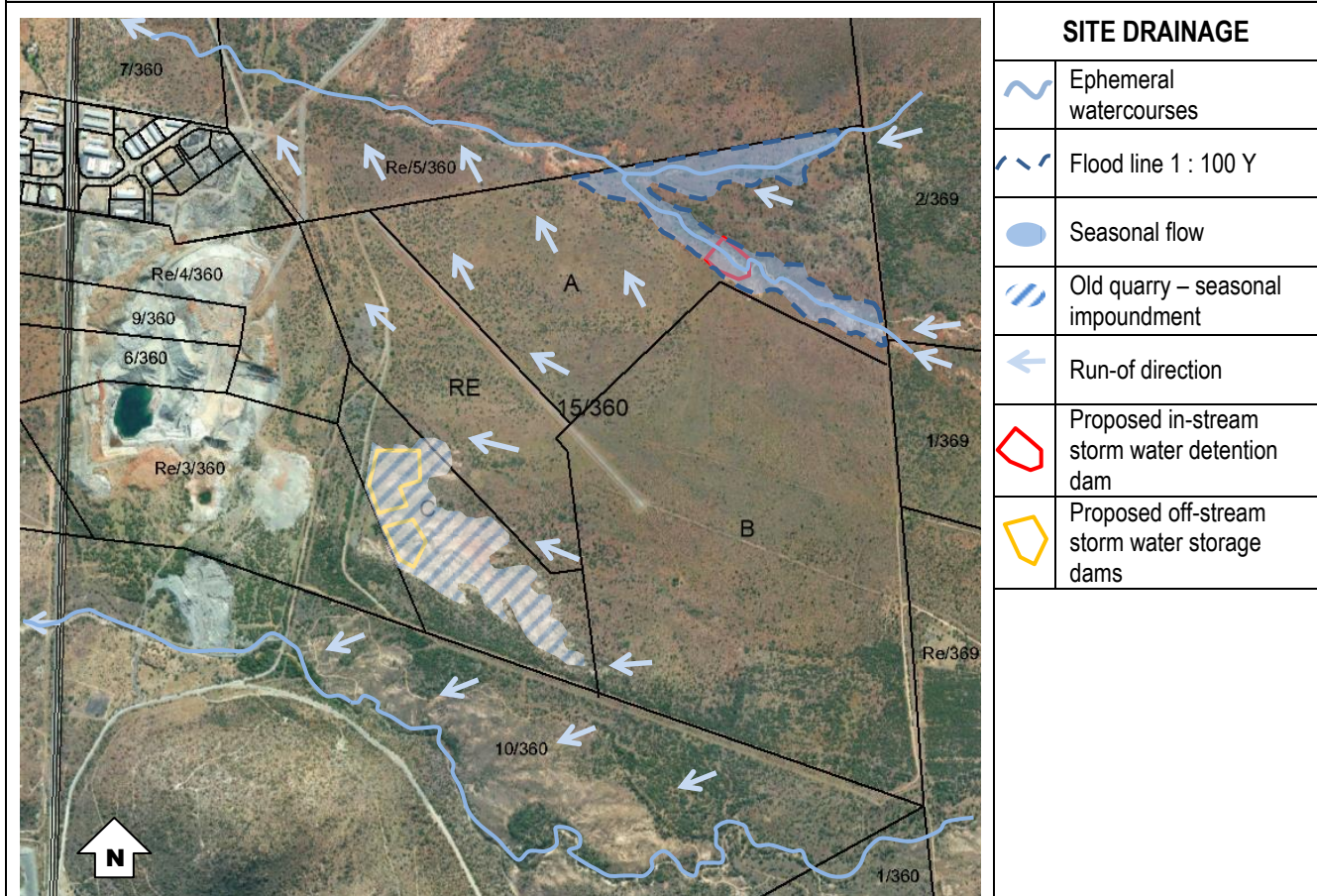
The property is situated in the Dwars River valley (a tributary of the Steelpoort River) that runs ±1500m west of the property in a northern direction. A moderately defined and highly eroded drainage line (dry stream bed) that originates on the adjacent property to the east is a tributary to the Dwars River and runs along the northern boundary of the property. Historic mining quarry activities created an erosion gully in the south-western portion of the property. This gully collects and impounds run-off water temporarily after heavy rain events but loses the water due to sub-surface drainage as the gully is not linked to any natural downstream watercourse. Run-off from the overall gentle slope of the property is not expected to result in ponding elsewhere. On-site verification did not identify perched water tables or wetlands on the property.



F6.3 SENSITIVE WATER RESOURCES WITHIN OR IMMEDIATELY ADJACENT TO THE SITE

Surface Water Resource Refer to Map H6.5)	Sensitivity	Site Relevance		
		On-site	Off-site	Distance to site
Perennial river (Dwars River)	High	No	Yes	±1500m
Ephemeral drainage lines	Moderate	Yes	Yes, south	±300m
Wetlands	N/A	No	No	N/A
Wetland buffer areas	N/A	No	No	N/A

F6.4 ON-SITE NATURAL DRAINAGE AND SENSITIVE WATER RESOURCES



F6.5 IMPACTS AND RISKS ON SURFACE WATER RESOURCES

- A calculation of run-off and watercourse parameters indicates that the development site is not subject to flooding.
- The proposed modification of the land surface for development purposes will alter natural run-off drainage patterns which may cause sheet erosion or new preferential run-off flow paths that may cause channelling and gully erosion.
- The hardening of the soil surface by structures and roads will decrease natural infiltration towards the sub-soil which will increase the volume and velocity of run-off water that will be concentrated within natural or newly caused channels.
- High velocities and volumes of concentrated storm water will be directed toward the natural drainage lines that can lead to extensive head erosion along the banks on- and off site. Storm water attenuation will be required within watercourses.
- A storm water attenuation dam within the watercourse and application of associate erosion control methods will buffer potential high storm water peak flows, and trap silt-laden storm water, thus resulting in the slow release of better quality water downstream. This in turn will minimise soil erosion downstream, minimise silt deposition downstream and in turn will enhance fresh water ecology downstream. Due to the ephemeral flow regime no aquatic biota is present on site and thus the seasonal impoundment of storm water in the dam is not likely to impact adversely on aquatic ecology.
- On-site wastewater treatment poses a risk of surface water and groundwater contamination that may cause deterioration of water quality and impact on aquatic ecology downstream and also impact on groundwater quality.
- The above potential impacts can lead to a further deterioration of the present ecological state of the Dwars River system and can compromise the catchment management objectives of improving overall river health.
- However, potential impacts as identified above are avoidable by way of design and implementation of sustainable storm water management systems and the specified design, construction and operation of wastewater treatment systems.

F.7 GROUNDWATER RESOURCES

F7.1 REGIONAL GROUNDWATER CLASSIFICATION

The Aquifer Classification Map of South Africa (DWA - August 2012), indicates that the property is located on a minor aquifer region which is a moderately-yielding aquifer system of variable water quality. The hydro-geological map of Vegter (2003) indicates that groundwater is locally located in cracks and intersects of underlying igneous bedrock and therefore produces a potentially low-yielding aquifer (2-5 l/s) of potential good water quality.

F7.2 AQUIFER VULNERABILITY

Aquifer vulnerability refers to the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer. The Aquifer Vulnerability Map of SA (Directorate Hydrological Services 2013) indicates that the site is located in the **least** vulnerable region that is only vulnerable to conservative pollutants in the long term when continuously discharged or leached.

F7.3 AQUIFER SUSCEPTIBILITY

Aquifer susceptibility refers to a qualitative measure of the relative ease with which a groundwater body can be potentially contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification (Aquifer Susceptibility Map of SA, Directorate Hydrological Services 2013).

F7.4 AQUIFER SUSCEPTIBILITY MATRIX		AQUIFER CLASSIFICATION		
VULNERABILITY		Poor	Minor	Major
	Least	Low	Low	Medium
	Moderate	Low	Moderate	High
	High	Medium	High	High

F7.5 IMPACTS AND RISKS ON GROUNDWATER RESOURCES

- The underlying aquifer is “least” vulnerable to pollutants, however long-term continuous point-source discharge or leaching may make the aquifer moderately vulnerable (refer to Groundwater Risk Assessment – Appendix G9).
- Therefore, although the aquifer has low susceptibility, point-source effluent (pollutants) from the proposed wastewater treatment plant may pose a potential low to moderate risk of groundwater contamination Refer to Appendix G9).
- By incorporating the necessary pollution prevention measures in the design and by ensuring appropriate operational management of the WWTP, groundwater impact by contamination is likely to be very LOW (refer to Appendix G9).

F8. LAND COVER

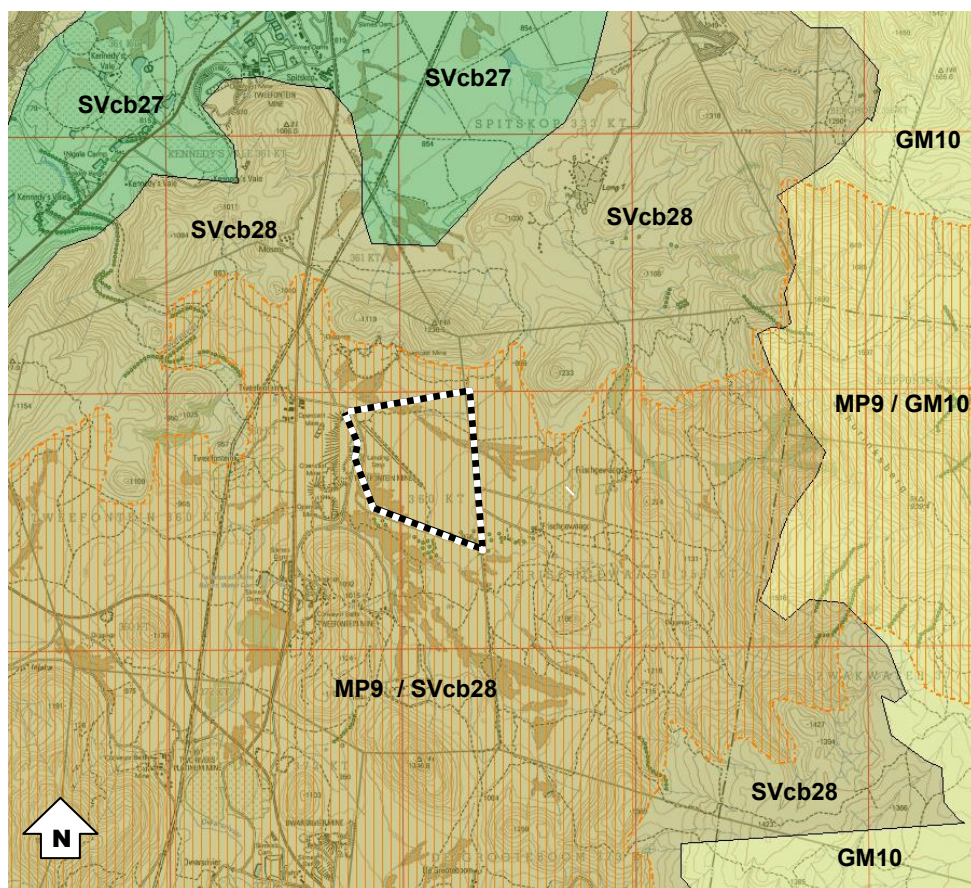
F8.1 BROAD VEGETATION DESCRIPTION AND ECOSYSTEM STATUS (IMPORTANCE & SENSITIVITY)

The vegetation region within which the property is located is the Central Bushveld Bioregion (SVcB). Acocks (1988) describes the vegetation type of the area as “Mixed Bushveld” (A18). The Sekhukhune Bioregional Plan (2019) describes the vegetation type as the Sekhukhune Mountain Bushveld (SVcd28) with “least concern/threatened” importance and sensitivity classification. Contrary to the low importance and sensitivity classification of the above-mentioned vegetation type, the National list of ecosystems that are threatened and in need of protection as published under GNR 1002 of 9 December 2011, classifies the ecosystem within which the property is located as the Sekhukhune Mountainlands (MP9) that is situated on the high-lying norite mountains between Roossenekal, De Berg and Steelpoort. The SANBI Grassland Ecosystem Guidelines refers to this ecosystem as “high-altitude grassland”. The above discrepancy between the SBP (2019) and GNR1002 (2011) is obvious. This discrepancy was investigated and verified on the development site by a qualified ecologist who found the vegetation type is not high-altitude grassland and is not located on the high-lying norite mountains. The verification thus confirms the description of the “bushveld” vegetation type that occurs on the development site in line with the Sekhukhune Bioregional Plan (2019) description of “Sekhukhune Mountain Bushveld”. A site assessment further confirms that no listed species of conservation concern that is associated with MP9 occurs on the development site. The GNR 1002 (2011) “endangered” ecosystem status of the development site is therefore invalidated.

F8.2 SITE VEGETATION DESCRIPTION AND LAND COVER CONDITION

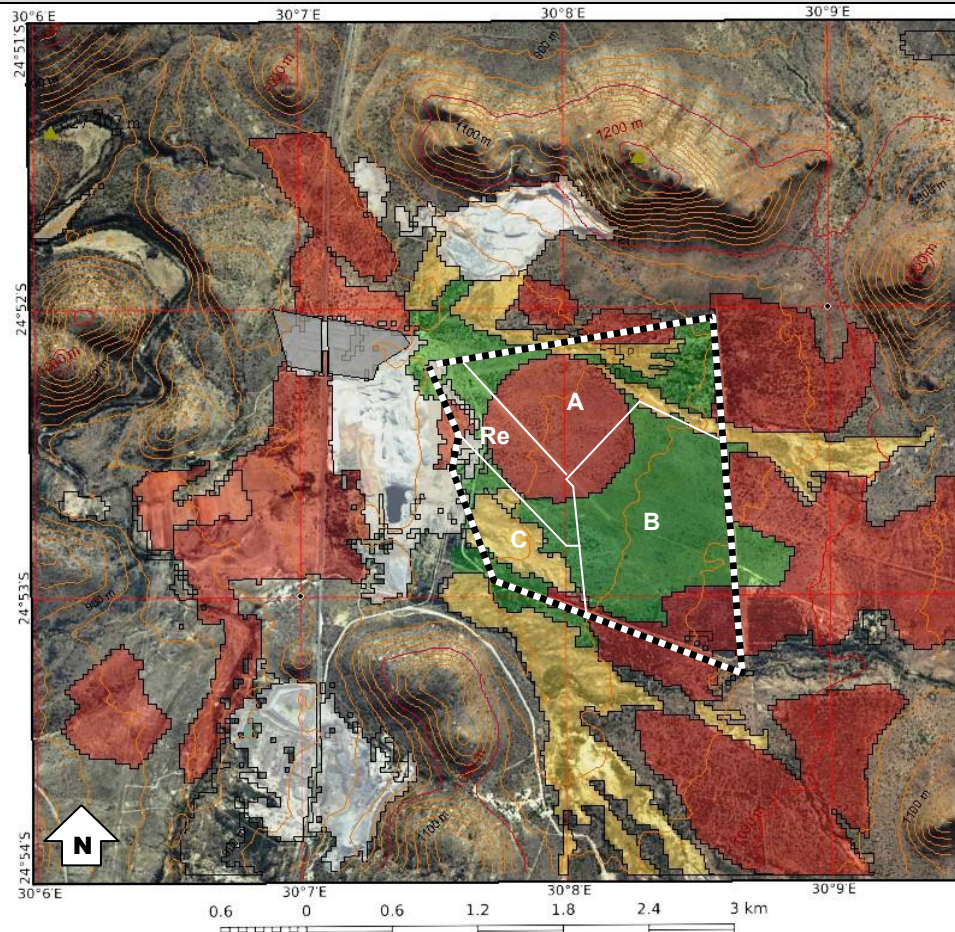
Predominantly open bushveld shrub and tree species of short to medium height represents the vegetation type and structure on the property. Heavy vegetation modification due to historic cultivation, grazing and current illegal wood harvesting resulted in the modification of the vegetation composition and structure. The original woodland has mostly been replaced by a shrubland and invader species thicket. Both man-made and natural erosion dongas occur due to historic vegetation modification and as a result the natural ephemeral drainage line excludes the presence of riparian vegetation. Predominantly the condition of the veld is overall poor and holds no to little ecological services or significant habitat for wildlife. In addition, historic surrounding agriculture and recent extensive mining land uses contributed to widespread soil and land cover degradation and habitat fragmentation locally, to such an extent that normal ecosystem functions have been irreparably impacted (refer to Terrestrial and Aquatic Biodiversity Verification and Compliance Reports – App. G4 and G3).

F8.3 BROAD VEGETATION CLASSIFICATION & ECOLOGICAL THREAT STATUS



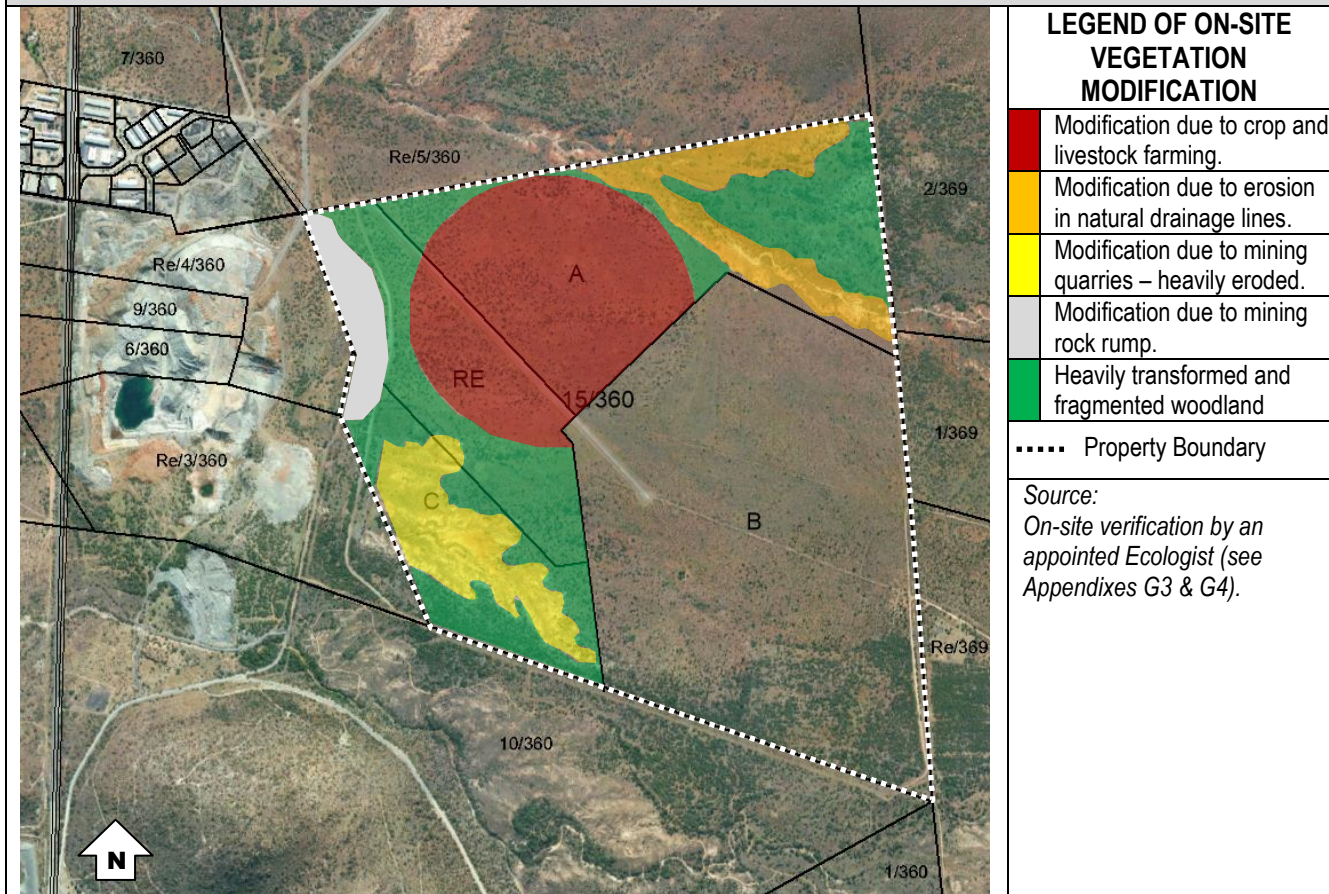
LEGEND OF VEGETATION CLASSIFICATION AND CONSERVATION STATUS	
	Sekhukhuni Mountain Bushveld (SVcb28) Status : Least Threatened
	Sekhukhuni Plains Bushveld (SVcb27) Status : Vulnerable
	Sekhukhuni Montane Grassland (Gm10) Status : Vulnerable
	Sekhukhuni Mountain Lands (MP9) Status : Endangered
- - - - Property Boundary	
Sources: Sekhukhuni Bioregional Plan 2019 GNR 1002 of 9 December 2011	

F8.4 VEGETATION / LAND COVER CONDITION OF THE SITE AND SURROUNDING AREAS



LEGEND OF LAND COVER AND VEGETATION MODIFICATION	
	Modified old crop lands
	Erosion gullies
	Extensive mining
	Industrial development
	Heavily modified woodland
- - - - Property Boundary	
Sources: Sekhukhuni Bioregional Plan 2019 National Land Cover Assessment 2018	

F8.5 DETAILED VEGETATION / LAND COVER CONDITION OF THE SITE



LEGEND OF ON-SITE VEGETATION MODIFICATION	
	Modification due to crop and livestock farming.
	Modification due to erosion in natural drainage lines.
	Modification due to mining quarries – heavily eroded.
	Modification due to mining rock rump.
	Heavily transformed and fragmented woodland
	Property Boundary
Source: On-site verification by an appointed Ecologist (see Appendixes G3 & G4).	

F8.6 CURRENT LAND COVER CONDITION ASSESSMENT

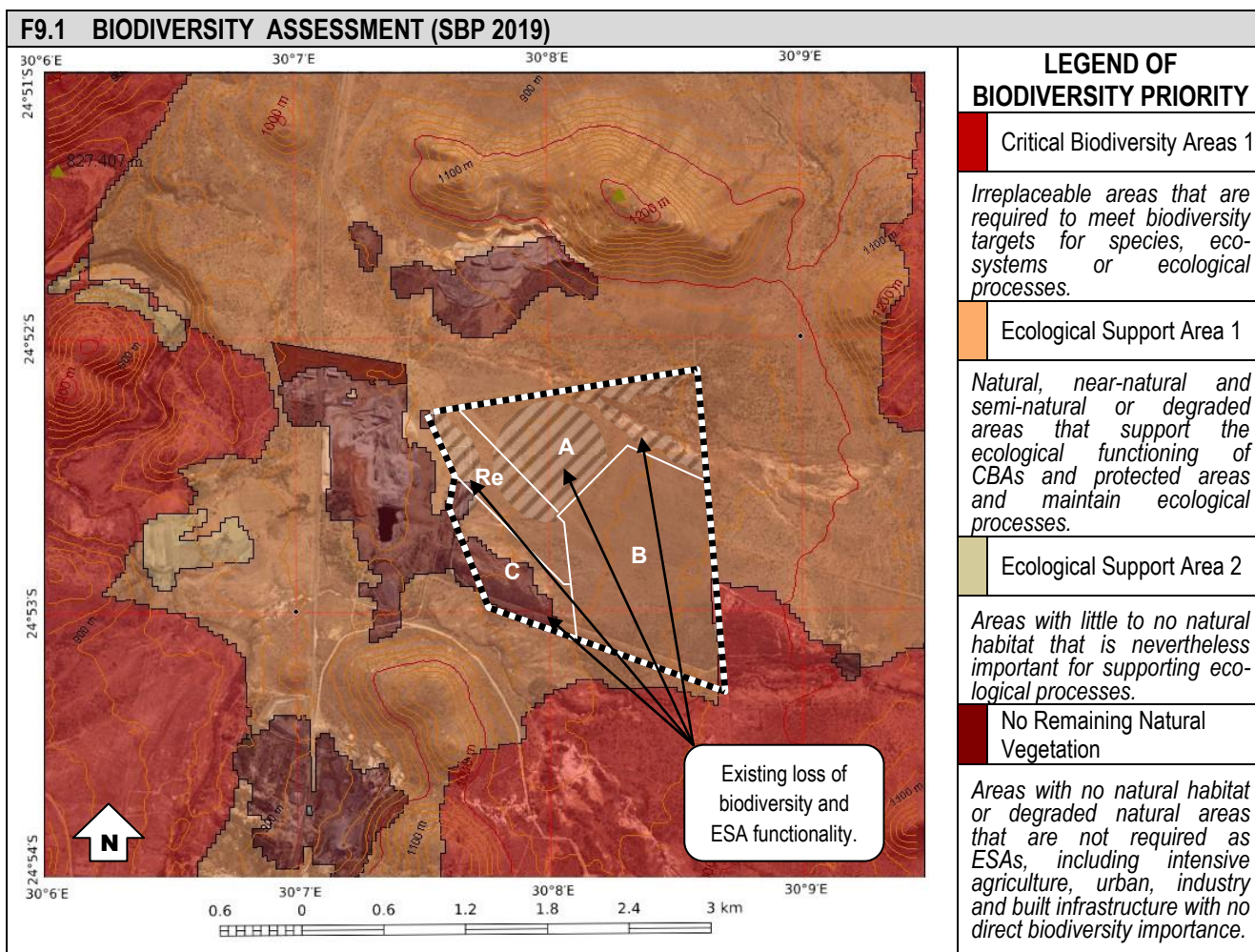
LAND COVER STATUS	EXISTING LAND COVER / VEGETATION IMPACT ASSESSMENT	
	✓ = Occurs in site, X=Does not occur on-site, U=Unsure – further site verification	Impact
Predominantly natural vegetation	X	Historic vegetation modification all over the property. Low
Predominantly modified/near natural	✓	Current modified vegetation species composition and structure. Low
Alien plant infestation	✓	Current modified vegetation species composition and structure. Low
Bush encroachment	✓	Current modified vegetation species composition and structure. Low
Poor veld management	✓	Current modified vegetation species composition and structure. Low
Erosion/donga/bare soil	✓	Additional vegetation modification may lead to further erosion. High
Old lands	✓	Historic vegetation modification on old lands. Low
Current and previous cattle grazing	✓	Historic vegetation modification all over the property. Low
Roads & servitudes	✓	Previous vegetation modification due to roads & servitudes. Low
Mining	✓	Mine rock dump area and quarry mining area. Low

F8.7 LAND COVER SUITABILITY AND IMPACTS AND RISKS ON REMAINING VEGETATION

- The original woodland (bushveld) vegetation on the development site was largely modified due to historic agriculture and recent mining activities.
- The remaining woodland vegetation therefore became highly fragmented and therefore to a large extent, has lost its function to produce ecological services and habitat for local animal species.
- More recent illegal wood harvesting by unknown persons further degraded the land cover and as a result the structure and composition of the remaining woodland was mostly replaced by pioneer and invader woody species.
- Riparian vegetation along the watercourse is mostly absent, mainly due to the ephemeral flow regime of the watercourse as well as ongoing erosion which severely impacts the watercourse and aquatic biota.
- Vegetation loss along the banks of erosion gullies may result in further soil erosion and therefore a development restriction buffer of 15m is applied to retain natural vegetation in mitigation of further loss of land to soil erosion.
- The proposed development of services utilities is not expected to pose any adverse impact on the original natural vegetation as most natural vegetation and ecosystem services have already been degraded and irreparably lost.
- In light of the current land cover condition mentioned above, the overall impact on vegetation due to the development is expected to be very low (refer to Specialist verification and confirmation Appendix G3 & G4.)

F.9 BIODIVERSITY SENSITIVITY

The Sekhukhune Bioregional Plan 2019 (SBP) provides an assessment of the biodiversity importance and sensitivity. According to the land cover assessment which provides the basis for biodiversity assessment, the vegetation composition and structure on the property and surrounding areas is mostly modified. Initial site verification indicates that the vegetation modification is in fact more significant than indicated on the land cover assessment map. Accordingly it can be expected that ecological biodiversity was significantly degraded and diminished. On the contrary the biodiversity assessment map as included in the SBP classifies the property and surrounding areas as Ecological Support Areas (ESAs) which is supposed to provide ecological services to surrounding Critical Biodiversity Areas (CBAs). Similarly the National Screening Tool indicates that the property is located in an area with very high terrestrial biodiversity sensitivity. It therefore seems that vegetation modifications on the property and surrounding areas were not adequately and accurately verified and mapped. Aquatic biodiversity sensitivity is indicated more realistically by the National Screening Tool as “Low” which is in line with the findings of initial site verification. Similarly a Specialist verification of terrestrial biodiversity concludes that the development site poses all over low biodiversity and that the land cover modifications that occurred resulted in an overall loss of its ecological services in support of critical biodiversity areas on surrounding properties.



F.9.2 IMPACT AND RISK ON BIODIVERSITY : ESA 1

The SBP states that areas with no natural habitat or degraded natural areas are not required as ESAs, including agriculture, and mined areas with no direct biodiversity importance. Section 8 of this report revealed the historic and current modification of the land cover and associated loss and fragmentation of vegetation, biodiversity and ecological functioning. In terms of the SBP's classification such degraded areas are not required as ESAs. The objective of (ESA1) to maintain ecosystem functionality and connectivity allowing for the limited loss of biodiversity patterns cannot be achieved as the ecosystem functionality and connectivity on and around the development site has been irreparably lost. Therefore the guidelines to maintain ESA objectives should not be applicable to this property and surrounding properties. A Specialist verification indicates that both terrestrial and aquatic biodiversity on site is low and therefore the proposed development will not pose an adverse impact on biodiversity and on ESA functionality on surrounding areas (refer to App G3 and G4).

F.10 SPECIES SENSITIVITY

A Specialist verification on site confirm the following with regard to the occurrence of species of conservation concern (including listed Red-data, endemic, threatened or rare species) on the development site (refer to Appendix G6 and G7) .

F10.1 SPECIES OF CONSERVATION CONCERN	Likelihood of SCC occurring on the development site			
	High	Medium	Low	Actual recording on site
Sensitive Plant Species	-	-	X	None
Sensitive Animal Species	-	-	X	None
Sensitive Avian Species	-	-	X	None

F10.2 SPECIES WITH LEGAL PROTECTION		
Act	Protected Species	Probability of Occurring
NFA	<i>Boscia albitrunca</i>	Actual recording of individual samples.
LNCA	<i>Aloe marlothii</i> and <i>Aloe cryptopoda</i>	Actual recording of medium sized samples.
	<i>Spirostachys africana</i>	Actual recording of individual examples.

NFA: National Forests Act 1998 / LNCA: Limpopo Nature Conservation Act 1998

F10.3 IMPORTANT SPECIES IMPACTS AND RISKS
<ul style="list-style-type: none"> ▪ Species of conservation concern is unlikely to occur on the development site and none such species were recorded during a Specialist site verification (refer to Appendix G6 and G7). This finding can be expected in light of the significant vegetation modifications that occurred historically and recently on the property. ▪ Several examples of species with legal protection were recorded and specifically two aloe species and two tree species (refer to Table 10.2 above). ▪ Where possible such species will be retained within the undeveloped areas of the site. Aloe species can be relocated to undeveloped areas of the site. Tree species that cannot be relocated must be replaced on a similar site on or adjacent to the development site. A permit must be obtained before removing such species and a replacement ratio of 1:3 shall apply (replace three individual plants for each one that needs to be removed). The impact due to the loss of these species can thus be neutralised.

F.11 HERITAGE RESOURCES

“Heritage impact” means the impact or potential impact that activity has, has had or may have on an object or place of cultural or archaeological significance, paleontological remains or a paleontological site, living heritage, public monuments, and memorials, or a place declared to be a national or provincial heritage site by the relevant authority.

F11.1 HERITAGE RESOURCES	SPECIALIST FINDINGS
Cultural & historic sites	A Specialist site assessment did not identify cultural or historic sites.
Historic buildings (older than 60 years)	A Specialist site assessment did not identify historic buildings.
Archaeological sites / settlements	A Specialist site assessment did identify two archaeological sites.
Fossils (Palaeontological)	A Specialist verification discards the occurrence of fossils in this area.
Graves	A Specialist site assessment did not identify any graves on the site.
Other	None

U: Unsure-Verification to be determined by a qualified person; X: No evidence found but can be changed by ground-truthing

F11.2 POTENTIAL IMPACT ON HERITAGE RESOURCES
A Heritage Impact Assessment was conducted (see Appendix G2). Two archaeological sites of moderate to low significance were identified on site but outside of the proposed development footprint. More detailed Phase 2 recording of the archaeological sites is proposed before obtaining permission from SAHRA for their destruction. The proposed development is not impacted and will not impact on these heritage resources.

F11.3 POTENTIAL IMPACT ON PALEONTOLOGICAL RESOURCES
A paleontological Specialist confirmed that the whole property is located on non-fossiliferous rocks so the placement of the utilities infrastructure anywhere on the site will not impact the palaeontological heritage (see Appendix G3).

F12. SENSITIVE GEOGRAPHIC AREAS

Sensitive geographic areas are incorporated in Listing Notice 3 of the EIA Regulations and therefore any development must be considerate to the locality and sensitivity of such areas.

F12.1 IDENTIFICATION OF GEOGRAPHIC SENSITIVE AREAS (AS IDENTIFIED IN LN3 OF EIA REGULATIONS)			
Important geographic areas	Y/N	Description Locality	Potential development impacts
Within national protected areas or 10km buffer areas.	Yes	Within 10km from the National De Hoop Dam Protected Area	None, not within the viewshed/ visual exposure area.
Within provincial protected areas or 5km buffer areas	No	Not within a 5km buffer surrounding a provincial protected area.	N/A
Within a focus area for protected area expansion (PAE)	No	Not located within a PAE.	N/A
Near to / within World Heritage Sites (WHS)	No	Not located within a WHS.	N/A
Near aerodromes and restricted air space (within 3km)	No	Not located near to any registered aerodromes or important flight routes.	N/A
Near to / within an International Convention Area.	No	Not located within a convention area.	N/A
Within sensitive areas identified in Environmental Management Frameworks	Yes	Located within Zone B of the Olifants-Letaba EMF	Promote effective water utilisation, pollution prevention.
Within a strategic area for renewable energy generation.	No	N/A	N/A

F12.2 POTENTIAL IMPACT ON SENSITIVE GEOGRAPHIC AREAS
<ul style="list-style-type: none"> ▪ The De Hoop Nature Reserve is located ± 10km to the west of the property. The property is surrounded by mining and industrial uses that already poses a visual impact. It is thus not expected that the proposed utilities infrastructure would pose a synergetic visual impact. Furthermore, the proposed solar infrastructure will be north-facing and would not pose a glare towards the nature reserve that is located 10km to the west of the site. ▪ The aim of the wastewater treatment plant is to receive and treat wastewater from surrounding wastewater generators to a quality standard suitable for re-use. This is in line with the water quality aims of the OLEMF. ▪ Due to the existing mining and industrial uses in the surrounding area, conservation and tourism uses as proposed within the OLEMF would not be compatible with these land uses.

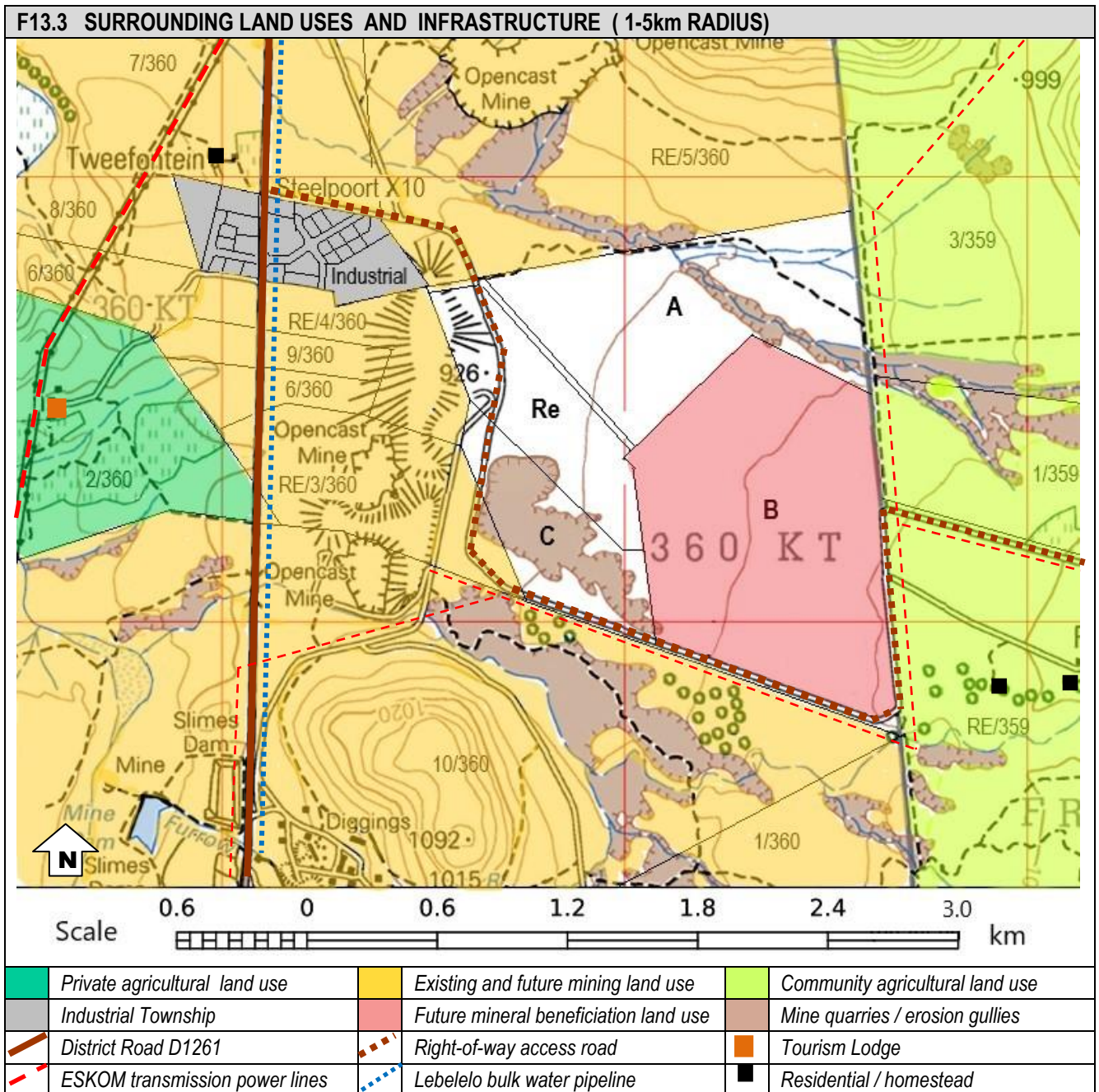
F13. SURROUNDING LAND USES AND INFRASTRUCTURE

“Land use” means the purpose for which land is or may be used lawfully in terms of a land use scheme, existing scheme or in terms of any other authorisation, permit or consent issued by a competent authority, and includes any conditions related to such land use purposes.

F13.1 LAND USES IN SURROUNDING AREA (<2KM FROM THE PROJECT AREA)			
Land Use	Y/N	Description Locality	Potential development impacts
Residential areas (formal)	No	>5km from the project area.	Positive – employment creation. No negative social impact anticipated.
Industrial township	Yes	Industrial township directly adjacent.	Positive – service provider to industrial uses. No negative impact expected.
Mining Areas	Yes	Directly adjacent.	Positive – service provider to mines. No negative impact expected.
Tourism / Guest Lodge	Yes	$\pm 1,8$ km west of the project area.	No negative impact expected as the site is visually screened by mine dumps
Community / private agriculture	Yes	Directly adjacent.	No negative impact expected.
Unregistered airstrip	Yes	A private air strip is located 2km due north of the SEGP.	Potential glint / glare visual impact (see Section F14 for more detail).

“Infrastructure” means installations, structures, facilities, systems, services or processes relating to the matters specified in Schedule 1 and which are part of the national infrastructure plan. (GNR447/2014).

F13.2 INFRASTRUCTURE SERVICES (<2KM FROM THE PROJECT AREA)			
Land Use	Y/N	Description Locality	Potential impact due to the proposed development project.
District Road	Yes	Road D1261 : ±1 km west of the property.	Formalisation of an existing informal intersection with access road – positive.
Right-of way Road	Yes	Provide access to the property.	The access road will be upgraded and formalised – no negative impact.
Bulk electricity services	Yes	ESKOM transmission and distribution.	Existing 22kV ESKOM connection available to provide base load.
Bulk water services	Yes	Lebelelo bulk water pipeline.	No impact on existing pipeline, future link to new pipeline – positive impact.
Bulk sewer treatment services	No	None	Positive impact – provision of essential service currently lacking in the area.
Waste management services	No	None	None



F13.4 POTENTIAL IMPACT ON SURROUNDING LAND USES AND INFRASTRUCTURE

- The proposed development will require the formalisation of an existing access road junction on road D1261. The planning for the necessary upgrading will conform to the required road designs standards of the Roads Agency. The upgrading will not impact negatively on existing road users.
- The existing right-of-way access road that is located on the property will be upgraded and formalised by way of registering of a road servitude. The upgrading will not impact negatively on existing road users.
- Raw water to be provided to the proposed water treatment works will be obtained from the existing or proposed new Lebelelo bulk water pipeline. The water scheme has adequate capacity to provide in the water demand.
- The existing 22Kv ESKOM distribution in the area is sufficient to provide base load to the SEGP and WWTP. The development will not impact on any existing powerline routes.
- The airfield on the application site will be closed and no other airfield was identified within an aerial glare and glint quadrant at a NW-N-NE direction and directly south and within a 10km distance from the centre of the proposed SEGP. The CAA confirmed that no registered aerodrome is located in the area.
- The development will not impact on privately owner or communal agricultural land.
- The development will not impact negatively on surrounding mining, mineral beneficiation and industrial land uses. The proposed utilities infrastructure aims to provide electricity, wastewater treatment and treated water to these land uses.
- The site is not located directly adjacent to existing homesteads and a Guest Lodge in the surrounding area and therefore these land uses are not expected to be impacted directly or indirectly by the proposed development.
- Overall the proposed utilities infrastructure services are not expected to pose any adverse impact on surrounding land uses and infrastructure.

F14 VISUAL ENVIRONMENT

“Sense of place” can be defined as how humans relate to or feel about the environments in which they live”. **“Sense of place impact”** means the impact or potential impact that activity has, has had or may have on the mix of natural and cultural features in the landscape that provides a strong and unique identity and character that is deeply felt by local inhabitants and/or visitors (GN R698:2017).

F14.1.1 “SENSE OF PLACE” ASSESSMENT AND IMPORTANCE RATING OF THE SITE

Criteria	High Rating	Moderate Rating	Low Rating
Sense of Place without any development	<i>A particularly definite place with a dominant natural ambience, character, or theme.</i>	<i>A place that projects a loosely defined theme, character, or ambience.</i>	<i>A place having little or no ambience with which it can be associated.</i>
The visual quality of the sites	<i>A very attractive setting with great variation and interest.</i>	<i>A setting that has some aesthetic and visual merit.</i>	<i>A setting that has little aesthetic value.</i>
Surrounding man-made Structures	<i>Man-made structures as a minor visual element.</i>	<i>Man-made structures as a partial visual element.</i>	<i>Man-made structures as a dominant visual element.</i>
Association with surrounding land uses	<i>No similar land uses occur within the local area.</i>	<i>Similar land uses occur further than 5km from the proposed development and are confined to specific areas.</i>	<i>Similar / associated land uses occur between 2-5km from the proposed development</i>
Surrounding Landscape Compatibility	<i>The landscape cannot accommodate proposed land use without it appearing totally out of place visually.</i>	<i>The proposed land use can be accommodated in the landscape setting without appearing out of place.</i>	<i>The proposed land use is ideally suitable within this landscape setting.</i>

F14.1.2 POTENTIAL SENSE OF PLACE IMPACT

- Extensive mining and industrial land uses within 5km from the application property define the local sense of place.
- The site and surrounding area have a low “sense of place” rating which means that the proposed utilities infrastructure development is expected to be highly compatible with the surrounding developed landscape and it is not expected to impact the area’s sense of place.

F14.2 BASIC VISUAL ASSESSMENT

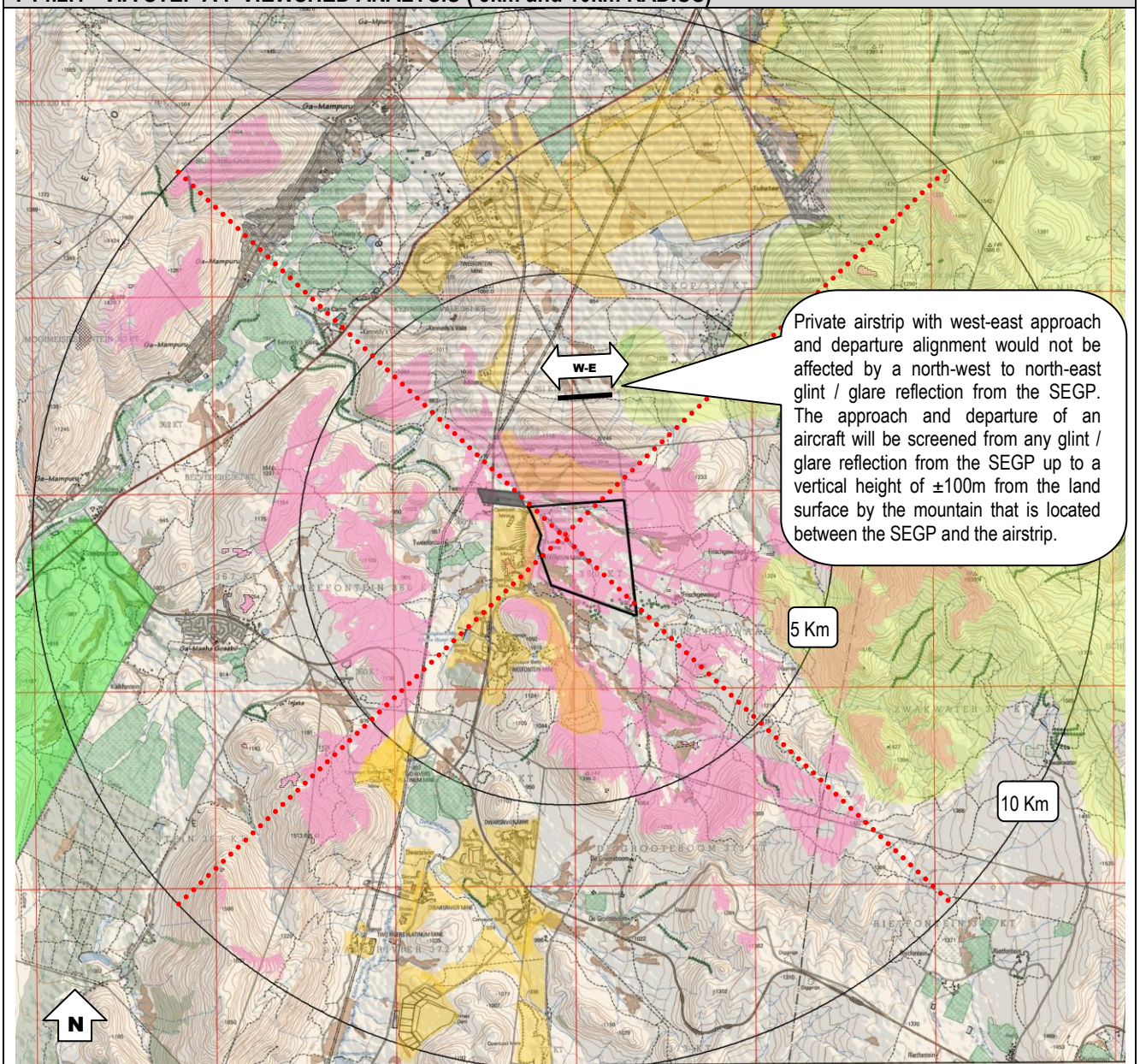
"Aesthetic environment" is the environment that viewers experience through senses (limited to visual experience for this application) (Sardon et al, 1986).

"Visual impact" means the degree of change in visual resources and viewer response to those resources caused by a development project (Sardon et al, 1986).

A visual assessment and impact prediction follows the method as indicated in Steps A – E below:

- A – Determine the viewshed & visibility (Refer to Map 14.2.1).
- B – Predict the visual exposure and viewer sensitivity.
- C – Determine the viewer proximity/ visual distance
- D – Predict & assess the visual absorption capacity of the site and the activity.
- E – Based on the above, the overall visual impact of the cultivation activity can be predicted.

F14.2.1 VIA STEP A : VIEWSHED ANALYSIS (5km and 10km RADIUS)



Private airstrip with west-east approach and departure alignment would not be affected by a north-west to north-east glint / glare reflection from the SEGP. The approach and departure of an aircraft will be screened from any glint / glare reflection from the SEGP up to a vertical height of $\pm 100\text{m}$ from the land surface by the mountain that is located between the SEGP and the airstrip.

	Visual Exposure Areas		Mining Areas		National Protected Area
	Urban Areas - Residential		Agriculture crop farming		National Protected Expansion Areas
	Aerial glint and glare limited to a north-west to north-east quadrant		Aerial glint and glare quadrant margins.		One private airstrip identified $\pm 2\text{km}$ directly north of the site.

F14.2.2 VIA STEP B: PREDICT POTENTIAL VISUAL EXPOSURE & VIEWER SENSITIVITY

“**Visual exposure**” means the degree to which viewers are exposed to a view by their physical location, number of viewings and duration of view (Smardon et al, 1986). “**Viewer sensitivity**” means the viewers variable receptivity to the elements within the environment that he/she is viewing, affected by the viewers’ activity and awareness (Smardon 1986).

Potentially important areas of visual exposure (refer to Viewshed Map F12.4)	VIEWER SENSITIVITY	Visual exposure rating			
		Very visible (High)	Moderately visible (Medium)	Hardly visible (Low)	Not visible
Views onto the proposed utilities infrastructure from residential areas.	Moderate / high	N/A	N/A	N/A	Yes
Views onto the proposed utilities infrastructure from national/provincial roads.	Low / moderate	N/A	N/A	Yes	N/A
Views from protected areas and tourism facilities.	Moderate / high	N/A	N/A	N/A	Yes
3km radius glint & glare quadrant for aircraft approach/departure flight paths	High	N/A	N/A	Glare not in flight path	Below ±100m flight height

F14.2.3 VIA STEP C: DETERMINE VIEWER PROXIMITY / VISUAL DISTANCE

“**Visual distance**” mean the measurable units between the viewer’s position and the object being observed (Smardon et al, 1986). “**Viewer proximity**” means the geographic extent of a resource and legibility of its features which can be seen by an observer (viewer) determined by his or her location. (Smardon et al, 1986).

Potentially important areas of visual exposure (refer to Viewshed Map F12.4)	VIEWER FREQUENCY	Viewer proximity			
		(High) Short Distance (1-500m)	Medium Distance (500 – 2500m)	(Low) Long Distance (> 2500m)	Verification Findings
Views onto the proposed utilities infrastructure from residential areas.	None	N/A	N/A	N/A	Not visible
Views onto the proposed utilities infrastructure from national/provincial roads.	Low	N/A	Yes	N/A	Partially visible
Views from protected areas and tourism facilities.	None	N/A	N/A	N/A	Not visible
View from aircraft approach/departure flight paths.	Low	N/A	Yes	N/A	Glare not in flight path

F14.2.4 VIA STEP D: PREDICT THE VISUAL ABSORPTION CAPACITY (VAC)

The “**Visual Absorption Capacity (VAC)**” is the physical capacity of a landscape to screen proposed development and still maintain its inherent visual character also referenced as the degree of visual penetration and the complexity the landscape affects this capacity (Smardon et al, 1986). The VAC is primarily a function of the vegetation structure and density as well as texture, colour, form and light / shade and contrasting characteristics of structures / land uses in the landscape. VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

Rating	Low (VAC)	Moderate (VAC)	High (VAC)
Expected Visual Absorption Capacity (VAC)	The landscape will not visually accept the proposed development due to incompatible land use within a natural landscape.	The landscape will partially accept the proposed utilities development visually, due to its moderate compatibility with surrounding land uses.	The landscape will easily accept the proposed development visually because of its low silhouette and surrounding land use compatibility.

F14.2.5 VIA STEP E: OVERALL VISUAL IMPACT PREDICTION

- A medium distance (up to ±2500m) partial viewshed from surrounding high lying areas is expected due to the mostly concealed setting of the site that is surrounded by mountainous topography and bushveld vegetation.
- No residential areas of the surrounding communities will be visually exposed to the development.
- Protected areas and tourism facilities will not be visually exposed to the development.
- Very limited visual exposure and medium distance viewer proximity is expected for users of Road 1261. In addition viewer sensitivity of the road users is also expected to be low as the road is not known to be a scenic tourism route.
- Although the utilities infrastructure would pose a low visual absorption capacity, the favourable landscape setting

within which the development will be established, the medium height bushveld vegetation and the compatibility of surrounding land uses will contribute to a moderate to high visual absorption capacity in the local landscape.

- The SEGP is not expected to create an aerial glint or glare impact to the aircraft that lands/departs at a private airstrip that is located ± 2 km due north of the site as the West-East flight approach and departure alignment would not be affected by a North-west-to-North-east glint and glare quadrant and the flight-approach alignment is screened from the SEGP by a ± 100 m high mountain ridge that is located in-between the airstrip and the SEGP.
- The overall visual impact of the proposed project is thus expected to be limited and of low significance.

F15. ACOUSTIC ENVIRONMENT

F15.1 SOURCES OF POTENTIAL NOISE IMPACTS

The solar energy generation plant will not generate noise during the operational period and the wastewater and water treatment plant is expected to provide low levels of noise similar to urban districts. Occasional high levels of noise may occur during the construction period, however no sensitive noise receptors occur or reside near to the development site.

F15.2 POTENTIAL NOISE RECEPTORS

Adjacent land owners (mainly mining and farm land), but no residences / receptors living within 1500m from the site.

F15.3 NOISE IMPACT ASSESSMENT PARAMETERS

SANS (10103) TYPICAL RATING LEVELS FOR AMBIENT NOISE		SANS 10103 Outdoors Rating Level (dBA)		NOISE IMPACT QUALIFIERS (SANS 10103)	
dB(A) is the value of sound pressure level in decibels (dB), determined using an expected weighted noise level (A) at typical noise emitting environments.		Day-time 06:00 – 22:00	Night-time 22:00 – 06:00	Impact	The noise difference between residual noise and typical outdoor rating level.
Type of District					
Residential Districts	Rural districts (N/A)	45	35	Negligible	0
	Sub-urban districts with little road traffic (similar to the site area)	50	40	Low	Between 0 & 5 dBA
	Urban districts (new land use)	55	45	Moderate	Between 5 & 10 dBA
Non-Residential Districts	Urban workshops, business premises & main roads (new uses)	60	50	High	Between 10 & 15 dBA
	Central business districts (N/A)	65	55	Very high	More than 15 dBA
	Industrial districts (N/A)	70	60	Noise dissipates by 6dBA as distance doubles	

F15.3 MODEL ASSESSMENT OF NOISE SOURCES (SANS10103)	Noise dissipates at 6dBA by doubling the distance from source							
Noise type and level at source	1m	2m	4m	8m	16m	32m	64m	128m
Daytime urban residential district noise (± 55 dBA)	55	49	43	37	31	25	19	13
Night time urban residential district noise (± 45 dBA)	45	39	33	27	21	15	9	3
Daytime urban and central business districts (60 – 65 dBA)	65	59	53	47	41	35	29	23
Daytime urban workshops / light industrial (± 60 – 70 dBA)	70	64	58	52	46	40	34	28
Daytime construction noise: bulldozer/trucks (± 92 dBA)	92	86	80	74	68	62	56	50

F15.4 POTENTIAL NOISE IMPACTS

- The average daytime outdoor ambient noise rating for the area that surrounds the site is expected to be ± 50 dBA, similar to sub-urban districts (due to existing noise generation from surrounding mines and industrial uses).
- New solar energy generation plant will not generate noise.
- New wastewater and water treatment works may generate low noise similar to urban light industrial uses ± 60 dBA at daytime and ± 50 dBA night time.
- Noise dissipates as the distance from the noise source doubles (refer to the noise model F14.3), therefore at a distance of 128m from a potential noise source the noise impact will be low to negligible.
- No noise impact is anticipated as no sensitive noise receptors occur within 128m from the proposed WWTP.

F16. AMBIENT AIR QUALITY

F16.1 AMBIENT AIR QUALITY CONTROL / STANDARDS / PRIORITY AREA		
Is the project located within a declared air quality control / priority area (Section 18 of the NEMAQA 2004).	No, the project is located in a low air quality risk area.	Regulations / Standards : The proposed utilities infrastructure would not generate emissions in excess of the minimum emission standards.

F16.2 IDENTIFICATION OF POTENTIAL SOURCES OF ATMOSPHERIC EMISSIONS / ODOURS				
New development potential emissions	Distance from site	Emissions description	Frequency / Rating	Impact/risk
Construction activities during the construction period.	On-site	Land preparation earthworks (Dust).	Occasional during the construction period.	No directly surrounding residents (Low impact).
On-site wastewater treatment (point-source) may contribute to potentially offensive emissions.	On-site	Methane (CH ₄), Nitrogen Oxide (NO ₂) Hydrogen Sulphide (H ₂ S) gasses during the operational phase.	Occasional during the operational period.	No directly surrounding residents, specifically downwind of the site (Low impact).

F16.3 POTENTIAL AIR QUALITY IMPACTS
<ul style="list-style-type: none"> The potential emission activities as identified above are not listed in the minimum emission standards (Cat 1-10) of GNR 893 (as amended) and therefore would not require an Atmospheric Emissions Licence (AEL). During the construction phase, dust may be a potential nuisance however there is no homesteads or residential areas within 1500m from the development area and none down-wind from the development area. Dust fall due to construction activities is thus not expected to pose a health/nuisance impact. Precautionary measures can be applied to minimise dust generation during the site preparation phase if required. The proposed wastewater treatment plant is an enclosed system but may occasionally emit offensive omissions during service periods. However, there is no homesteads or residential areas within 1500m from the development area and none down-wind from the wastewater treatment site. Occasional offensive emissions from the wastewater treatment plant are thus not expected to pose any nuisance or health impact to nearby residents of adjacent properties.

F.17 ENVIRONMENTAL POLLUTION AND WASTE

F17.1 EXISTING WASTE MANAGEMENT SERVICES
<ul style="list-style-type: none"> The Fetakgomo Tubatse Waste Management By-Law (2017) indicates that the municipality is responsible for collection and disposal of waste within the municipal area but where such service cannot be rendered an approved service provider may conduct such activities, and no person may dispose of waste on any land or at any facility unless authorized for disposal purposes. A licensed waste disposal / landfill site is located at Burgersfort. The removal of hazardous waste within the municipal area is currently being contracted to an approved contractor for disposal at a registered hazardous waste site. Both general and hazardous waste that may be generated as part of the project development and operation can therefore be removed and disposed of safely. Municipal wastewater treatment plants are located at Burgersfort (1.5Ml/day), Steelpoort (0.35Ml/day) and Ga-Mapodile (1.0Ml/day). The proposed development will not require these services or link to existing municipal plants. The proposed wastewater treatment plant will contribute to the overall treatment of wastewater in the municipal area and sustainable re-use of treated wastewater for non-consumptive uses.

F17.2 IDENTIFICATION OF POTENTIAL SOURCES OF POLLUTION AND WASTE				
Development activities that may cause generate waste and pollution	Action	Waste type	Frequency / Rating / Disposal	Impact/risk
Solid & liquid waste will be generated during the construction phase.	Re-use on-site or disposal off-site	Construction waste Inert waste, vehicle washing, spill of hazardous substances.	Continuous during the construction period. General waste disposal at the Burgersfort Landfill. Hazardous waste to be removed by Contractor.	Inert waste is not suitable for general landfills. Identify re-use possibilities on site such as quarry filling. Hazardous waste not to general landfill.

Development activities that may cause generate waste and pollution	Action	Waste type	Frequency / Rating / Disposal	Impact/risk
<i>The SEGP will generate a negligible volume of solid waste during the operational period.</i>	<i>Collection & off-site disposal</i>	<i>General waste: cleaning and repair material</i>	<i>Continuous during the operational period. Disposal at the Burgersfort Landfill.</i>	<i>Pollution of the local area if not collected and disposed of correctly.</i>
<i>Effluent from the wastewater treatment plant.</i>	<i>On-site treatment & re-use</i>	<i>Hazardous waste</i>	<i>Continuous during the operational period. Treated wastewater to be re-used for industrial purposes.</i>	<i>Potential health risk if not managed / treated correctly. Risk to surface and groundwater resources.</i>
<i>Sludge removal from the wastewater treatment plant.</i>	<i>Collection & off-site disposal</i>	<i>Hazardous waste</i>	<i>Occasionally during the operational period. Sludge disposal at registered site or remove for re-use.</i>	<i>Potential health risk if not managed correctly. Risk to surface and groundwater resources.</i>

F17.3 ALTERNATIVE POSSIBILITIES FOR ON-SITE SOLID WASTE MANAGEMENT

Waste mitigation hierarchy	Methods	Implementation feasibility
Reduce solid waste	<i>Waste separation at source.</i>	<i>Feasible during construction & operational phases.</i>
Re-use solid waste	<i>Find other uses for waste material</i>	<i>Feasible during construction e.g. re-use of inert building waste for construction filling.</i>
Recycle solid waste	<i>Industrial recycling of goods and material</i>	<i>Private recycling companies and informal recyclers are collecting recyclable waste.</i>
Recover solid waste	<i>Install a composting facility for handling of sewer sludge.</i>	<i>Feasible demand by urban agriculture and ample land available.</i>

F17.4 POLLUTION AND WASTE IMPACTS AND RISK

<ul style="list-style-type: none"> ▪ <i>Inert waste can be used on-site for filling of the old quarry for rehabilitation purposes.</i> ▪ <i>A registered Landfill at Burgersfort is available for disposal of general waste, however very little waste expected.</i> ▪ <i>The correct design, construction and operation of the wastewater treatment plant hold little risk for solid or liquid waste pollution and resultant degradation of the biophysical environment.</i> ▪ <i>Poor operational standards of the wastewater treatment plant can however lead to potentially significant on-site and off-site contamination of surface and groundwater resources but appropriate mitigation can prevent contamination.</i> ▪ <i>Even small volumes of wastewater be generated during the construction phase including drainage arising from spills and from bunded areas may impact on the natural environment. Suitable management measure can be implemented by way of the EMPR and monitored by way of environmental compliance inspections during the construction period.</i> ▪ <i>The safe storage and handling of potentially hazardous substances, spillages and liquid waste is dealt with in detail in the EIR and EMPR.</i> ▪ <i>Positive impact due to re-cycling of treated wastewater for the beneficial re-use at surrounding mining operations.</i>

F.18 SOCIO-ECONOMIC CHARACTER OF THE AREA

The property is located in Ward 27 of the Fetakgomo Tubatse Local Municipality. The latest Census data as provided by Statistics South Africa (SSA) and the Municipal Integrated Development Plans were used to determine the broad socio-economic conditions of the area.

F18.1 BROAD SOCIO-ECONOMIC CHARACTER OF THE WARD		
DEMOGRAPHIC INDICATOR	2011/2016 CENSUS DATA OF WARD 27*	SOCIO-ECONOMIC INTERPRETATION OF WARD 27
Age	<i>The population has a median age of 22 and a 52% male to 48% female ratio.</i>	<i>The data indicates a young population.</i>
Education	<i>±55.3% completed Grade 9 or higher but only 20.4% completed Matric or higher.</i>	<i>The population has a poor educational profile and therefore has little prospect of being included in the formal or skilled workplace. There is thus a need for employment of unskilled people.</i>

DEMOGRAPHIC INDICATOR	2011/2016 CENSUS DATA OF WARD 27*	SOCIO-ECONOMIC INTERPRETATION OF WARD 27
Employment	<i>±78% of the economically active population is unemployed. Most formal employment by mines, agriculture and industry.</i>	<i>The high unemployment rate can be attributed to few employment opportunities. There is thus a need for economic development and employment opportunities.</i>
Average annual income	R57500	<i>The average annual income of an employed person is low, but higher than the provincial average, mainly due to better salaries in the mining and related sectors.</i>
Income opportunities	<i>The opportunity to earn an income in the formal sector within this Ward is currently limited to the mining and associated industrial sectors.</i>	<i>New employment should be created in the services sector.</i>

*The Ward census data as provided by Statistics South Africa (SSA), as well as IDP data.

“Socio-economic impact” means the impact or potential impact that activity has, has had or may have on the surrounding community's social and economic wellbeing, including changes in demographics, housing, employment, income opportunities, and demand for public services.

F18.2 SOCIO-ECONOMIC IMPACT INTERPRETATION

An overall positive socio-economic impact can be expected by the development. The proposed project aligns with the development goals of the Greater Tubatse Municipal IDP (2016-2021) and can contribute to service delivery in support of mining and industry in the area which could in turn increase local investment.

- *The proposed development is not expected to result in the loss of employment opportunities.*
- *The proposed development is also not expected to impact any person's income as the property is currently not being utilised for any income-generating activity.*
- *The proposed development is expected to contribute directly over the short to long-term in new employment opportunities. Economic benefits of this development are also expected to filter through to the supply-chain service providers and toward secondary and indirect employment opportunities that can lead to widespread income generation within the local communities.*
- *Over the long term, an estimated 60 new employment opportunities can be created which will 95% be allocated to local communities and unskilled individuals. This potential positive impact will benefit local individuals and households.*
- *There are no homesteads within 1500m or residential areas within 5000m from the development area and it is not expected to impact people's environmental rights in terms of access to resources, opportunity costs, loss of amenity, air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc.*
- *The proposed utilities infrastructure development can benefit the local business, industrial, residential and mining uses by providing essential services in association with the local municipality that can enhance local living conditions and livelihood.*

F19. SUMMARY

This section thus highlighted any potential impact that the selected development alternatives may pose on the receiving environment.

Several issues were identified that may be impacted by the development or that may pose an impact on the development.

However, no issue was identified that poses an adverse risk to the receiving environment or constitutes a fatal flaw in the development concept.

The assessment of the receiving environment in did not identify any significant limitation for establishing the respective utility services infrastructure on the selected sites.

The issues identified in this section are thus put forward for further assessment in the flowing sections.

THE PROJECT NEED & DESIRABILITY

This Section complies with GN R326 Appendix 3, Section 3(1)(f) and motivates the need and desirability of the proposed development, in the context of the preferred development footprint and within the approved site as contemplated in the accepted scoping report.

G1. METHOD OF DETERMINING NEED AND DESIRABILITY

*The **Integrated Environmental Management Guideline on Need and Desirability**, (DEA:2017) provides the requirements for need and desirability assessment in the EIA process in the form of a questionnaire that aims to ensure that all the relevant need and desirability considerations have been taken into account. During the scoping process these questions identified gaps in information and the key issues to be addressed as well as alternatives that may better respond to the development. Specialist studies were (where relevant) commissioned to provide the identified information requirements on key issues. The findings and recommendations of these studies including any those in Section F of this report adequately address the previously outstanding information. Therefore the questionnaire that formed part of the Scoping Report is not duplicated in this report. The following sections provide a summary of the findings of the need and desirability assessment for the proposed utilities infrastructure development on the context of the preferred development footprint and on the proposed development site.*

G2. PROJECT NEED AND DESIRABILITY MOTIVATION

The Landowner has been desirous to develop the property that has lain vacant for approximately 20 years and has previously considered various development options including residential, mixed use and industrial land uses. However, none of these ideas materialised mainly due to poor demand at this locality. Recent mining and industrial developments in the immediate locality and the lack of efficient and sufficient municipal services in support of these developments led to a demand to provide such services by the private sector. The Landowner was requested by the local mining and mineral beneficiation sector as well as local industrial businesses to consider making the property available for the development of utility services infrastructure in support of their operations. The supply of additional energy, the treatment of wastewater for re-use and the supply of treated water for industrial and domestic purposes were identified as an immediate need by the relevant mines and industrial businesses in this area. Such provision of essential services is aligned with the over-arching objectives of the municipality and also aligns with provincial and national development plans and economic objectives. However, it is unlikely that the state will have the means to provide the required services. The provision of these services in addition to existing electricity and water supply services in this area will ensure additional capacity and resilience in the local services supply systems in an otherwise unstable and unreliable services environment. Specifically local private energy generation and water supply services are considered priorities at the highest level of government.

G3. THE PROJECT NEED IN CONTEXTS

G3.1 National Economic Growth and Development Strategies

“Need and desirability” considerations as part of an EIA process must also take into account national policies and strategies that support growth in the economy (need) whilst ensuring that such growth is ecologically sustainable (desirable).

In October 2020 the National Government announced a far-reaching economic reform agenda for South Africa to shift the economic growth trajectory and enable investment and job creation through key objectives of which the supply of stable electricity and sustainable water supply to meet demand, are prioritised.

*In September 2022 the National Government introduced the **Electricity Reform Amendment Bill** to Parliament to remove the energy licensing threshold from 1 MW to 100MW in order to enable and accelerate private investment in energy generation capacity thus achieving long-term energy security.*

*In September 2022 the National Government submitted the **National Water Resources Infrastructure Agency Bill** to Parliament which will provide support to municipalities and other water authorities to enable private sector participation in water infrastructure provision.*

The National Development Plan 2030 (NDP): The plan identifies services provision as an important key to unlock economic growth. As such the proposed utility services infrastructure development can contribute to unlock such growth locally.

The New Growth Path 2010 (NGP): Infrastructure development and investment is the main job driver of the NGP and includes amongst others water projects and energy projects with specific emphasis on the green economy including solar energy projects.

The Industrial Policy Action Plan (IPAP) 2018 -20/21: Identifies mineral beneficiation, industrial development and sustainable energy production as priority programmes for economic growth nationally. The proposed utility services project will directly benefit local mines, mineral beneficiation and manufacturing companies' thus aiding stability and resilience in these sectors which in turn will aid local investment and employment opportunities.

The need for the proposed utility services infrastructure development can thus be justified in terms of the national economic growth and development strategies as indicated above.

G3.2 Local Municipal and Provincial Plans and Development Frameworks

The need and desirability assessment in EIA deals with the search for the best practicable options that will best ensure the maintenance of ecological integrity while promoting justifiable social and economic development. When considering how development may affect or promote justifiable economic and social development, the relevant District and Local Municipal Plans and Policies must be considered, including Municipal Integrated Development Plans (IDP) and Spatial Development Frameworks (SDF).

The Fetakgomo Tubatse Municipal Spatial Development Framework (2019) and Spatial Development Framework establishes the geographic context for physical and infrastructural development concerning the desired spatial form, desirable land use patterns, and the location of future development. It also establishes priorities for public sector development and investment and provides a spatial logic that guides private sector investments. The IDP and accompanying Spatial Development Framework identifies the area within which the project is planned as a priority area for mining and associated supporting industries and infrastructure.

The Sekhukhune District Municipality IDP (2019-2023) identifies the mining sector as the primary economic sector in the district with an estimated growth rate of 5.6%. The municipality identifies services provision as the major constraint that impedes accelerated growth and development of the mining sector. The IDP therefore prioritises the development and enhancement of linkages with other economic sectors in support of the mining sector. This includes linkages with both manufacturers of inputs (capital goods and consumables) and suppliers of mining-related service and downstream producers, especially for platinum-group metals and chrome ore. Furthermore the IDP identifies the backlog and decrease in services delivery provision of sanitation and water services and as such also identifies the considerable scope for wastewater treatment and re-use. The project is thus in line with the aims of the IDP.

Considering the project motivation it can be stated that the proposed development is in line with the needs as identified in the District and Local Municipal IDPs as well as the spatial context (place) for such development at the planned locality.

G4 THE PROJECT DESIRABILITY IN CONTEXT

While the need for economic growth, service delivery and employment in South Africa cannot be denied, the Constitution calls for justifiable economic development. While the specific social and economic needs of the broader community should be achieved, the desirability of the economic activity in terms of ecological sustainability must be upheld.

The Sekhukhune District Bioregional Plan (2019) spatially identifies the biodiversity status and priority of terrestrial and freshwater ecosystems and is accompanied by recommended land-use guidelines for use in land-use and development planning, environmental assessment and regulation, and natural resource management, ultimately ensuring continued progress towards sustainable development.

The following consideration of sustainability criteria as proposed in the Integrated Environmental Management Guideline on Need and Desirability, (DEA:2017) identifies the impact of the proposed utilities infrastructure development on the critical ecological integrity components of the area in which the project is planned:

Loss of threatened ecosystems	<i>In Section F8 of the report a discrepancy is identified and in Appendix G4 a Specialist site verification confirms that the land cover on the proposed development site is not reminiscent of the vegetation type, structure and locality of the Sekhukhune Mountainlands (MP9) as identified in GNR1002 (2011). According to the Sekhukhune Bioregional Plan (2019) the project site is located within the Sekhukhune Mountain Bushveld (SVcd28) with “least concern/threatened” importance and sensitivity classification. The proposed development will thus not contribute to the loss of a threatened ecosystem.</i>
Loss of Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”)	<i>According to the Sekhukhune Bioregional Plan (2019) the proposed development site is not located in a CBA but it indicates that the site is located within an ESA in support of surrounding CBAs. Site verification and Specialist investigation found that the development site has been heavily modified and holds no importance in terms of ecological functionality and services. The modified land cover of the site is therefore suitable for development without loss of any important ecological services.</i>
Impact on conservation targets	<i>A low conservation target is assigned to the Sekhukhune Mountain Bushveld (SVcd28) with “least concern/threatened” importance. The site is heavily modified with very little remaining of the original vegetation composition and structure and the use of the site for the proposed development would not compromise any ecosystem conservation targets.</i>
Loss of ecosystem drivers.	<i>Ecological drivers on the property were irreparably lost due to historic agricultural and mining activities as well as recent wood harvesting. The overall vegetation degradation resulted in a loss of ecosystem drivers. The ephemeral flow regime of the watercourse on the site poses no to little ecosystem service and the intended storm water detention dam would not pose any adverse impacts on downstream freshwater ecology. On the contrary the buffering and silt deposition function of the proposed dam will result in enhanced water quality downstream. The use of the site for the proposed SEGP and WWTP would thus not compromise any ecosystem drivers.</i>
Loss of biodiversity	<i>A Specialist verification of terrestrial and aquatic biodiversity concludes that the development site poses all over low biodiversity. The proposed development and associated clearance of vegetation on the heavily modified selected development site will thus not lead to a loss of important biodiversity.</i>
Pollution and degradation of the biophysical environment	<i>Point-source effluent and solid waste pollution can emanate from the WWTP operation and may lead to indirect contamination of water resources with resultant deterioration of the physical environment. However, on-site pollution containment measures will be implemented at the WWTP which will prevent pollution of the biophysical environment.</i>
Changes to the landscape “sense of place”	<i>The development will result in physical and visual changes in the landscape, however the site is surrounded by extensive mining as well as industrial land uses. The proposed development is visually compatible with these land uses and therefore, no significant negative change in the local “sense of place” is expected.</i>
Changes to the cultural heritage	<i>The development footprint will not impact directly or indirectly on an archaeological site.</i>
Use of renewable resources (solar and water)	<i>Both the proposed Solar Energy Generation Plant and the Wastewater Treatment Plant make use of renewable resources to generate clean electricity and clean water to local users. Both utilities are considered to be sustainable and will contribute to decrease the local demand of electricity and water from non-renewable resources.</i>
A risk-averse and cautious approach	<i>This assessment is indicative of the risk-averse and cautious approach that the Applicant initiated before commencement with the development. In this assessment the potential significant impacts are identified and appropriate mitigation measures are proposed to prevent, minimise or to manage potential negative impacts.</i>
Bio-physical and physical site suitability	<i>The assessment of the receiving environment in Section F of this report did not identify any significant limitation for establishing the respective utility services infrastructure on the selected sites. The proposed localities of the respective development components have been carefully selected by applying the EIA assessment findings and the respective development sites have been found suitable for the intended purpose.</i>

The above deliberation indicates the proposed development is expected to be ecological sustainable and will be economically and socially justifiable without compromising the natural system on which it is based.

ISSUE IDENTIFICATION : DEPARTMENTAL, PUBLIC AND SPECIALIST INPUTS

In compliance with Appendix 3, Section 3(h)(ii) and (iii) of GNR326 (2017), the Section below provides the details of the public participation process that was undertaken and a summary of the issues raised by interested and affected parties and an indication of the manner in which the issues are incorporated or the reasons for not including them (the unabridged comments can be viewed in Appendix E & F).

H1. PUBLIC PARTICIPATION PROCESS

H1.1 PURPOSE OF PUBLIC AND DEPARTMENTAL PARTICIPATION

The IEM Guideline Series 7 (2010) indicates the main purpose of public participation is:

- *to provide an opportunity for interested and affected parties (I&APs), the environmental assessment practitioner and the competent authority to obtain clear, accurate and understandable information about the environmental impacts of the project or implications of a decision,*
- *to provide I&APs with an opportunity to voice their support, concerns and questions regarding the project, and for suggesting ways for reducing or mitigating any negative impacts of the project,*
- *it enables the applicant to incorporate the need, preferences and values of affected parties into his application, and*
- *it provides the opportunity for clearing up misunderstandings about technical issues, resolving disputes and reconciling conflicting interests.*

H1.2 METHOD OF PUBLIC AND DEPARTMENTAL NOTIFICATION AND PARTICIPATION

The method followed the requirements of GNR 326 of 7 April 2017 and the following public participation process was concluded as part of the Environmental Scoping Process which commenced on 28 July 2022.

- *A notification of the project to the broad public in the local newspaper.*
- *A notification of the project to the broad public by way of a notice board that was fixed on the boundary of the site.*
- *A written notice of the application was provided to owners and occupiers of land / property directly adjacent to the site.*
- *A written notice of the application was provided to the Municipal Councillor of the relevant Ward.*
- *A written notice of the application was provided to the Local Municipality and District Municipality.*
- *A written notice of the application was provided to relevant State Departments that have interest / jurisdiction.*
- *The above-mentioned notice provided the above-mentioned parties a 30-day period to review and to comment on a Draft Scoping Report. Comment was received as indicated in Section H2 below.*

The following method will be followed in the second round of public participation with registered I&APs and State Departments as part of the Environmental Impact Assessment:

- *A written notification will be provided to registered parties and State Departments, inviting them to review and to comment within 30 days on a Draft Environmental Impact Report (EIR) that will be made available for review on a publicly accessible electronic platform.*
- *Comments received during this period will be reviewed, responded to and will be incorporated into a Final EIR that will be submitted to the Competent Authority in support of their decision on the application for Environmental Authorisation of the relevant regulated activities associated with this project.*

H2. PUBLIC AND DEPARTMENTAL IDENTIFICATION OF ISSUES

H2.1 SUMMARY OF ISSUES IDENTIFIED / COMMENTED BY INTERESTED AND AFFECTED PARTIES

Written comments were received from interested and affected parties and state departments during the Scoping Process and the EAP responded thereon. A Register of Interested and Affected Parties was opened and the comments were incorporated completely into a Final Scoping Report. Where relevant and applicable the comments /issues were included in the plan of study for EIA. The following Section provides a summary of the issues raised during the Scoping Public Participation Process by registered Interested and Affected Parties and State Departments.

Note that general comments that do not constitute an issue / impacts that require specific attention, investigation or assessment are not included but can be viewed in Appendix E & F.

#	Summary of comments/issues received	Response and manner in which the comment/issue has been incorporated / or not	Report Ref
	2021-11-22 Civil Aviation Authority (CAA)		
	During a pre-application consultation the CAA confirmed that the proposed development is not located within 3km from a registered aerodrome and that an application for an Obstacle Permit as well as Glint and Glare Impact assessment is not required.	<i>A copy of the Draft Scoping report that indicates the footprint of the development site, elevation and coordinates was send to the CAA for comment. No comment was received by the CAA.</i>	App F
	2022-08-01 Boulder Processing (Pty) Ltd		
	Boulder Processing is an adjacent landowner and would like to be notified of any activities or incidents that occur. Further, Boulder Processing would like to request all technical documents and reports used in the IWULA process as well as all reports associated with the final EIA.	<i>Noted</i>	N/A
	2022-08-30 Department of Water & Sanitation		
1.1	The applicant should note that the following activities will trigger section 21 water uses in terms of the National Water Act, Act 36 of 1998 (NWA) and should be authorised by the Department of Water and Sanitation.	<i>The water use licensing requirements are noted and are included in Section E of the Draft EIR.</i>	Sec E
1.2	Your attention is drawn to Government Notice No. 509 dated 26 August 2016 in Government Gazette No. 40229 which states that a General Authorisation (GA) is not applicable to the following: (refer to Par. 1.2 of the DWS letter attached in Section K).	<i>Noted, none of the mentioned activities are applicable and therefore a General Authorisation would not be appropriate. The Applicant will continue with a Water Use License for the relevant listed activities under Section 21 of the NWA.</i>	Sec E
1.3	The Applicant will require authorisation from the Department for any activity within the riparian habitat or the 1:100-year floodline, whichever is the greatest distance. Furthermore, the Applicant must note that any activity within a 500m radius from the boundary of a wetland requires a water use authorisation in terms of Section 21(c) and (i) of the NWA.	<i>Section 144 of the NWA refers to the determining and indication of a 1:100 year flood line on a township layout plan. The Act does not require the 1:100 year flood line to be calculated and indicated for any other development other than a township. No wetlands were identified within 500m radius of the development site. A qualified Civil Engineer calculated the 1:100 year floodline which is indicated on the site plan.</i>	App G11 Annex E
1.4	The river, stream and associated buffers must be treated as sensitive environment areas: caution must be exercised near the watercourses.	<i>An Aquatic Ecologist identified and delineated the riparian habitat and determined an appropriate buffer by way of the DWS River Buffer Calculation Tool.</i>	App G5
1.5	Please note that no person may use water unless permitted under the NWA.	<i>Noted, as mentioned in 1.1 above.</i>	Sec E
2.1	The requirements of this Department with respect to solid waste must be strictly enforced and complied with. The waste management hierarchy must be implemented for all solid waste generated.	<i>The sources of solid waste and a waste management hierarchy were identified and suitable management measures are proposed.</i>	Sec F17
2.2	The Applicant should note that contaminated soil or other hazardous material must be disposed of at a permitted hazardous landfill site that is authorized to accept the said material.	<i>The Scoping Report identified this risk and specific design, installation and operational management measures are included in the EIR and EMPR.</i>	Sec F17
2.3	Should private contractors be used, all solid waste must be disposed of at a permitted landfill site and proof of this must be made available to this Department when required.	<i>This requirement is included in the EMPR.</i>	App D
2.4	The recycling of suitable material is encouraged by this Department, provided it is properly managed.	<i>The sources of solid waste and a waste management hierarchy were identified and suitable management measures are proposed.</i>	Sec F17

3.1	Washing, refuelling, maintaining of vehicles or the transfer of hazardous substances must be conducted within a bunded area. All drainage arising from the bunded area must be treated as a water containing waste and disposed of safely.	<i>This requirement is included in the EMPR.</i>	App D
3.2	The following is applicable should small volumes of wastewater be generated during the construction phase: <ul style="list-style-type: none"> ▪ Water containing waste must not be discharged into the natural environment, and; ▪ Measures to contain the water containing waste and safely dispose thereof must be implemented. 	<i>This requirement is included in the EMPR.</i>	App D
4.1	It is imperative that there is proper management of storm water at the project site. This Department requests a Storm-water Management Plan.	<i>A storm water management report is included in the Civil Engineering Services Report.</i>	App G11
5.1	Soil erosion onsite must be prevented at all times, i.e. pre-, during- and post-construction activities. Erosion control measures must be implemented in areas prone to erosion such as near water supply points, edges of slopes, etc.	<i>The risk of soil erosion was identified in Section F4.3 and is dealt with in more detail in the EMPR.</i>	App D
6.1	Storage of material, chemicals, fuels etc. must not pose a risk to the surrounding environment, and this includes surface and groundwater. Temporary bunds must also be constructed around chemical or fuel storage areas to contain possible spillages.	<i>Potential spills from hazardous materials were identified in Section F17.2 and F17.4 and specific mitigation measures are included in the EMPR.</i>	App D
6.2	It is important that any significant spillage of chemicals, fuels, etc. during the construction phase and/or operational phase is reported to this Office and other relevant authorities. In the event of a spill, specific steps must be taken.	<i>The safe storage and handling of potentially hazardous substances, spillages and liquid waste is dealt with in detail in the EMPR.</i>	App D
7.1	No form of secondary pollution should arise from the disposal of sewage and refuse. The contractor must be clearly briefed on the method of disposal of such waste and compliance must be ensured/monitored. Any pollution problems arising from the above project is to be addressed immediately by the Applicant.	<i>Noted. The operational management of the WWTP is described in Annexure D of the Civil Engineering Services Report and also incorporated in the EMPR.</i>	App D
2022-09-05 Department of Economic Development Environment & Tourism			
	Provide confirmation from Lebelelo Water Supply Scheme indicating that they have adequate capacity to provide water for the proposed development.	<i>The development will not rely on water from Lebelelo it will be self-reliant from own boreholes and treated wastewater.</i>	
	Provide an Engineering services report that includes, but not limited to, water, sewerage and waste management services.	<i>A Civil Engineering Services Report was commissioned and is included in Appendix G12.</i>	App G12
	The issues or comments that can be raised by other I&APs must be clearly addressed in order for the Department to make an informed decision.	<i>Noted. A comments and response report will be included in the Final EIR.</i>	
2022-10-13 Department of Economic Development Environment & Tourism			
	Should it be confirmed that a glint and glare assessment is necessary as per consultation with the Civil Aviation Authority and aerodrome owner, it must be undertaken during the EIA phase.	<i>Noted. The CAA already confirmed that no registered aerodrome is located within the 3km regulated distance from the development site. The airstrip on the application property will be closed. An unregistered private airstrip ±2km north of the site was identified. The assessment indicates that the landing and take-off of aircraft at this landing strip will not be affected by glint or glare. The airstrip owner is included in the public consultation process.</i>	Sec F14.2
	The hydrological assessment must include floodline delineation.	<i>A qualified Civil Engineer calculated the 1:100 year floodline which is indicated on the site plan.</i>	App A App G11 Annex E

H3 INVESTIGATION AND INPUTS ON KEY ISSUES BY ENVIRONMENTAL SPECIALISTS AND TECHNICAL PROFESSIONALS

H3.1 PURPOSE OF INVOLVING SPECIALIST

The purpose of involving a wide range of specialist input is to specifically address the technical ability of EIA in determining baseline environmental conditions, field surveys and data collection, identifying and predicting potential impacts and prescribing mitigation measures and implementing monitoring requirements regarding direct, indirect and cumulative impacts (DEAT, 2002c).

H3.2 METHOD OF DETERMINING KEY ISSUES FOR SPECIALIST INVESTIGATION

The priorities of the environmental assessment are determined by applying the scoping process during which the project activities and project site is "scoped" for potential issues, risks and impacts. Stakeholder engagement as a means of identifying key issues forms part of the scoping process. The completed scoping assessment identified issues, risks and impacts and further determined the key aspects that require in-depth investigation by way of specialist verification and/or assessment and which were included in specific terms of reference the Scoping Report's Plan of Study for EIA.

H3.3 SUMMARY OF THE INPUTS / FINDINGS OF SPECIALIST INVESTIGATIONS

The required specialist studies as referred to above have been concluded and are attached in Appendix G to this report. In compliance with Appendix 3, Section 3(k) of GNR326 (2017), the Section below provides a summary of the findings of specialist investigations, based on the previously identified key issues and it also makes reference to the relevant Sections in this report where the findings and recommendations of specialists are included in this report.

Summary of the findings / inputs from an Agricultural Specialists : Appendix G1	Report Ref
<ul style="list-style-type: none"> ▪ There will be no loss of high potential land. Because of the low and variable rainfall and high summer temperatures the rain fed crop production potential is low. Only irrigated land can be classified as high potential and there is no irrigation. ▪ The impact of the loss of grazing is low on a regional scale. The land is not farmed commercially at present. However, the grazing land can potentially loose some income. ▪ No farming infrastructure will be lost. ▪ There will be no loss of jobs. The mining activities that will flow from the new land uses will be very high and can even address the unemployment crises in the region. 	App G1
Summary of the findings / inputs from Archaeological Specialists : Appendix G2	Report Ref
<ul style="list-style-type: none"> ▪ One site with remnants of Late Iron Age stone walling was found on the property <u>but outside the solar PV development footprint</u>. The cultural heritage significance of the site is not deemed very high. If the proposed development actions cannot avoid impacting on the site it is recommended that detailed mapping & drawing of site and limited Archaeological Excavations are conducted before the site is demolished. ▪ One site containing a small scatter of Middle/Later Stone Age (MAS/LSA) material was also recorded in one of the large erosion dongas found in the area. Cultural and heritage significance is low and the site may be demolished if necessary construct erosion protection structures in the donga. 	App G2 Sec F11
Summary of the findings / inputs from Paleontologically Specialists : Appendix G3	Report Ref
<ul style="list-style-type: none"> ▪ The site in on non-fossiliferous igneous rocks of the Rustenburg Layered suite (gabbro, anorthosite and magnetite-gabbro, and partly on modern to Quaternary soils. ▪ This is confirmed by the grey and blue coding on the SAHRIS palaeo-sensitivity map. ▪ Since there will be no impact on the palaeontological heritage, we request exemption from any further assessment, and that, as far as the palaeontology is concerned, that this project be authorised. 	App G3

Summary of the findings / inputs from Terrestrial Biodiversity Specialists : Appendix G4	Report Ref
<ul style="list-style-type: none"> ▪ <i>Initial site verification it is concluded that the largest part of the site is in a modified state and of low biodiversity significance.</i> ▪ <i>The site assessment confirms that a significant loss of the natural vegetation has occurred in the remaining natural habitat. Subsequently the vegetation assemblage is impoverished and its diversity status is low. This trend is negative</i> ▪ <i>The site assessment confirms that a significant loss of the natural habitat has occurred and the remaining natural habitat is in a degraded state. Subsequently the animal assemblage is impoverished and its diversity status is low. This trend is negative.</i> <ul style="list-style-type: none"> ▪ <i>As result of the human induced impacts on site and in the local surrounding area habitats are degraded, ecological functions and corridors are compromised and the overall ecological importance and biodiversity status is low-medium. The status of habitats are listed below:</i> ▪ <i>The sensitivity of the modified land and old lands for the presence and maintenance of biodiversity is concluded to be low.</i> ▪ <i>The sensitivity of the degraded woodland for the presence and maintenance of biodiversity is concluded to be low.</i> ▪ <i>The sensitivity of the stream and riparian habitat falls in a medium category as it will have a limited function as an ecological corridor for certain terrestrial animals and it functions as a refuge for the maintenance of biodiversity.</i> ▪ <i>The sensitivity of the eroded areas for the presence and maintenance of biodiversity is concluded to be low.</i> 	<p>App G4</p> <p>Section F9</p>
Summary of the findings / inputs from Aquatic Biodiversity Specialist : Appendix G5	Report Ref
<ul style="list-style-type: none"> ▪ <i>The PES and EIS calculations provides the following findings:</i> <ul style="list-style-type: none"> ▪ <i>The in-stream PES is “Moderately modified” and the riparian PES is “Largely modified”.</i> ▪ <i>Due to the small size and seasonal flow regime of the watercourse no obligate riparian vegetation is present.</i> ▪ <i>Riparian Zone Habitat Integrity is thus “Largely to Seriously Modified”.</i> ▪ <i>No biological / ecological features or biota are present along the length of the watercourse.</i> ▪ <i>The level of aquatic biodiversity of the stream is low and the stream is of low aquatic ecological significance.</i> ▪ <i>The status of ES and EI for the watercourse is categorized as low.</i> ▪ <i>Only mitigatable activities with a low risk category is allowed within the watercourse including erosion control measures, storm water attenuation dam, formal road crossings and mitigated discharge of storm water and treated waste water.</i> ▪ <i>In-stream soil erosion must be pro-actively mitigated via applicable methods and eroded areas must be rehabilitated with the objective to provide stable, vegetated areas.</i> ▪ <i>The development activities pose a low pollution risk and low impact significance on the characteristics of the watercourse and a relatively small buffer is required. It is recommended that a buffer line with a minimum distance of 20m is applied measured from the active channel bank.</i> ▪ <i>An additional 15m buffer zone must protect the edge of the erosion donga against deterioration from the main development layout and activities.</i> ▪ <i>The assessment concludes that the activities will not result in significant negative consequences to the aquatic and riparian ecosystems of the local area. This is mainly due to the fact that the watercourse is in a severely degraded state and the proposed activities will improve its status.</i> 	<p>App G5</p> <p>Section F8 and F9</p>

Summary of the findings / inputs from Plants Species Specialist : Appendix G6	Report Ref
<ul style="list-style-type: none"> ▪ <i>The largest extent of the site consists of historic agriculture lands and the vegetation is classified as pioneer woody vegetation.</i> ▪ <i>The degraded woodland on site is fragmented and degraded as result of historic and on-going human induced impacts.</i> ▪ <i>Soil erosion has sterilized a large surface area on the site.</i> ▪ <i>It can be concluded that the terrestrial plants diversity on the site is very low and the vegetation habitats are either seriously modified or degraded.</i> ▪ <i>No plant SCC was recorded on the study area.</i> ▪ <i>The findings of the site assessments support the very low sensitivity value for SCC terrestrial plant species.</i> ▪ <i>A few legally protected plant and tree species were recorded on site. These plants/ trees may be removed subject to obtaining the relevant permit to do so and on condition that aloe species must be relocated to a safe site elsewhere on the property and tree species must be replaced at a ratio of 1:3.</i> ▪ <i>The development will overall not pose a very low impact on plant species.</i> 	<p style="text-align: center;">App G6</p> <p style="text-align: center;">Section F10</p>
Summary of the findings / inputs from Animal Species Specialists : Appendix G7	Report Ref
<ul style="list-style-type: none"> ▪ <i>The largest extent of the site consists of historic agriculture lands and the vegetation is classified as pioneer woody vegetation.</i> ▪ <i>The degraded woodland on site is fragmented and degraded as result of historic and on-going human induced impacts.</i> ▪ <i>It can be concluded that the terrestrial plants diversity on the site is very low and the vegetation habitats are either seriously modified or degraded.</i> ▪ <i>It is concluded that a large loss of the natural vegetation has occurred and subsequently terrestrial animal species assemblage is impoverished.</i> ▪ <i>No SCC (Red Data Listed), endemic or otherwise threatened or rare animals were recorded.</i> ▪ <i>Site verification concludes that the sensitivity and diversity for animal species is low.</i> ▪ <i>The development will overall not pose a very low impact on animal species.</i> 	<p style="text-align: center;">App G7</p> <p style="text-align: center;">Section F10</p>
Summary of the findings / inputs from Geo-technical Specialists : Appendix G8	Report Ref
<ul style="list-style-type: none"> ▪ <i>The central part of Portion A, all of the Remainder and isolated northern areas of Portion C are suitable for development with some provisos.</i> ▪ <i>A small part of the eastern part of Portion A is suitable for development although the land surface is uneven.</i> ▪ <i>The stream channel and surrounding eroded stream banks are not suitable for development and the excavated part of Portion C may be suitable for the proposed wastewater treatment works.</i> ▪ <i>In general all areas to be developed will need some form of storm water management and soil cover protection against erosion (wind and water), all areas will need some improvement and remedial measures if high loads are envisaged and to improve subgrades for the service roads.</i> ▪ <i>The eastern area (Zone 1A) will need elevation modifications to reduce grades to less than 30° depending on the type of foundation and panels used.</i> ▪ <i>Construction material may be sourced from mine discard available in the surrounding area.</i> ▪ <i>Compaction characteristics are fair, the soils are not active or collapsible, but are strongly alkaline and corrosive.</i> ▪ <i>The general geotechnical constraints can be mitigated by compaction of in situ soils below individual footings, soil raft and improvement of subgrade and use imported materials.</i> ▪ <i>Storm water management and erosion protection will be required all over the site and specifically along the edges of the watercourse.</i> ▪ <i>Flooding in stream channel and inundation of quarry floor must be managed in addition to erosion protection of exposed slopes and bare soil areas.</i> 	<p style="text-align: center;">App G8</p> <p style="text-align: center;">Section F4</p>

Summary of the findings / inputs on a Wastewater Risk Assessment from a Geo-hydrological Specialists on : Appendix G9	Report Ref
<ul style="list-style-type: none"> ▪ <i>The aquifer system underlying the study area classified as a minor aquifer that is defined as a moderately-yielding aquifer system of variable water quality. The ratings for the Aquifer System Management Classification and Aquifer Vulnerability Classification yield a Ground Water Quality Management Index of 2, indicating that low level groundwater protection may be required.</i> ▪ <i>The overall risk of contamination based on both risk components is assessed as low to medium (take precautionary measures). However, taking into consideration the proposed on-site sanitations and wastewater treatment system to be implemented the risk is considered as low (if well operated and maintained).</i> ▪ <i>It is recommended that mitigation measures include the following:</i> <ul style="list-style-type: none"> ▪ <i>A dedicated environmental monitoring program must be put in place (see section 5)</i> ▪ <i>The storm water drainage infrastructure must be equipped with strategically placed filters and oil traps.</i> ▪ <i>Lining of retention pond with an impermeable synthetic liner.</i> ▪ <i>If at any point excessive sludge build-up occurs, it must be removed and conveyed to a treatment or waste disposal facility.</i> ▪ <i>Installation of a downstream (from the WWTP and retention ponds) monitoring borehole on proposed Portion C.</i> ▪ <i>In order to ensure long term use, proposed monitoring borehole required rehabilitation and an uPVC liner, due to the collapsing side walls.</i> 	<p>App G9</p> <p>Section F7 and F17</p>

Summary of the findings / inputs from a groundwater use assessment by a Geo-hydrological Specialists : Appendix G10	Report Ref
<ul style="list-style-type: none"> ▪ <i>The aquifer system underlying the study area classified as a minor aquifer that is defined as moderately-yielding aquifer system of variable water quality.</i> ▪ <i>Following the geophysical investigation five (5) new boreholes were drilled, and one existing borehole rehabilitated. Three (3) of the newly drilled boreholes were subjected to aquifer testing programs to determine their long-term sustainability.</i> ▪ <i>The Groundwater Balance Equation yields a surplus, of 491.97m³/day (179 568m³/annum), and it is therefore concluded that there is sufficient groundwater available in the immediate catchment area for the utilisation of boreholes GT-03014, GT-03016 and GT-03017 at their full capacities of 264.67m³/day, without permanently removing water from storage or lowering the local groundwater levels or impacting on other nearby ground water users in the sub-catchment.</i> ▪ <i>However, caution should be added not to exceed the recommended abstraction rates. Monitoring will be essential to ensure the long-term sustainability of the production boreholes.</i> ▪ <i>Conservative including a 5L/s groundwater contribution to the neighbouring opencast sections to the immediate west, as well to the underground mining section to the far south, still results in a surplus of 60m³/d (21 888m³/a).</i> ▪ <i>The overall finding is that a sufficient volume of groundwater is available for own use at the SEGP and WWTP and, subject to obtaining a water use license groundwater can be supplied sustainably for domestic purposes and for supplementing industrial uses within the abstraction parameters and conditions of such a license.</i> 	<p>App F10</p> <p>Section F7</p>

H4. INCORPORATION OF THE FINDINGS OF SPECIALIST INVESTIGATIONS IN THE EIA

The findings of the specialist studies as well as specifically identified impacts and mitigation measures are included in Sections F, I and J as well as the impact assessment and mitigation proposals in Section K of this report.

ASSESSMENT OF ALTERNATIVES

This section provides a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report : GN R326 of 17 April 2017, Appendix 3 Section 3(1)(h).

11.1 OBJECTIVE OF ALTERNATIVES

Reasonable and feasible alternatives is considered in respect of the proposed development or activities that forms part of it, for it to feedback into the planning and design of the development/activity thereby optimising the positive aspects and minimising the negative aspects that are highlighted during the assessment process with the aim of including the best environmental option / alternatives in the proposed development.

11.2 DEFINING ALTERNATIVES

The “**alternatives**” concerning the proposed development or activity, means different means of meeting the general purpose and requirements of the development or activity. In this assessment the following alternatives are considered:

- the land/site on which or location where it is proposed to undertake the activity (SA);
- the type of land use activity to be undertaken (LA);
- the technology used to undertake a specified activity (TA);
- consider layout plan alternatives in order to place the activities at the appropriate position on the terrain (PA); and
- the option of not implementing the activity/development, the no-go alternative (NG).

11.3 THE SELECTION AND ASSESSMENT METHOD

In the Scoping process alternatives were identified and pre-selected by applying the method proposed by the Integrated Environmental Assessment Guideline Series 11, (DEA in 2004). Only those alternatives that were found to conform to both the requirements of reasonability and feasibility were put forward for further investigation during the EIA process.

Reasonability refers of considerations of moderation, fairness, cost-effectiveness, sensibility and sound judgement when considering an alternative. **Feasibility** refers to the ease, convenience and capability to achieve/implement an alternative. Only alternatives that were identified in the scoping process and listed as such in the scoping report, and which were found to be **reasonable** and **feasible**, are included in this assessment. The following table indicates the alternatives that were considered during the scoping process and their selection [✓] or not [X] for further assessment in the EIR.

11.3.1 ALTERNATIVES SELECTED FOR ASSESSMENT			
	Type of alternative	Pre-selection findings in the Scoping Process	Selection
SA	Site / Land	The property is already owned by the Applicant/Developer.	X
LA ₁	Tourism & conservation	The extensive mining operations disqualify tourism in this area.	X
LA ₂	Cultivation agriculture	Not feasible – refer to Agricultural Feasibility Report (Appendix G1)	X
LA ₃	Livestock agriculture	Not feasible – refer to Agricultural Feasibility Report (Appendix G1)	X
LA ₄	Solar Energy Generation	A current need for additional energy supply and suitable locality & site.	✓
LA ₅	Wastewater Treatment	A current need for local wastewater treatment, suitable locality & site.	✓
TA	Storm water management	Existing and expected erosion on the property must be addressed.	✓
PA	Planning – site layout	Site layout according to physical and bio-physical terrain aspects.	✓
NG	No-Go Alternative	An option if the development poses adverse impacts.	?

11 3 2 FEASIBILITY, REASONABILITY AND SELECTION OF LAND USE ALTERNATIVES

- The overall environmental, social, and economic feasibility and advantages of the proposed utilities infrastructure services (SEGP and WWTP) at this location is motivated in Sections F, G and H.
- It is therefore reasonable to consider both the selected land uses at the identified sites and to discard alternatives.

The purpose of the following Section is to compare the selected project alternatives in terms of their advantages (positive impacts) and disadvantages (negative impacts) as a further method of impact identification.

11.4 COMPARATIVE ASSESSMENT : IDENTIFICATION OF IMPACTS OF SELECTED PROJECT ALTERNATIVES

This Section applies the method of comparative assessment by considering the advantages, disadvantages and the mitigation potential of selected project alternatives as part of the process to identify potentially significant impacts, and of reaching the proposed development footprint, in compliance with GNR 326 Appendix 3, Section 3(h)(vii), (viii), (ix), (x).

Symbols used in this assessment have the following meaning : Positive impact Negative impact **!** Mitigation potential **?** Unknown

11.4.1 LAND USE AND TECHNOLOGY ALTERNATIVE (LA/TA) SOLAR ENERGY GENERATION

ADVANTAGE <i>Positive impacts on ecological/social/economic/physical environments</i>	POTENTIAL DISADVANTAGES / LIMITATIONS AND RECOMMENDATIONS <i>Mitigation to negative impacts on ecological/social/ physical environments</i>
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> An economically viable service (energy provision) can be provided to address the existing demand for energy by surrounding mines and associated industries. <input checked="" type="checkbox"/> The resource is renewable and the activity can be decommissioned in future to utilise the property for another use if required. <input checked="" type="checkbox"/> The locality and physical properties of the identified site (proposed Portion A and Re) are suitable for such development. <input checked="" type="checkbox"/> The surrounding are pose limited viewsheds, viewer sensitivity and viewer frequency, and therefore a visual impact is expected to be insignificant. <input checked="" type="checkbox"/> The implementation of applicable mitigation measures in support of the SEGP is both feasible and reasonable. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> A solar plant can be visually intrusive, however the existing sense of place that consists of mining and industries as well as a low silhouette of the plant in the local topography surrounded by mountains, would limit the obtrusive nature of the development. <input checked="" type="checkbox"/> It is not anticipated that glinting and glaring of the solar panels will impact on air traffic as no major aerodrome is located within the 10km glare zone of the SEGP. A private airstrip that is located ± 2km north of the site is orientated as such that the solar glare will not affect the landing and departure flight path. Furthermore the airstrip and the landing and departure flight path will be screened up to 100m in vertical flight height by a mountain that is located between the SEGP and the airstrip. <input checked="" type="checkbox"/> The mitigating factors support the SEGP development at this site.

11.4.2 LAND USE AND TECHNOLOGY ALTERNATIVE (LA/TA) WATER AND WASTEWATER TREATMENT

ADVANTAGE <i>Positive impacts on ecological/social/economic/physical environments</i>	POTENTIAL DISADVANTAGES / LIMITATIONS AND RECOMMENDATIONS <i>Mitigation to negative impacts on ecological/social/ physical environments</i>
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> An economically viable service (water and wastewater treatment) can be provided to address the existing demand for treated water by surrounding mines and associated industries. <input checked="" type="checkbox"/> As part of the system the aim is to provide an on-site wastewater treatment system that will provide treated wastewater outflow at a standard equal or better to the DWS requirement. <input checked="" type="checkbox"/> The service can obtain wastewater (renewable resources) from surrounding local residential areas, mines and industries for treatment and can then be provided for re-use, thus reducing the demand placed on bulk water provision and on the use of groundwater. <input checked="" type="checkbox"/> The locality and physical properties of the identified site (proposed Portion C) are suitable for the WWTP and the WTW. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> A wastewater treatment plant can be visually intrusive, however the existing sense of place and local topography of the proposed site would limit the potential obtrusive and nature of the development. <input checked="" type="checkbox"/> A wastewater treatment plant can emit odours, however this can be mitigated by way of design. <input checked="" type="checkbox"/> The proposed technology is a "closed" system with minimal emissions. <input checked="" type="checkbox"/> A wastewater treatment plant contains hazardous liquid waste which holds a contamination risk to nearby surface water resources and local groundwater resources. <input checked="" type="checkbox"/> However, such risk can be avoided by suitable design and monitoring of the effective operation of plant. <input checked="" type="checkbox"/> The system will require energy to drive the pumps that are part of the system. <input checked="" type="checkbox"/> Solar power generation can be considered for this purpose as back-up to ESKOM and

<ul style="list-style-type: none"> <input checked="" type="checkbox"/> The proposed WWTP site is not located near to residential areas (no nuisance factor). <input checked="" type="checkbox"/> The proposed technology of the WWTP consists of an activated sludge process which optimises bacteria effectiveness in the system and thus avoids sludge removal. <input checked="" type="checkbox"/> The system is constructed completely enclosed and therefore pose little likelihood for emissions and contamination. <input checked="" type="checkbox"/> The capacity of the modular on-site wastewater treatment plant can be increased incrementally to facilitate a phased development approach. 	<p>power generators.</p> <ul style="list-style-type: none"> ! An efficient and competent Contractor must be appointed to ensure effective and sufficient daily management of the WWTP with sufficient back-up systems in case of an emergency. <input checked="" type="checkbox"/> The implementation of applicable mitigation measures is both feasible and reasonable.
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11.4.3 TECHNOLOGY ALTERNATIVES (TA) : STORM WATER MANAGEMENT AND EROSION CONTROL	
ADVANTAGE <i>Ecological/social/economic/efficiency</i>	POTENTIAL DISADVANTAGES / LIMITATIONS AND RECOMMENDATIONS <i>Mitigation to negative impacts on ecological/social/ physical environments</i>
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> The layout makes provision for a properly designed storm water system with the aim of minimising the effect of concentrated storm water on the lower-lying areas. <input checked="" type="checkbox"/> The aim of an on-site storm water system is to attenuate storm water run-off affectively on-site to minimise peak flows, minimise concentrated volume and velocity to be similar or better than the pre-development condition. <input checked="" type="checkbox"/> This type of design addresses storm water attenuation from the source, along the run-off paths and at the storm water outlets. <input checked="" type="checkbox"/> Storm water buffering before final discharge by way of detention and/or retention dams will enhance the present poor ecological state of the watercourse. <input checked="" type="checkbox"/> The above buffering methods will sufficiently reduce run-off peak flows and will release storm water for downstream discharge at lower volumes and velocities. <input checked="" type="checkbox"/> This will prevent potential downstream flooding, soil erosion and subsequent sediment deposition, poor water quality and impacts on downstream freshwater ecology. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> The implementation of storm water and erosion control methods requires on-site management at higher installation and maintenance cost. <input checked="" type="checkbox"/> The direct and indirect cost of storm water and soil erosion damage to property and ecological deterioration downstream if storm water is not suitably managed will ultimately exceed the initial on-site installation cost. ! The storm water system and all of its components must be suitably designed during the planning period. ! The storm water attenuation dams must be installed before the construction of other development components to prevent potential downstream flooding and soil erosion during the construction period. <input checked="" type="checkbox"/> The implementation of applicable mitigation measures in support of the storm water management and erosion control is both feasible and reasonable.

1.4.4 PLANNING ALTERNATIVE (PA) : SITE LAYOUT	
ADVANTAGES <i>Positive impacts on ecological/social/economic/physical environments</i>	POTENTIAL DISADVANTAGES / LIMITATIONS AND RECOMMENDATIONS
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> The proposed land uses aligns with the development need analysis of the Municipal Integrated Development Plan and it is important that the proposed utility infrastructure develops along the “mining corridor” as suggested in the Municipal Spatial Development Framework (2017). <input checked="" type="checkbox"/> The formalisation of informal roads and road junctions with the D1261 will promote traffic safety along this section of the District Road. <input checked="" type="checkbox"/> The overall layout design also provides possibility for future decommissioning of the 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Certain site limitations and activity impacts were identified (see Impact identification matrix). <input checked="" type="checkbox"/> All of the site limitations and activity impacts can be mitigated (see Section K and L). The site layout has been refined to such an extent in alignment with the bio-physical and physical features of the site, including adherence to watercourse and heritage site buffer zones, that disadvantages or limitations have been minimised.

<p>development or components thereof and re-use of the land for any other appropriate land use.</p> <p><input checked="" type="checkbox"/> The detailed assessment of the biophysical and physical environment (refer to Section F) confirms that the layout of the development activities on the site avoids the site limitations and risks and the project components are all suitably positioned on the site where it can function optimally with the least impact.</p>	<p><input checked="" type="checkbox"/> The implementation of applicable mitigation measures in support of the layout plan is both feasible and reasonable.</p>
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11.4.5 NO-GO ALTERNATIVES – (KEEP STATUS QUO)	
ADVANTAGE OF THE DEVELOPMENT NOT OCCURRING	DISADVANTAGE OF THE DEVELOPMENT NOT OCCURRING
<p><input checked="" type="checkbox"/> As the property is zoned agriculture, cultivation is an option.</p> <p><input checked="" type="checkbox"/> However, without water for irrigation only dry land cultivation and cattle grazing will be possible which are not economically viable.</p>	<p><input checked="" type="checkbox"/> Lose the opportunity to utilise vacant land for provision of essential services.</p> <p><input checked="" type="checkbox"/> Lose the opportunity to utilise the property for a viable income generating purpose.</p> <p><input checked="" type="checkbox"/> Lose the opportunity of short and long term job creation.</p> <p><input checked="" type="checkbox"/> Lose the opportunity for basic service provision of water, sewage and electricity to local mines and industries.</p> <p><input checked="" type="checkbox"/> Lose the opportunity to upgrade certain portions of the R40 (national road).</p> <p><input checked="" type="checkbox"/> Vacant land may lead to human settlements at a site that is not suitable for such purpose.</p>

11.5 FINDINGS OF THE COMPARATIVE ASSESSMENT

- The purpose of the comparative assessment was to analyse the selected project alternatives in terms of their advantages (positive impacts), disadvantages (negative impacts) and mitigation potential as a further method of impact identification and of reaching the proposed development footprint within the selected and approved site (property).
- The assessment revealed overwhelmingly more advantages (positive impacts) compared to disadvantages (negative impacts) of the selected project alternatives. The assessment further identified feasible mitigation potential [!] with regard to disadvantages (negative impacts) of the selected alternatives.
- The assessment of the “no-go” alternative indicates a substantial disadvantage if the proposed development does materialise on the selected site.

The land use, technology and planning alternatives as indicated in Section 11.3 are feasible and reasonable and are selected for inclusion in the development subject to mitigating the potential disadvantages and negative impacts identified in this assessment.

12. IMPACT ASSESSMENT RANKING METHOD

The impact ranking assessment method is used to assess the nature, magnitude, extent and duration of potentially significant impacts of the selected project alternatives after which a range of mitigation measures is considered that could be implemented to lessen the impacts of the activity. The ranking results in a significance rating of residual impacts i.e. impacts that remain after taking mitigation measures into account. The ranking method that is used is indicated in the three tables below.

12.1 IMPACT ASSESSMENT RANKING METHOD				
Nature of Potential Impact	Rating or Category	Ranking		Description of Impact on the Environment
Period	Planning	PI	-	Project planning and decision-making phase.
	Construction	Co	-	Construction phase
	Operational	Op	-	Operational phase
	Decommissioning	De	-	Replacement / Closure or Decommissioning of an activity
Extent	Site	S	1	Limited to the site and its immediate surroundings.
	Local	L	2	Up to 5km from the project site.
	Regional	R	3	Beyond 5km of the site. Up to a 20km radius from the project site.
	Province/National	P	4	Will affect beyond 20km from the site.
Duration	Short term	S	1	Not applicable or construction and early operation 0 - 5 years.
	Medium-term	M	2	Operational phase up to 25 years.
	Long term	L	3	Operational phase is longer than 25 years.
	Permanent	P	4	The impact will continue after the operational phase.
Intensity / Consequence or Severity	Very low	L-	0	None or limited damage to a small area. Natural, cultural or social functions or processes are not affected/negligible.
	Low	L	1	Marginal damage. Natural, cultural or social functions or processes can / will be only marginally affected.
	Medium	M	2	Moderate damage. Natural, cultural or social functions or processes can / will be notably altered but can continue although in a modified way /state.
	High	H	3	Severe damage. Natural, cultural or social functions or processes can / will be altered to the extent that they temporarily cease.
	Very high	H+	4	Irreparable damage. Natural, cultural or social functions or processes can / will be altered in such a way that they will permanently cease.
Probability	Unlikely	U	1	Less than 5% probability that impact may occur.
	Probable	P	2	There is a good chance that the impact may occur (6-49%)
	Very likely	VI	3	Likely that the impact will occur, (50 – 94%)
	Definite	D	4	More than 95% probability that impact may occur.
Degree of loss of irreplaceable resources	Low	L	1	Not likely that there will be an irreplaceable loss of resources.
	Probable	P	2	There is a good chance of loss of irreplaceable resources.
	Very likely	VI	3	More than 50% probability of loss of irreplaceable resources.
	Definite	D	4	More than 90% probability of loss of irreplaceable resources.
Significance	See significance ratings in Table 12.2			Significance rating without applying mitigation measures.
Mitigation potential	See mitigation measures in Table 11.2.3		-1/-5	Mitigation measures and objectives and ranking in the table below.

(Impact rating: 0 = Lowest / 4 = Highest)

“Significant impact” means an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

I2.2 CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE				
	Rating or Category	Ranking		Description of Impact on the Environment
	Significance	Neutral	N	0
Low (Normally acceptable)		L	0-5	The impact is likely to be very low and mitigation is not required. Impacts have little real effect/ mitigation is easily achieved.
Medium (Can be acceptable with mitigation).		M	6-10	Moderate impact and mitigation is both feasible and fairly easily possible but may influence the decision if not mitigated / or modification of the project design or alternative action may be required.
High (Normally unacceptable).		H	11-15	Mitigation is essential to reduce to an acceptable level, mitigation is difficult, time-consuming and/expensive and may affect the decision to continue or approve.
Very high (Unacceptable).		>H	16-20	No possible mitigation or mitigation is extremely difficult, time-consuming and/or expensive. The decision to approve will be affected
Status of the impact	Positive or Negative	+	-	Status of the impact: positive (benefits) or negative (costs).

I2.3 RANKING MODEL : MITIGATION ACTIONS THAT ARE AIMED AT REDUCING UNACCEPTABLE IMPACTS			
Mitigation objective	Ranking		The degree to which negative impacts can be mitigated
Avoidance / prevention	AP	-5	Measures are taken to anticipate and prevent adverse environmental impacts before actions or decisions are taken that could lead to such impacts. This approach is most effective when applied in the earliest stages of project planning. Project alternatives can also form part of avoidance mitigation measures (see Section I1.2) with the aim of identifying the best environmental option and incorporating the selected alternatives in the early planning stages of the proposed development.
Minimise / Reduce	MI	-4	Measures are taken to reduce the duration, intensity, extent and significance of environmental impacts cannot be completely avoided. This can be achieved by scaling down, relocating, or redesigning elements of a project.
Rehabilitate	RE	-3	Measures are taken to repair/restore degradation or damage to specific environmental features and ecosystem services of concern following project impacts that cannot be completely avoided and/or minimized.
Compensate / Off-set	CO	-2	Measurable conservation outcomes resulting from actions designed to remedy the negative impacts of development which remain after measures to avoid, minimize and rehabilitate have been taken into account. Creation, enhancement, or protection of the same type of resource at another suitable and acceptable location, compensating for lost resources.
Preservation	Ps	-1	Preventing any future actions that might adversely affect an environmental resource. This is typically achieved by extending legal protection to selected resources beyond the immediate needs of the project.

Mitigation rating: -4= Most favourable / -1=Least Favourable

I2.4 IDENTIFICATION OF POTENTIAL SIGNIFICANT IMPACTS BY WAY OF MATRIX RANKING METHOD

The adapted Environmental Impact Identification Matrix method has the following objectives:

- The matrix method **identifies positive and negative impacts/risks** that selected land use and technology alternatives may pose on the receiving environment and where relevant identify the impacts/risks that the receiving environment may pose on the proposed development.
- The matrix method predicts the **significance** (quantitative and qualitative) of negative impacts/risks that may be posed by the selected land use and technology alternatives.
- The matrix method provides a **comparative ranking** of the land use and technology alternatives to facilitate the identification of potentially significant impacts / key issues that need to be put forward for additional assessment in Section K where specific mitigation descriptions are required.

13. ENVIRONMENTAL IMPACT IDENTIFICATION AND IMPACT PREDICTION MATRIX		PROJECT COMPONENT ASSESSMENT: PROPOSED UTILITIES INFRASTRUCTURE DEVELOPMENT ON PTN 15 TWEEFONTEIN 360-KT																
LEGEND		LAND USE ALTERNATIVE						NEGATIVE IMPACT PREDICTION										
POTENTIALLY SIGNIFICANT IDENTIFIED IMPACTS/RISKS		LU ₁ Solar Energy Generation Plant	LU ₂ Wastewater Treatment Plant	LU ₃ Water treatment and storage	TA Storm water and detention dam	TA Roads (on site only)	TA Erosion control & rehabilitation	No-go - (continued degradation)	Period	Extent	Duration	Consequence / intensity	Probability	Irreplaceable loss of resources	Impact significance w/o mitigation	Degree of impact mitigation	Predicted residual impact /risk	Residual Impact significance rating
RECEIVING ENVIRONMENT	POTENTIAL IMPACTS/RISKS OF THE CULTIVATION PROJECT																	
POTENTIALLY NEGATIVE		○ Indirect		● Direct														
POTENTIALLY POSITIVE		□ Indirect		■ Direct														
BLANK = NOT APPLICABLE OR NO ANTICIPATED IMPACT																		
I-1 LAND USE & INFRASTRUCTURE	Land use compatibility	■	■	■	■	■	■	-	-	-	-	-	-	-	-	-	-	-
	Access to provincial / district roads	■	■	■	-	■	-	-	-	-	-	-	-	-	-	-	-	-
	Access to electricity	■	■	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Access to sewer	-	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Access to bulk water	-	-	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-2. IMPACTS OF TERRAIN FORM	Land form type – mid-slope	■	■	■	-	■	-	-	-	-	-	-	-	-	-	-	-	
	Land form stability	■	■	■	●	■	●	-	Pl	1	1	1	2	1	6	-4	2	L
I-3 IMPACTS OF TERRAIN GRADIENT	Even Gradient	■	■	■	-	■	-	-	-	-	-	-	-	-	-	-	-	
	Steep Gradient	-	-	-	●	-	●	-	Pl	1	1	1	2	1	6	-4	2	L
I-4.1 IMPACT OF LOCAL GEOLOGY	Development limitations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Fault lines / unstable rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
I-4.2 IMPACTS OF LOCAL SOIL CONDITIONS	Soil suitability	■	■	■	●	■	●	-	Pl	1	1	2	2	2	8	-4	4	L
	Soil clay content	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Soil internal drainage	-	-	■	-	■	-	-	-	-	-	-	-	-	-	-	-	
	Hard layers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Saturated soils	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Erosion hazard	●	●	●	●	●	●	●	-	Co	1	1	3	3	2	10	-4	6
-	Vulnerability to heat stress	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Vulnerability to drought	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Vulnerability to flooding	-	-	-	●	-	●	-	Op	1	1	2	2	2	8	-4	4	L
	Vulnerability to fire hazard	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Wind speed & direction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
I-6 CHANGES TO SURFACE DRAINAGE	Altered drainage patterns	○	-	-	-	○	○	-	Co	1	1	1	3	2	8	-4	4	L
	Changes to watercourse bed & banks	-	-	-	●	○	●	-	Co	1	3	1	2	1	8	-4	4	L
	Drainage impediment / altering flow	-	-	-	●	○	●	-	Op	1	3	1	3	1	9	-4	5	L
	Scouring, silting & poor water quality	-	-	-	■	○	■	●	Co	1	1	2	3	3	10	-4	6	M
I-7 CHANGES TO GROUNDWATER QUANTITY AND QUALITY	Groundwater availability	-	-	○	-	-	-	-	Op	2	3	4	2	3	14	-5	9	M
	Groundwater sustainability	-	-	○	-	-	-	-	Op	2	3	4	2	3	14	-5	9	M
	Groundwater quality	-	○	-	-	-	-	-	Op	2	2	2	1	1	8	-5	3	L
	Aquifer contamination vulnerability	-	○	-	-	-	-	-	Op	2	2	2	1	1	8	-5	3	L
	Aquifer contamination susceptibility	-	○	-	-	-	-	-	Op	2	2	2	1	1	8	-5	3	L
I-8 CHANGES TO LAND COVER / VEGETATION	Vulnerable ecosystem / services	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Modified - Old lands - agriculture	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Modified – mining, quarry, gully	-	-	-	-	-	■	●	-	-	-	-	-	-	-	-	-	
	Modified degraded woodland	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Modified recent wood harvesting	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-	
	Modified - watercourse	-	-	-	■	-	●	-	-	-	-	-	-	-	-	-	-	
	Modified – existing roads	-	-	-	-	■	●	-	-	-	-	-	-	-	-	-	-	
I-9 IMPACTS & RISKS TO TERRESTRIAL AND AQUATIC BIODIVERSITY	CBA Irreplaceable (CBA 1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CBA Optimal (CBA 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	ESA level 1	-	-	-	□	-	□	●	-	-	-	-	-	-	-	-	-	
	ESA level 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Other Natural Area (ONA)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Remaining Natural Habitat	-	■	■	-	-	■	●	-	-	-	-	-	-	-	-	-	

13. ENVIRONMENTAL IMPACT IDENTIFICATION AND IMPACT PREDICTION MATRIX		PROJECT COMPONENT ASSESSMENT: PROPOSED UTILITIES INFRASTRUCTURE DEVELOPMENT ON PTN 15 TWEEFONTEIN 360-KT																
LEGEND		LAND USE ALTERNATIVE						NEGATIVE IMPACT PREDICTION										
RECEIVING ENVIRONMENT	POTENTIAL IMPACTS/RISKS OF THE CULTIVATION PROJECT	LU ₁ Solar Energy Generation Plant	LU ₂ Wastewater Treatment Plant	LU ₃ Water treatment and storage	TA Storm water and detention dam	TA Roads (on site only)	TA Erosion control & rehabilitation	No-go - (continued degradation)	Period	Extent	Duration	Consequence / intensity	Probability	Irreplaceable loss of resources	Impact significance w/o mitigation	Degree of impact mitigation	Predicted residual impact /risk	Residual Impact significance rating
		POTENTIALLY SIGNIFICANT IDENTIFIED IMPACTS/RISKS	POTENTIALLY NEGATIVE		POTENTIALLY POSITIVE		BLANK = NOT APPLICABLE OR NO ANTICIPATED IMPACT											
I-10 IMPACTS AND RISKS TO FRESH-WATER ECOLOGY	Catchment FEPA (Category D)	-	-	-	□	-	□	●	-	-	-	-	-	-	-	-	-	-
	Wetland FEPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wetland clusters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fish sanctuaries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ESA Fish support areas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Upstream management area	-	-	-	□	-	□	●	-	-	-	-	-	-	-	-	-	-
	Phase 2 FEPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Free-flowing rivers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Strategic water resource areas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ecosystem services	-	-	-	□	-	□	●	-	-	-	-	-	-	-	-	-	-
I-11 IMPACTS AND RISKS ON SENSITIVE SPECIES	SCC Plant species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SCC Animal species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NFA Protected species	○	○	○	-	-	-	●	Co	1	4	1	2	4	12	-2	10	M
	LNCA Protected species	○	○	○	-	-	-	●	Co	1	4	1	2	4	12	-2	10	M
	NEMBA Protected species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-12 IMPACTS ON HERITAGE SITES	Cultural sites/ historic landmarks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Graves / burial sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sites of archaeological importance	○	-	-	-	-	○	●	Co	1	4	1	2	4	12	-5	7	M
	Sites of paleontological importance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-13 IMPACTS ON SENSITIVE GEOGRAPHIC AREAS	National protected area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Provincial protected area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Private/other protected areas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Protected area expansion strategy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	World heritage site	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	International convention area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sensitive areas identified in EMF's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Within/below restricted air space	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-14.1 IMPACTS ON SURROUNDING LAND USES	Residential uses – rural & informal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Commercial uses - urban	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Institutional uses	■	■	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tourism uses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agriculture	-	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	-
	Industrial uses	■	■	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mining and related industries	■	■	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Near aerodrome & airfield	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Land use compatibility	■	■	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-

13. ENVIRONMENTAL IMPACT IDENTIFICATION AND IMPACT PREDICTION MATRIX		PROJECT COMPONENT ASSESSMENT: PROPOSED UTILITIES INFRASTRUCTURE DEVELOPMENT ON PTN 15 TWEEFONTEIN 360-KT																
LEGEND		LAND USE ALTERNATIVE						NEGATIVE IMPACT PREDICTION										
RECEIVING ENVIRONMENT	POTENTIAL IMPACTS/RISKS OF THE CULTIVATION PROJECT	LU ₁ Solar Energy Generation Plant	LU ₂ Wastewater Treatment Plant	LU ₃ Water treatment and storage	TA Storm water and detention dam	TA Roads (on site only)	TA Erosion control & rehabilitation	No-go - (continued degradation)	Period	Extent	Duration	Consequence / intensity	Probability	Irreplaceable loss of resources	Impact significance w/o mitigation	Degree of impact mitigation	Predicted residual impact /risk	Residual Impact significance rating

I-14.2 IMPACTS ON EXISTING INFRA-STRUCTURE AND PUBLIC SERVICES	Roads	-	-	-	-	■	-	●	-	-	-	-	-	-	-	-	-	-
	Storm water	-	-	-	■	-	■	●	-	-	-	-	-	-	-	-	-	-
	Local bulk water users	-	-	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater users	-	-	○	-	-	-	-	Op	2	3	4	2	3	14	-5	9	M
	Electricity supply infrastructure	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Waste disposal / waste site	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Waste water treatment & re-use	-	■	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-15 CHANGES TO THE SENSORY ENVIRONMENT	Change in the sense of place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Change in the visual environment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Change in the acoustic environment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Change in the ambient air quality	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-16 IMPACT AND RISK OF WASTE AND POLLUTION	General waste sources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hazardous waste sources	-	○	-	-	-	-	-	Op	2	2	2	1	1	8	-5	3	L
	Point source contamination risk	-	○	-	-	-	-	-	Op	2	2	2	1	1	8	-5	3	L
	Non-point sources contamination risk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-17 CHANGE IN SOCIO-ECONOMIC ENVIRONMENT	Direct employment opportunities	■	■	■	■	■	■	●	-	-	-	-	-	-	-	-	-	-
	Indirect employment opportunities	■	■	■	-	-	-	●	-	-	-	-	-	-	-	-	-	-
	Short-term job opportunities	■	■	■	■	■	■	●	-	-	-	-	-	-	-	-	-	-
	Long-term job opportunities	■	■	■	-	-	-	●	-	-	-	-	-	-	-	-	-	-
	Land value improvements	■	■	■	■	■	■	●	-	-	-	-	-	-	-	-	-	-
	Contribute to local economic growth	■	■	■	-	-	-	●	-	-	-	-	-	-	-	-	-	-
	Contribute to municipal services	■	■	■	-	■	-	●	-	-	-	-	-	-	-	-	-	-

I-18 LAND USE AND TECHNOLOGY ALTERNATIVE RANKING (WITHOUT APPLYING MITIGATION MEASURES)	LA1	LA2	LA3	No-go				
POSITIVE DIRECT and INDIRECT IMPACTS (P)	19	21	22	10	13	12	0	Comparative ranking show positive (+) impacts and negative (-) impacts. This ranking indicates an overall positive score in favour of the utilities infrastructure development when compared to the negative score of the no-go alternative.
NEGATIVE DIRECT and INDIRECT IMPACTS (N)	-4	-8	-6	-7	-8	-9	-31	
COMPARATIVE ALTERNATIVES RANKING (C = P - N)	15	13	16	3	5	3	-31	

I.4 FINDINGS OF THE MATRIX RANKING METHOD
<ul style="list-style-type: none"> The “No-go” alternative poses negative long-term impacts due to continued land degradation and loss of socio-economic opportunities. The “No-go” alternative is thus discarded. The utilities infrastructure development and operation pose overall more positive impacts than negative impacts. Potentially significant (High scoring) negative impacts can be mitigated to a Low or Medium levels of significance. Mitigation is both feasible and reasonably easy to achieve, during all phases of the development. The impacts identified in this matrix with a medium to high significance ranking (without application of mitigation measures) are included in Section J for further assessment.

14 CONSIDERATION OF CUMULATIVE IMPACTS

This section provides a full description of the process followed to assess each identified potentially significant cumulative impact and risk within the approved site as contemplated in the accepted scoping report as required in GN R 326 of 17 April 2017, Appendix 3 Section 1 (j).

A “**Cumulative impact**”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities [DEA 2017].

14.1 OBJECTIVES OF CUMULATIVE IMPACT ASSESSMENT PREDICTION

The aim is to determine if the combined impacts of the project and activities will result in a condition that may put the sustainability of the valued environmental and social components at risk.

14.2 RAPID CUMULATIVE IMPACT PREDICTION MODEL (RCIA)

The methodology for the Rapid Cumulative Impact Assessment (RCIA) follows the five-step approach as proposed by the IFC Good Practice Handbook.

Step 1: Selection of valued environmental and social components (VESC).

This method considers fifteen selected baseline environmental and social components (refer to Section F) namely: Soil conservation, Groundwater, Surface Water (hydrology), Land cover (vegetation), Terrestrial biodiversity, Aquatic Biodiversity and Freshwater Ecology, Heritage Environment, Sensitive Geographic Areas, Land Use & Infrastructure, Acoustic Environment, Visual Environment, Air Quality, Pollution & Waste, Social and Economic Environment.

Step 2 : Determine the spatial contexts of VESCs

The spatial boundaries selected in this model include (a) the site, (b) the immediate surrounding area up to 500m, (c) the local area and (d) the municipality area.

Step 3 : Determine the temporal boundaries of VESCs

Consider the trend of each of the identified VESCs in terms of duration, frequency and reversibility.

Step 4 : Consider the cumulative impacts of VESCs.

Consider the trend of each of the identified VESCs in terms of magnitude and probability (how substantial the predicted residual effect is) and the likelihood of the residual effect.

Step 5 : Assign a cumulative significance prediction ranking of VESCs

The cumulative prediction assigns a low, moderate or high significance ranking on the identified VESCs.

Step 6 : Assigns a positive or negative cumulative prediction

Considering the past, current and the predicted mitigated future effect on/to the VESCs, an overall positive or negative cumulative prediction can be assigned to the VESCs.

14.3 CUMULATIVE PREDICTION MODEL ASSUMPTIONS

The findings of this model are based on primary data collection and secondary sources and it is assumed that the information contained in such sources is accurate.

I4.4 RAPID CUMULATIVE IMPACT IDENTIFICATION AND PREDICTION MODEL			Step 1 Valued Environmental and Social Components (VESC)														
PROPOSED UTILITIES INFRASTRUCTURE DEVELOPMENT PTN 15 TWEEFONTEIN 360-KT			SC=Soil conservation SW=Storm water & erosion LC=Land cover TB=Terrestrial biodiversity AB=Aquatic Biodiversity				HE=Heritage Environment SG=Sensitive Geographic Areas LU=Land Use & Infrastructure AE=Acoustic Environment VE=Visual Environment				AQ=Air Quality GQ=Groundwater quality PW=Pollution & waste SE=Socio-economic N/A=None/ Not applicable Blank=No cumulative effect						
			Cumulative prediction criteria with mitigation included			SC	SW	LC	TB	AB	HE	SG	LU	AE	VE	AQ	PW
Step 2	Spatial extent : the spatial occurrence of past, present and future additive / interactive impact components																
Footprint area	The land/project site (potential cumulative effect remains within the site).		X	X	X	X	-	X	-	X	X	X	X	X	X	X	X
Immediate area	The area directly surrounding the project site up to 500m.		X	X	-	-	-	-	-	X	-	X		X	X	X	
Local area	The local area 500m up to 2000m from the project area			X											X	X	
Broader area	The broader area up to 5000m and surface water sub-catchment area.		-	X	-	-	-	-	-	-	-	-	-	-	X	X	
Step 3	Temporal Context																
Duration Period of the event causing the effect (without mitigation).	Short-term	Event occurs during the extent of clearing and construction through to project commissioning.															
	Mid-term	Event occurs during the first 10 years of operations.															
	Long-term	Ongoing event that extends greater than 10 years, over the life of the project and beyond.		X											X	X	
Frequency How often would the event that caused the effect occur (without mitigation)?	Accidental	Event occurs rarely over the life of the project.													X		
	Isolated	Event is confined to a specified project activity. Occasional Event occurs intermittently and sporadically.															
	Occasional	Event occurs intermittently and sporadically over the life of the project.		X													
	Periodic	Event occurs intermittently however, repeatedly over the life of the project.															
	Continuous	Event occurs continually over the life of the project.														X	
Reversibility Period of time over which the reversing effect extends (with mitigation).	Short-term	The reversing effect is limited to the project construction through to operations or an incident.		X											X		
	Mid-term	The reversing effect extends during the first 10 years of operations.															
	Long-term	The reversing effect extends beyond the first 10 years of operations.														X	
	Permanent	The effect is irreversible.															

RAPID CUMULATIVE IMPACT PREDICTION MODEL		Valued Environmental and Social Components (VESC)													
Step 4	Cumulative prediction criteria	SC	SW	LC	TB	AB	HE	SG	LU	AE	VE	AQ	PW	GQ	SE
Residual Magnitude (after mitigation has been applied)															
Negligible	No detectable change from existing (baseline) conditions.													X	
Low	Change is detectable and results in a limited effect on the VESC.		X												
Medium	Change is detectable and results in a moderate effect on the VESC.														X
High	Change is detectable and results in a severe effect on the VESC.														
Residual Probability (after mitigation has been applied)															
Low	Unlikely to cause any cumulative impact													X	
Moderate	Likely to cause a moderate cumulative impact		X												X
High	Most likely to cause a potentially significant cumulative impact														
Step 5	Positive or Negative cumulative significance predictions (after mitigation has been applied)														
Null	The cumulative effect has no net loss or net benefit.													X	
Positive	Predictive significance outcome has a positive cumulative impact		X												X
Negative	Predictive significance outcome has a negative cumulative impact														
Step 6	Cumulative Significance Prediction (after mitigation has been applied)														
Low Cumulative Impact - positive (+) or negative (-)			+X											X	
Moderate Cumulative Impact - positive (+) or negative (-)															+X
High Cumulative Impact - positive (+) or negative (-)															

I4.5 FINDINGS CUMULATIVE IMPACT PREDICTION

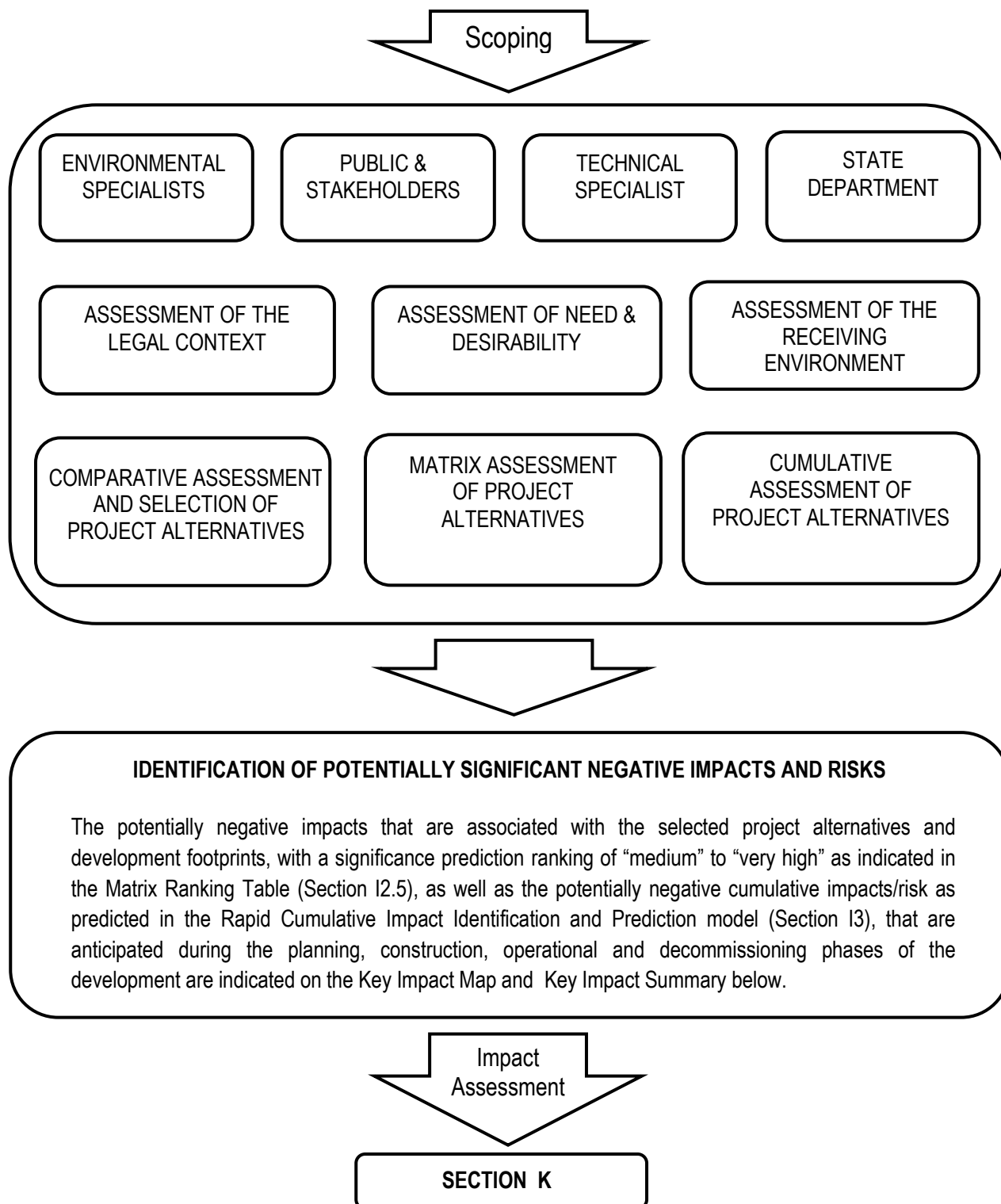
The impacts on/of most VESCs can be contained and or mitigated within the site, immediate surrounding and local area. Three project VESCs were identified that may pose additive or interactive cumulative impacts (positive/negative) in the sub-regional area namely storm water discharge (negative), wastewater/groundwater contamination (negative) and social-economic change (positive). The planning and installation of mitigation measures such as storm water attenuation measures including an in-stream storm water detention dam as well as planning, installation and management of an enclosed wastewater treatment system will neutralise the potential negative cumulative effect of surface water sedimentation and groundwater contamination. The social and economic change through provision of essential services to surrounding mines, industries and businesses are beneficial. Anticipated new employment opportunities and secondary economic spin-offs will contribute to local economic growth which will result in a moderately positive long-term cumulative effect. Overall the project will not pose any long- term adverse cumulative effects on the surrounding environment, economy or community.

SUMMARY OF IMPACT IDENTIFICATION

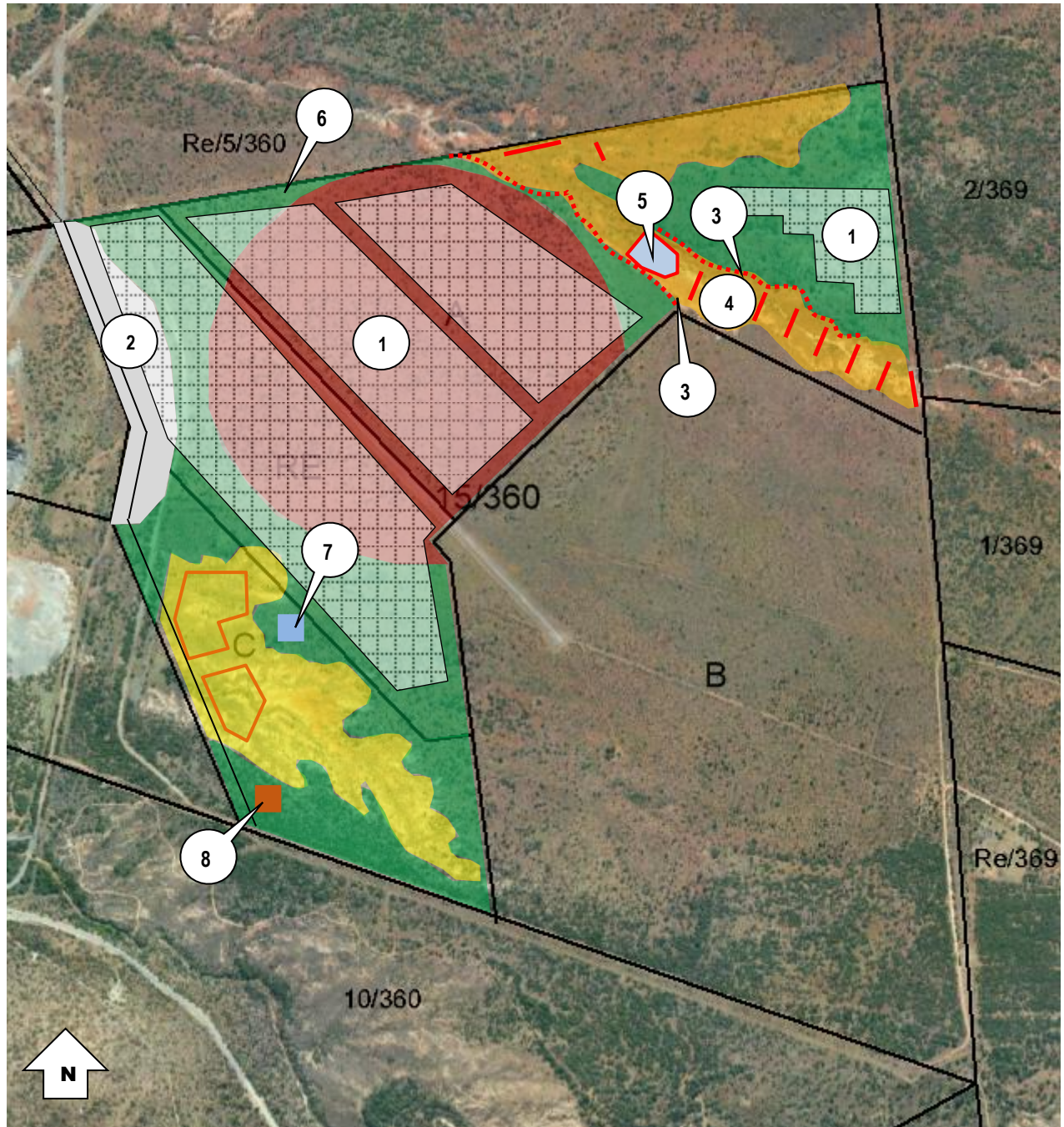
This section provides a description of the process followed to identify the potentially significant impacts that the activity and associated structures and infrastructure may impose on the preferred development footprint and approved sites as contemplated in the accepted scoping report. This section also summarises the potentially significant negative environmental issues and risks that were identified during the scoping and environmental impact assessment process; as required in GN R326 of 17 April 2017, Appendix 3 Section 3(i)(i).

J1.1 THE IMPACT IDENTIFICATION PROCESS / METHOD






The following schematic diagram indicates the sources and methods utilised to identify potentially significant adverse impacts and risks associated with the project alternatives and development footprint.



J1.2 KEY IMPACT IDENTIFICATION MAP



MAIN DEVELOPMENT ACTIVITIES (NUMBERED IMPACTS ARE DESCRIBED IN SECTION J2)

	SOLAR ENERGY GENERATION PLANT AND ASSOCIATED INFRASTRUCTURE
	WASTEWATER TREATMENT PLANT AND ASSOCIATED INFRASTRUCTURE
	WATER TREATMENT WORKS AND ASSOCIATED INFRASTRUCTURE
	IN-STREAM STORM WATER DETENTION DAM AND EROSION PREVENTION STRUCTURES
	OFF-STREAM WATER STORAGE DAMS AND QUARRY REHABILITATION AND EROSION PREVENTION

J2. KEY IMPACT SUMMARY

POTENTIALLY SIGNIFICANT IMPACTS DURING THE PLANNING AND CONSTRUCTION PHASES

#	IMPACT GROUP	IMPACT DESCRIPTION	MAP NO	ACTIVITY
J2.1	Geo-Technical Impacts	<i>Slight compression and settlement of the residual soils can be expected which may affect excavations, surface, and underground building / infrastructure installations (Soil Zone A and A1).</i>	1	SEGP WWTP
		<i>The extreme western strip between the boundary and dirt road is covered (in the north) and backfilled (towards the south) with mine waste and not compacted. This zone will be prone to large and differential settlements and difficult excavation in the boulder layers.</i>	2	SEGP
		<i>The fine-grained (ML, MH, SC, SM) soils with low or no cohesion are highly erodible and may also be dispersive and any concentration of runoff will cause severe erosion.</i>	-	All sites & roads
		<i>Along the edges of the drainage channel steep to near vertical slopes are present which are not stable and which can initiate rapid backward erosion.</i>	3	SEGP
J2.2	Changes in surface hydrology	<i>Structures and hardened surfaces within the development area will alter the drainage pattern and run-off infiltration area.</i>	-	All sites & roads
		<i>Concentrated run-off with high volume peak and velocity may result in erosion and subsequent changes in the bed and banks of natural watercourses. Soil erosion and scouring of natural waterways contributes to poor water quality and silt deposition downstream, and subsequent downstream loss of aquatic biota and poor river health downstream.</i>	4	SEGP & roads, dam & SWS
		<i>Drainage impediment and altering flow due to the in-stream storm water dam may impact on downstream ecology and loss of aquatic biota.</i>	5	SW Dam
J2.3	Changes to Vegetation, Biodiversity and Ecology	<i>Vegetation clearing will impact on protected NFA and LNCA species.</i>	-	All sites
		<i>Disturbed sites may increase the establishment of invasive species. Invasive alien and indigenous vegetation will not achieve the rehabilitation objectives to restore vegetation growth along the watercourse.</i>	-	All sites
J2.4	Heritage Aspects	<i>The development footprint will not lead to the direct destruction of an iron-age site but indirect causes as part of development actions may impact on the site.</i>	6	SEGP & roads
		<i>The bulk of archaeological remains are normally located beneath the soil surface. It is therefore possible that some significant cultural material or remains can be impacted once earth moving commence.</i>	-	All sites
J2.5	Ground water impacts	<i>Over exploitation of the groundwater resource and dewatering associated with nearby mining (opencast) & further afield (underground) will lead to lower ground water levels and overall lower yield and availability.</i>	7	WTW
		<i>The wastewater treatment plant poses a moderate risk of groundwater contamination by defective underground storage tanks, pipe work, surface spillage and poor operational maintenance of the plant.</i>	8	WWTP

POTENTIALLY SIGNIFICANT GENERIC IMPACTS DURING THE CONSTRUCTION PHASE

#	IMPACT GROUP	IMPACT DESCRIPTION	MAP NO	ACTIVITY
J2.6	Construction staff impacts	Improper conduct of construction staff and uncontrolled construction activities may lead to environmental degradation and security risks.	-	All sites
		The risk of accidental fires is considered to be high, especially during dry winter months.	-	All sites
J2.7	Site establishment impacts	Indiscriminate clearing of vegetation for construction may result in a loss of sensitive species that may require rescue or a permit and loss of natural vegetation that needs to aid erosion prevention.	-	All sites
		Indiscriminate earth moving activities may result in loss of important topsoil and subsequent soil erosion and downstream ecological impacts.	-	All sites
		Nuisance, noise, and dust from construction activities may impact on adjacent land uses.	-	All sites
J2.8	Construction waste issues	Solid waste from construction work may result in pollution of soil and water resources.	-	All sites
		Liquid waste from construction work may result in pollution of soil and water resources.	-	All sites
		Using of hazardous materials and liquids may result in pollution of soil and water resources.	-	All sites

POTENTIALLY SIGNIFICANT IMPACTS DURING THE OPERATIONAL PHASE

#	IMPACT GROUP	IMPACT DESCRIPTION	MAP NO	ACTIVITY
J2.9	Operational Management	Degradation of remaining natural vegetation due to poor management and alien species invasion.	-	All sites
		Poor maintenance of storm water systems and erosion protection infrastructure may result in poor water quality and aquatic ecological impacts downstream.	4	All sites
		Poor maintenance of the sewer treatment plant works may result in pollution of soil water resources and further resulting in ecological and health impacts.	8	WWTP WTW

POTENTIALLY SIGNIFICANT IMPACTS DURING THE CLOSURE OR DECOMMISSIONING PHASE

#	IMPACT GROUP	IMPACT DESCRIPTION	MAP NO	ACTIVITY
J2.10	Decommissioning Impacts	In event of closure or replacement of any component of the WWTP there is the potential of spillage of untreated wastewater that may contaminate soil, surface and groundwater.	8	WWTP
		In event of closure or replacement of any component of the SEGP there is potential of solid waste pollution.	-	SEGP

ASSESSMENT OF POTENTIALLY SIGNIFICANT IMPACTS

In Compliance with GN R 326 of 17 April 2017, Appendix 3 Section 3(i)(ii) and (j), this Section applies the impact and mitigation ranking methods (see Sections I1.5.1-3) to provide a more detailed assessment with mitigation measures of each of the potentially significant impact and risk as identified in the previous Section I. In addition generic construction and operational impacts and mitigation measures that may pose less significant impacts are also included in this assessment.

POTENTIALLY SIGNIFICANT IMPACTS DURING THE PLANNING AND CONSTRUCTION PHASES

K1.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.1									
	Impact Group: Geo-Technical Impacts									
	Impact Description : Soil conditions, disturbance and steep slopes may contribute to construction risks and soil erosion.									
a.	<i>Slight compression and settlement of the residual soils can be expected which may affect excavations, surface, and underground building / infrastructure installations (Soil Zone A and A1).</i>	Co	1	2	1	2	1	7	-5	2
b.	<i>The extreme western strip between the boundary and dirt road is covered (in the north) and backfilled (towards the south) with mine waste and not compacted. This zone will be prone to large and differential settlements and difficult excavation in the boulder layers.</i>	Co	1	2	1	2	1	7	-5	2
c.	<i>The fine-grained (ML, MH, SC, SM) soils with low or no cohesion are highly erodible and may also be dispersive and any concentration of runoff will cause severe erosion.</i>	Co Op	1	3	3	3	3	13	-5	8
d.	<i>Along the edges of the drainage channel steep to near vertical slopes are present which are not stable and which can initiate rapid backward erosion.</i>	Co Op	1	3	2	3	3	11	-5	6
K1.2	Mitigation :									
a.	<ul style="list-style-type: none"> ▪ <i>The actual predicted allowable bearing capacities to prevent compression and settlement of foundations of all the material horizons can be mitigated by following the indicated foundation recommendations as recommended in the Geotechnical report.</i> ▪ <i>The eastern area (Zone 1A) will need elevation modifications to reduce grades to less than 30° depending on the type of foundation and panels used. Construction material may be sourced from mine discard available in the surrounding area.</i> 									
b.	<ul style="list-style-type: none"> ▪ <i>All areas will need some improvement and remedial measures if high loads are envisaged and to improve subgrades for the service roads.</i> ▪ <i>It is recommended that the design engineers and other competent persons calculate the best economical foundation option for the proposed development including the roads, service buildings, power distribution structures and PV panel installation.</i> 									
c.	<ul style="list-style-type: none"> ▪ <i>The SEGP platforms shall be planned in accordance with such method and laid out in such a manner that run-off water is managed and directed to the formal storm water management system with the aim of preventing soil erosion.</i> ▪ <i>In this regard soil conservation terraces must be aligned along the natural terrain contours (at right angle to the slope). This layout will assist to retain run-off for longer periods that will promote soil-water absorption and prevent high velocity run-off over the site that may otherwise result in sheet erosion.</i> ▪ <i>Grassed waterways or swales must be planned along the edges of the SEGP to safely convey runoff collected from in-field areas to the formal storm water management system.</i> ▪ <i>Where possible maintain the natural grass cover within the project area to assist with prevention of soil erosion</i> 									

	<p>but subject to consideration of fire hazards, specifically within a proposed 15m development restriction buffer to be applied along the edges of the watercourse.</p> <ul style="list-style-type: none"> ▪ Apply selective stripping of topsoil only in those areas within the actual development footprint. ▪ Preserve topsoil during the construction period for later re-use in rehabilitation and landscaping on all areas that becomes disturbed during the construction period. ▪ The eroded mine quarry is suitable for rehabilitation by way of back-filling with inert building waste and inert waste rock from surrounding mining activities, according to a required engineering standard in order to be able to utilise the filled areas for future development purposes. ▪ Check soil conservation structures seasonally for their optimal functioning and maintain and improve such structures throughout the life of the project.
d.	<ul style="list-style-type: none"> ▪ Only commence with site preparation work within or over watercourse when it can immediately be followed by the construction and rehabilitation. ▪ All sites within the watercourse where earth moving and excavation will take place for dam construction and erosion prevention structures must be limited to clearly demarcated and marked areas. No earthmoving or excavation may take place outside of demarcated areas. ▪ Construction work within the watercourse must be planned and executed during the dry winter months. If necessary the flow of the watercourse must not be impeded during construction but may be temporarily diverted and channelled. ▪ The in-stream and off-stream storm water dams must be constructed on the site immediately before the bulk of site establishment, vegetation clearing and earthworks commence during the construction period. This measure is of utmost importance to prevent adverse impacts of erosion and sediment deposition, flooding of downstream properties, and contamination of sensitive watercourses downstream. The storm water detention dams will act as a buffer to retain and retard run-off peak flows, contaminants and sediment from the construction site. ▪ The walls of the storm water dams must be layered and compacted, taking into account the soil properties as indicated in the Geo-technical report. ▪ Steeply sloped excavated cuts and fills must either be battered back to a 1:3 slope (vertical : horizontal) or must be stabilised by using suitable retaining material such as rock, logs, geo-membranes, gabion retaining walls or similar and vegetating with suitable endemic grass and shrub species to ensure long term resilience. ▪ The bed and banks of the watercourse at pipe and culvert inlets and outlets must be protected from erosion by making use of rock pitching, rock gabion, rock mattress or other suitable method and structure.

K2.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.2									
	Impact Group: Changes in surface hydrology									
	Impact Description : Changes to surface drainage patterns, concentration and velocity									
a.	Structures and hardened surfaces within the development area will alter the drainage pattern and run-off infiltration area.	Co Op	1	3	2	3	2	11	-4	7
b.	Concentrated run-off with high volume peak and velocity may result in erosion and subsequent changes in the bed and banks of natural watercourses. Soil erosion and scouring of natural waterways contributes to poor water quality and silt deposition downstream, and subsequent downstream loss of aquatic biota and poor river health downstream.	Co Op	2	3	3	3	2	13	-5	8
c.	Drainage impediment and altering flow due to the in-stream storm water dam may impact on downstream ecology and loss of aquatic biota.	Op	2	3	1	2	1	9	-4	5

K2.2	Mitigation :
a.	<ul style="list-style-type: none"> ▪ A storm water management plan that was compiled by the project engineer provides for on-site storm water attenuation to reduce the peak discharge and prevent damage. ▪ A storm water management system that consist of a combination of surface run-off diversion channels, surface run-off detention as well as sub-surface drainage and flow buffering at storm water outlets and at storm water detention dams are incorporated into the planning and design of the development area. ▪ Three suitable locations for the construction of three storm water detention dams within the development area was identified where such dam structures will pose the least negative impact but the best efficiency in the receiving and buffering of storm water run-off from the development area. ▪ The identified site that was selected for storm water detention within the natural drainage line was found to be suitable with low to negligible impact on on-site morphology, biodiversity and ecology.
b.	<ul style="list-style-type: none"> ▪ The storm water design must include the installation of grassed swales, rock mattresses or stone pitching on the beds and banks of drainage channel to prevent erosion and to further dissipate the energy of water. ▪ The design of the storm water detention dams must be able to accommodate and retain expected peak storm water flows within the natural watercourse and within the man-made quarry. ▪ Design measures must ensure that downstream properties are not flooded by the damming of storm water to allow for the safe release of flood peaks. ▪ Adequate flood spillway and erosion prevention structures must be incorporated in the dam design. ▪ Storm water outlets directly into the natural watercourse and quarry must include erosion prevention structures. ▪ The banks and walls of the dams must be landscaped with natural vegetation cover to retain topsoil. ▪ Maintain a 15m buffer zone around the eroded edges of the watercourse and supplement vegetation in these zones with endemic vegetation. The buffer zone, therefore, becomes an important part of the impact mitigation planning to address erosion control and water purification. ▪ A series of gabion wall structures must be placed within all existing narrow and deeply channelled gullies within the natural watercourses. The wall structures will trap sediment and as these fill over time, the narrow shape of the watercourse will be broadened and flattened to change the flow of water over a wider area that will create favourable conditions for the establishment of vegetation and will assist in reducing flow velocity within the watercourses. This progressive enhancement of the watercourse must be maintained during the operational period by way of periodic upgrading of storm water management structures within the watercourse to ultimately achieve a fully rehabilitated natural waterway.
c.	<ul style="list-style-type: none"> ▪ The storm water peak buffering and slow release of run-off water must be achieved in the in-stream storm water detention dam design but must include an overflow spillway in case of an extreme flood. ▪ During the operational all storm water infrastructure and the detention dams must be kept clean as part of the routine maintenance. ▪ During the operational period the dam basins and dam walls of the in-stream storm water detention dam and off-stream water storage dams must be maintained by way of routine removal of deposited debris, sand, silt and rock to ensure its ongoing function to buffer storm water peaks and to trap sediment. The design of the dams must allow access for future maintenance and removal of silt and debris within the dam basins.

K3.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.3									
	Impact Group : Changes to Vegetation, Biodiversity and Ecology									
	Impact Description: Vegetation clearing for the development may lead to direct and indirect ecological and species impacts.									
a.	Vegetation clearing will impact on protected NFA and LNCA species.	Co	1	1	1	3	1	7	-2	5
b.	Disturbed sites may increase the establishment of invasive species. Invasive alien and indigenous vegetation will not achieve the rehabilitation objectives to restore vegetation growth along the watercourse.	Co Op	1	2	1	3	2	9	-4	5

K3.2	Mitigation :
a.	<ul style="list-style-type: none"> ▪ Delineate and clearly mark the development footprints before construction commences and prevent any removal of vegetation on areas where development will not occur. ▪ Protected plant species, must where possible be protected in the remaining natural areas. ▪ Where possible important plant species that occur within the development footprint must be relocated to the future “open space” areas before construction commences. ▪ Obtain the necessary permits for the relocation or destruction of protected plants. ▪ Replace all protected tree and plant species that needs to be destroyed due to the development according to a ratio of 1:3 (replace three of each species for every one individual specimen that was lost) at suitable areas within the open space areas.
b.	<ul style="list-style-type: none"> ▪ Allocate trained staff to remove invasive species during the construction period. ▪ The re-establishment of vegetation biodiversity must be complimented by only considering endemic plants for site rehabilitation. No alien, invasive or exotic ornamental species may be considered for site rehabilitation or landscaping purposes. ▪ Rehabilitate disturbed areas after construction and maintain a suitable natural vegetation community in open areas during the operation period. ▪ Research indicates that vegetation is considered extremely efficient in reducing the velocity of water flow entering a stream system and in trapping and utilisation of sediment, nutrients and attached pollutants contained in both surface runoff and sub-surface flow. It is therefore important to maintain a 15m buffer zone around the eroded edges of the watercourse and to supplement vegetation in these zones with endemic vegetation. ▪ The buffer zone, therefore, becomes an important part of the impact mitigation planning to address erosion control and water purification. ▪ Maintain all natural areas free of alien vegetation throughout the operational period.

K4.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.4									
	Impact Group: Heritage Aspects									
	Impact Description: Impacts on heritage sites.									
a.	The development footprint will not lead to the direct destruction of an iron-age site but indirect causes as part of development actions may impact on the site.	Co	1	1	3	4	4	13	-5	8
b.	The bulk of archaeological remains are normally located beneath the soil surface. It is therefore possible that some significant cultural material or remains can be impacted once earth moving commence.	Co	1	1	1	2	4	9	-4	5
K4.2	Mitigation :									
a.	<ul style="list-style-type: none"> ▪ Maintain a 15m buffer area around the HIA site. ▪ Commission a detailed mapping & drawing of the site and limited archaeological excavations in order to recover information and cultural material from the site to assist with interpreting and dating the site. ▪ Obtain a permit from SAHRA if the site needs to be demolished. 									
b.	<ul style="list-style-type: none"> ▪ During the construction period, any visible sign of heritage resources or graves must be reported immediately. ▪ All work in such area must stop immediately and a heritage specialist must investigate the find and make recommendations before proceeding with construction work in the affected area. Refer to the procedure as recommended in the EMPR. 									

K.5.1	Nature of impact		Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.5										
	Impact Group: Ground water impacts										
	Impact Description: Changes to groundwater quantity and quality.										
a.	Over exploitation of the groundwater resource and dewatering associated with nearby mining (opencast) & further afield (underground) will lead to lower ground water levels and overall lower yield and availability.		Op	2	3	3	3	2	13	-5	8
b.	The wastewater treatment plant poses a moderate risk of groundwater contamination by defective underground storage tanks, pipe work, surface spillage and poor operational maintenance of the plant.		PI Op	1	3	1	1	1	7	-5	2
K5.2	Mitigation :										
a.	<ul style="list-style-type: none"> ▪ Maintain and do not exceed sustainable safe yield and dynamic water level determinations for proposed abstraction boreholes. ▪ Water level monitoring is essential to ensure that the boreholes are and continues to be a sustainable source Commission a monitoring program (this includes routine monthly monitoring) of abstraction rates/volumes and groundwater levels on site and periodically on surrounding privately owned boreholes. ▪ It will be mandatory to monitor the water level and record the data on a monthly basis to ensure boreholes GT-03014, GT-013016 and GT-03017 recover to their initial static waters level and critical water levels as indicated in the geo-hydrological report (see Appendix G9). ▪ Production boreholes should be subjected to a full aquifer testing program every 4-5 years to ensure continued sustainability. 										
b.	<ul style="list-style-type: none"> ▪ The soil and geological and hydro-geological conditions was found to be suitable for construction and operational of a wastewater treatment plant (WWTP) at the preferred however, the installation of the underground tanks and pipework, must employ the latest technologies that includes impermeable membranes, and physical, visual and electronic monitoring to prevent any leaks and spills of wastewater on surface and underground. ▪ The design and installation of the proposed WWTP must avoid the risk of site contamination. ▪ An adequate impermeable solid waste containment facility must be incorporated into the design for the temporary storage of solid inorganic waste that is removed from the waste stream. This facility must include a sump that drains into the WWTP. ▪ Although the WWTP technology includes the reactivating of sludge and no sludge removal, the design must allow for the safe removal of sludge by way of suction to a mobile tanker for safe disposal off-site. ▪ The wastewater treatment plant must be able to treat wastewater effectively to the required standard as indicated in the Special Wastewater Limit Values (DWA 2013). The system must also be adaptable to any future changes of these values (to be updated and published by DWA from time to time). ▪ Adequate storm water management structures must be designed around and on the WWTP site to ensure that run-off is directed away from the site. ▪ Emergency power supply for pumps at the WWTP must be made by the provision of alternative energy provision in case of an emergency or loss of ESKOM electricity supply. ▪ The WWTP site will be fenced all round with security proof fencing and with a gate for access control to restrict entry to unauthorised personnel. ▪ The wastewater treatment plant staff must be trained to monitor wastewater treatment plant levels on a scheduled monitoring and reporting basis. ▪ Establish a downstream monitoring borehole and rehabilitate borehole GT-03019 (by installing a uPVC liner) for groundwater monitoring purposes. Water quality monitoring is the systematic collection of samples and observations on a regular basis to identify changes in a water body. Additional site specific monitoring boreholes might be required. ▪ Commission a monitoring program of groundwater quality on site and surrounding privately owned boreholes. 										

POTENTIALLY SIGNIFICANT GENERIC IMPACTS DURING THE CONSTRUCTION PHASE

K6.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Degree of mitigation	Significance before mitigation	Significance after mitigation
	Impact ref. J2.6:									
	Impact Group : Construction staff impacts									
	Impact Description: Damaging actions by personnel									
a.	Improper conduct of construction staff and uncontrolled construction activities may lead to environmental degradation and security risks.	Co	1	1	2	1	1	-4	6	2
b.	The risk of accidental fires is considered to be high, especially during dry winter months.	Co	1	1	2	1	1	-4	6	2
K6.2	Mitigation :									
a.	<ul style="list-style-type: none"> ▪ All construction staff must be informed of environmental issues and specifically with regard to littering, the use of toilets, the use of hazardous materials, the prevention of pollution, the prohibition of clearing of natural vegetation for firewood or for medicinal purposes and the prohibition of poaching or snaring of wildlife. ▪ All construction staff must be made aware of the boundaries of the development sites, must understand that trespassing onto adjacent properties is illegal, and may be regarded as a criminal act. ▪ A demarcation line must be maintained for all construction work that occur within sensitive sites and no staff or vehicle conduct any unauthorised activity outside of the demarcated work site boundaries. 									
b.	<ul style="list-style-type: none"> ▪ Adequate fire-fighting equipment must be on site during construction and construction staff must be instructed how to use the equipment effectively. ▪ No open fires for heating or cooking will be permitted on site outside of a demarcated construction camp. ▪ The use of fire as part of vegetation clearing must be fully controlled and must be authorised by the local Fire Prevention Agency. 									

K7.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.7:									
	Impact Group : Site establishment impacts									
	Impact Description Indiscriminate actions leading to undue damage.									
a.	Indiscriminate clearing of vegetation for construction may result in a loss of sensitive species that may require rescue or a permit and loss of natural vegetation that needs to aid erosion prevention.	Co	1	1	2	2	2	8	-5	3
b.	Indiscriminate earth moving activities may result in loss of important topsoil and subsequent soil erosion and downstream ecological impacts.	Co	1	1	2	2	2	9	-4	4
c.	Nuisance, noise, and dust from construction activities may impact on adjacent land uses.	Co	1	1	1	1	1	5	-4	1
K7.2	Mitigation :									
a.	<ul style="list-style-type: none"> ▪ All areas outside of the development footprint must be delineated and must be clearly marked before clearing of vegetation commences and such area must be excluded from vegetation clearing activities. ▪ Linear routes for pipelines and roads that need to be cleared of natural vegetation as well as the degree of clearing required must be determined and must be demarcated and marked and the clearing activity must remain within the demarcated footprint. ▪ Only clear, the areas that will immediately be developed, where installation of services can occur immediately as to prevent uncontrollable soil erosion over large areas. ▪ Any alien and invasive vegetation that occur on the development property must be removed making use of mechanical methods in combination of minimal and selective chemical application to specific alien species. 									

b.	<ul style="list-style-type: none"> ▪ All sites where earthmoving, blasting, and excavation will take place must be clearly demarcated and marked. No earthmoving or excavation may take place outside of demarcated areas. ▪ Site preparation for earth moving and excavations must not be undertaken until such time that all required materials / services etc. is available on-site, to facilitate the immediate preparation and stabilisation of building platforms and the construction of infrastructure. ▪ Strip topsoil together with grass / groundcover from all demarcated areas and stockpile the topsoil separately for later rehabilitation use. ▪ Excavated trench material must be stockpiled for later backfilling within the demarcated working area unless otherwise authorised. Ensure in situ compactions of backfill according to the geo-technical recommendations. ▪ Excess spoil material must be stockpiled for later use as filling material wherever necessary. ▪ Storage of building materials must be demarcated within the confines of the construction camp. ▪ Clearly indicate which activities are to take place in which areas within the site e.g. the mixing of cement, stockpiling of materials etc. ▪ Routes for temporary access and haul roads to construction sites must be identified and vehicle movement must be confined to these roads. Haul roads must be monitored and regularly upgraded where necessary. ▪ Only two (2) dedicated haul roads may be developed within and across the watercourse, one haul road to be located within the footprint area of the proposed storm water detention dam and the other along the already disturbed eastern property boundary where it crosses over the watercourse. The latter haul road will require the temporary installation of a pipe to allow unimpeded water flow if a run-off event occurs due to rain during the construction period. Haul roads must be removed and rehabilitated after completion of bulk earth works. ▪ Any earth works within the watercourse for the construction of a storm water detention dam and the construction of erosion protection structures must be executed according to a plan and a design as compiled by a suitably qualified person in combination with an Environmental Control Officer to achieve the objective of minimum environmental impact and maximum effectiveness in order to rehabilitate the currently degraded watercourse so that it will be able to receive storm water from the proposed development and prevent further environmental damage on-site and down-stream. ▪ The earth works within the eroded mine quarry for the construction of two water storage dams must be executed according to a plan and a design as compiled by a suitably qualified person in combination with an Environmental Control Officer to achieve the objective storm water control. ▪ The earth works and back-filling of the existing mine quarry must be executed according to a plan and a design as compiled by a suitably qualified person in combination with an Environmental Control Officer to achieve the objective of land restoration for future development use.
c.	<ul style="list-style-type: none"> ▪ Continuous use of haul roads and earth works on site will result in excessive dust. All construction areas and roads in use on any particular day must be wetted as required to suppress dust. ▪ Construction work that may result in a noise nuisance must be confined to normal working hours during week days and up to 13:00 on Saturdays. If necessary work on Sundays and on any public holidays must be communicated with potentially affected neighbours.

K8.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.8:									
	Impact Group : Construction waste issues									
	Impact Description: Environmental degradation due to pollution and waste during the construction period.									
K8.2	Mitigation :									
a.	Solid waste from construction work may result in pollution of soil and water resources.	Co	1	1	1	3	1	7	-5	2
b.	Liquid waste from construction work may result in pollution of soil and water resources.	Co	1	1	1	2	1	6	-5	1
c.	Using of hazardous materials and liquids may result in pollution of soil and water resources.	Co	1	1	2	1	1	6	-5	1

K8.2	Mitigation :
a.	<ul style="list-style-type: none"> ▪ <i>During both the construction and operational period of the development the overall impact of general and hazardous waste generation can be mitigated effectively by the implementation of waste hierarchy management principles as recommended in the Municipal Waste Management Strategy as follows:</i> ▪ <i>Plan for the separation, containment, re-use or correct disposal of construction waste.</i> ▪ <i>Re-use where possible inert solid waste during the construction period.</i> ▪ <i>Remove unusable construction waste with reputable service providers for re-cycling, or for disposal to approved municipal waste disposal facilities.</i> ▪ <i>It is known that contractors and service providers locally dispose of building waste at unauthorised areas, along roadsides, in the natural veld and in watercourses. No waste shall be disposed of on site or surrounding areas, by burning, or by burying. Any littering and unauthorised waste disposal shall be brought to the attention of the local and provincial authorities who can impose official warnings and fines to the Developer.</i> ▪ <i>All refuse and solid waste generated at all work sites shall be deposited in containment vessels at the relevant work site or at the construction camp, where the waste shall be stored for regular removal and disposal.</i> ▪ <i>Apart from the Contractor, sub-contractors and service providers that shall remove and dispose of waste, shall be pre-approved and registered with the Project Manager with the required approval to dispose of waste at an authorised site.</i> ▪ <i>Inert building waste (a mix of half bricks, concrete aggregate, concrete spills and slurry and spoil material) must be contained separately from glass, plastic, timber and other construction waste as inert building waste may be re-used on site for filling and stabilising under road and parking areas as well as under-floor filling.</i> ▪ <i>Excess inert waste can be delivered / collected for the same use as indicated above at another approved building site. The Contractor shall provide the details of such site to the Project Manager for record purposes.</i> ▪ <i>Inert (non-toxic) mine rock/residue that was discarded as waste from surrounding mines may be used to back-fill the old mine quarry. Such waste may be used for this purpose subject to contractual agreement and certification with the supplier that the waste rock and soil is inert waste and uncontaminated (non-toxic and non-leaching).</i>
b.	<ul style="list-style-type: none"> ▪ <i>An adequate number of ablution facilities shall be provided at the construction camp, at least 50m away from the watercourse. A service provider shall service these facilities regularly and timeously.</i> ▪ <i>Any service provider that shall remove and dispose of sewer waste, shall be pre-approved and registered with the Project Manager with the required approval to dispose of effluent waste at an authorised private or municipal sewer treatment plant.</i> ▪ <i>Demarcated concrete batching areas shall be determined which areas shall be bundled by soil berms to contain concrete mixing at designated areas on the development sites. Such sites shall not be closer than 20m from the edge of the watercourse. During the installation of roads, concrete mixing may be done within the road surface areas which will be paved over after completion. Similarly, during building construction, concrete mixing other than in the batching yard may be done within the building footprint area.</i> ▪ <i>All visible remains of excess concrete and building waste must be deposited of at the inert waste dumping site that may be used later for filling purposes.</i> ▪ <i>A dedicated shallow sump must be located at the dedicated inert waste dumping yard where excess concrete slurry and washings of concrete mixing machinery and equipment can be done. The sump must be lined with plastic to catch cement solids and clear effluent can drain into the sub-soil. The plastic lining that holds the cement solids can be cleaned weekly by depositing the cement solids onto the inert waste heap on site.</i>
c.	<ul style="list-style-type: none"> ▪ <i>Re-fuelling of construction vehicles on site shall be done by way of a dedicated fuel truck/trailer with the required pumping and piping mechanisms that will ensure effective, safe and leak free transfer of fuel.</i> ▪ <i>Any stationary fuel tank on site shall be located at least 100m from the edge of the watercourse and shall have the necessary all-round bunding wall with impermeable floor to retain any form of leak or spill.</i> ▪ <i>Any leak or spill of fuel/oil shall be removed from the soil or from any bunded area immediately a suitably sized container and subsequent treatment with an appropriate chemical. The treated soil can then be disposed of at the inert waste dump for later re-use as filling within the development site.</i> ▪ <i>All emergency servicing of construction vehicles on site shall include the necessary drip trays underneath the serviced vehicle in order to retain dripping oil and soiled/replaced parts. Oil shall be drained into containers and shall be discharged at approved oil recycling depots or to be removed by approved service providers.</i>

POTENTIALLY SIGNIFICANT IMPACTS DURING THE OPERATIONAL PHASE

K9.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.9:									
	Impact Group : Operational Management									
	Impact Description : Management of important aspects to prevent environmental degradation.									
a.	Degradation of remaining natural vegetation due to poor management and alien species invasion.	Op	1	3	1	2	2	9	-4	5
b.	Poor maintenance of storm water systems and erosion protection infrastructure may result in poor water quality and aquatic ecological impacts downstream.	Op	2	3	2	3	3	13	-5	8
c.	Poor maintenance of the sewer treatment plant and water treatment works may result in pollution of soil water resources and further resulting in ecological and health impacts.	Op	1	3	1	3	2	10	-5	5
K9.2	Mitigation :									
a.	<ul style="list-style-type: none"> ▪ The natural vegetation within the watercourse and a 15m buffer area around the watercourse must be maintained as well as other natural areas outside of the development footprint. ▪ A maintenance programme must be implemented after construction to ensure that all vegetation that was introduced takes root and becomes well established to create habitats that will support a diversity of indigenous plants. ▪ An ongoing alien control programme must be introduced to prevent the colonisation of alien and invasive plants on previously disturbed areas and within the watercourse bed and banks. ▪ A long term maintenance program must be instituted to ensure a good condition of the vegetated buffers around the watercourse to prevent bush encroachment by listed invasive and alien species. ▪ No exotic plants, amphibian or fish species may be released in the dams. 									
b.	<ul style="list-style-type: none"> ▪ A maintenance programme must be introduced to maintain and upgrade all storm water structures and erosion control structures seasonally within the SEGP, WWTP, WTW dams and watercourse area. ▪ Pipes or culverts will need to be cleaned regularly of any debris to prevent water impoundment and possible water flooding which may lead to erosion. ▪ The dam wall structures must be kept void of tree growth. Tree growth allows large roots to penetrate the dam wall which in future can lead to tunneling of water and collapse of the wall. ▪ Low-level outlet pipes will allow water entering the detention dam to be discharged at a reduced flow volume. This discharge pipe must be kept clean and open at all times. ▪ The flood overflow spill of the dam must be kept open and unobstructed at all times. ▪ Erosion protection structures including gabion, rock mattresses, rock pitching and log structures must regularly be inspected and any damage and must be repaired seasonally. ▪ Any scouring of soils along stream channels must be identified and must be repaired on a regular basis. ▪ Repairs to the storm water management structures must be initiated as soon as possible after damage to any of the structures has been detected. ▪ It is important to maintain stabilised banks of the watercourse. As soon as new erosion has been detected along the banks of the watercourse action must be taken to stabilise that section of the bank of the watercourse by way of suitable and efficient methods and structures to prevent further erosion. ▪ The dam and affected sections of the watercourse must be cleaned seasonally by removing of silt, sand, pebbles and rock from the dam and river basin. Such waste material may be used for in-stream and off-stream in-filling as part of a land rehabilitation programme. 									
c.	<ul style="list-style-type: none"> ▪ An ongoing maintenance programme must be introduced to maintain the wastewater treatment plant and water treatment works so as to function effectively and thus preventing environmental contamination. ▪ The operator should be fully conversant with the recommended operating procedures as stipulated in the operation and maintenance manual of the WWTP and WTW. 									

	<ul style="list-style-type: none"> ▪ The Operator shall ensure that the WWTP and WTW comply throughout the operational life with all applicable national norms and standards, all existing and new legislation and regulations and the applicable Wastewater Limit Values as published from time to time. ▪ Monitoring of the WWTP and WTW for efficient operation must be a daily routine and sampling and effluent quality analysis must be done according to the DWS licensing conditions. ▪ Any indication of inefficient water and wastewater treatment must be identified and must be addressed immediately by the operator. ▪ All gravitational pipes, underground tanks and pump lines must be inspected regularly for leaks and spills. ▪ A program for the safe and authorised removal and disposal of brine and wastewater sludge must be included in the operation and maintenance plan. ▪ All reasonable emergency measures must be taken to provide for the mechanical, electrical, operational, or process failures and malfunctions of the WWTP and WTW. ▪ Establish a downstream monitoring borehole and rehabilitate borehole GT-03019 (by installing a uPVC liner) Water quality monitoring is the systematic collection of samples and observations on a regular basis to identify changes in a water body. Additional site specific monitoring boreholes might be required. ▪ Commissioning of a monitoring program (this includes routine quarterly and annual monitoring) of groundwater qualities – on site and surrounding privately owned boreholes. ▪ Maintain good housekeeping practises, adequately trained personnel in emergency wastewater spill response procedures and storage/handling of materials as per industry specification. ▪ Wastewater spills on soil would require the determination of the lateral and vertical extent of the contamination and then based on the risk that the contamination pose to the receiving environment, remedial actions will be implemented. ▪ Any significant spillages that occur on soil must be dealt with in terms of NEMA Section 30 and contaminated soil must be remediated according to the National Norms and Standards for the Remediation of Contaminated Land and Soil (NEMWA 2014).
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POTENTIALLY SIGNIFICANT IMPACTS DURING THE CLOSURE OR DECOMMISSIONING PHASE

K10.1	Nature of impact	Period	Extent	Duration	Intensity	Probability	Degree of loss of resources	Significance before mitigation	Degree of mitigation	Significance after mitigation
	Impact ref. J2.10									
	Impact Group : Decommissioning Impacts									
	Impact Description									
a.	Environmental degradation due to site / activity closure and decommissioning <i>In event of closure or replacement of any component of the WWTP there is the potential of spillage of untreated wastewater that may contaminate soil, surface and groundwater.</i>	De	1	3	2	2	2	10	-5	5
b.	<i>In event of closure or replacement of any component of the SEGP there is potential of solid waste pollution.</i>	De	1	3	2	2	1	9	-5	4
K10.1	Mitigation :									
a.	<ul style="list-style-type: none"> ▪ All WWTP pipes and pump lines that connect to the components to be removed or replaced must be sealed to prevent accidental wastewater spills. ▪ All pipes, pumps and tanks must be flushed to ensure that when the system is disassembled there is a lower risk of potential wastewater spillage from any elements. ▪ All wastewater processing and storage tanks must be emptied by a suitable sump/pump and the effluent shall be transferred to a suitable tanker truck for removal to the municipal sewer treatment plant for treatment and disposal. ▪ Any significant spillages that occur on soil must be dealt with in terms of NEMA Section 30 and contaminated soil must be remediated according to the National Norms and Standards for the Remediation of Contaminated Land and Soil (NEMWA 2014). 									

	<ul style="list-style-type: none"> ▪ <i>No fire or sparks may be present at the initial opening or closing of pipes and tanks, as the methane gas that may emanate from the tanks can be explosive.</i>
b.	<ul style="list-style-type: none"> ▪ <i>The SEGP will be de-energized from the utility power grid. The infrastructure connecting the facility to the utility power grid will be removed unless the landowner determines that the electrical service line will be beneficial for future use of the site, in which case the line may remain after decommissioning.</i> ▪ <i>All wirings, cables, conduits, panel boards, inverters, transformers and associated equipment will be uninstalled and recycled as applicable.</i> ▪ <i>PV modules will be uninstalled and recycled as applicable.</i> ▪ <i>The steel racking system will be disassembled and recycled as applicable.</i> ▪ <i>Steel pilings which supported the module racking will be mechanically removed and recycled as applicable.</i> ▪ <i>The demolition debris and removed equipment may be cut or dismantled into smaller pieces that can be safely lifted or carried by the deconstruction equipment being used. Most of the glass and steel and aluminium will be processed for transportation and delivery to an off-site recycling plant. Minimal non-recyclable materials are anticipated and; these will be properly disposed of at a licenced disposal facility.</i> ▪ <i>Any resulting holes from the removal of the steel piles will be backfilled with locally imported soil to match existing site soil conditions.</i> ▪ <i>The concrete transformer and interconnection equipment pads will be broken up and removed.</i> ▪ <i>The on-site access roads servicing the Project and the security fencing around the Project will remain in place during decommissioning activities to support the removal of equipment. Once removal activities are completed, discussion with the landowners will occur to determine if the roads or security fencing will be beneficial for future use of site. If the access roads or security fencing is determined to be beneficial for future use of site, these facilities may remain in place.</i> ▪ <i>Access roads that will not be utilized to support future use of the site will be restored to preconstruction conditions.</i> ▪ <i>Aggregate base material of the roads will be removed, and the compacted base section will be filled with locally imported soil to match existing onsite soils. The areas will then be seeded to match existing onsite groundcover.</i> ▪ <i>If the security fencing is not to be used, it will be removed and transported to the nearest recycling facility.</i> ▪ <i>Once all Project equipment has been removed, additional activities will occur to return the property back to conditions similar to pre-construction. Reclamation will restore vegetative cover and hydrological function after the closure of the facility.</i> ▪ <i>Storm water dams and erosion protection measures will remain.</i> ▪ <i>Once landform features and soils are restored, a seed mix will be applied to match the existing onsite groundcover.</i>

K11 IMPACT ASSESSMENT CONCLUSION	
	<ul style="list-style-type: none"> ▪ <i>The assessment of each identified aspect and impact in the sections above indicates that mitigation measures can be implemented that would effectively minimise or prevent any residual and adverse effect on the environment.</i> ▪ <i>The erosion control mitigation measures will enhance the current degraded state of the watercourse and will pose an overall positive impact.</i> ▪ <i>No flaws were identified where mitigation is not expected to be effective or where mitigation is not achievable.</i> ▪ <i>The proposed impact mitigation will result in an overall low impact significance for each of the identified impacts.</i>

MITIGATION OUTCOMES

This Section lists impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation, based on the assessment, and where applicable, recommendations from specialist reports as required in terms of GNR 327, Appendix 3, Section 3(m).

L.1 IMPACT MANAGEMENT OBJECTIVE

The objectives are the overall environmental goals for this project which need to be achieved by way of avoiding, preventing, preserving and minimising adverse environmental impacts associated with the project or specific activities thereof and where applicable rehabilitate and restore aspects associated with this project that may result in environmental damage.

L.2 IMPACT MANAGEMENT OUTCOMES

The environmental impact management outcomes indicated below are performance orientated, where possible quantifiable, verifiable and measurable and applicable to the activities and mitigation measures, that arises from the environmental objectives. Performance measurement during the planning and construction periods of the project can be achieved by way of verifying the implementation of plans, guidelines and standards as well as monitoring, reporting and auditing compliance to the EMPr and EA. Performance measurement during the operational period will need to determine the success and the efficiency of the implemented plans and guidelines by way of operational audits and compliance to regulatory norms and standards.

L2.1 IMPACT MANAGEMENT STATEMENT : PLANNING AND DESIGN PHASE	
<i>The development planning shall be finalised to achieve the objectives of sustainable development.</i>	
OUTCOMES	PERFORMANCE MEASURE
2.1.1 <i>The administrative requirements for the documentation of the Heritage Site that is located within the property shall be commissioned before demolishing of the site.</i>	<i>The Applicant shall appoint an independent Environmental Control Officer (ECO) before the commencement of construction or phased construction, who shall verify together with the Project Planner and Project Engineer that the relevant planning objectives and outcomes have been met and where relevant shall report to the Compliance and Enforcement Section of the competent authority on these matters before the commencement of a construction phase.</i>
2.1.2 <i>All above-ground and sub-surface structural and buildings designs shall include the findings and recommendations of the Geotechnical Report with regard to excavations, fills, footings and foundations.</i>	
2.1.3 <i>All the planning for development of services infrastructure design and construction work shall incorporate a site rehabilitation plan to prevent soil erosion and shall form part of a contractual agreement.</i>	
2.1.4 <i>The planning of all the construction phases must ensure that the storm water infrastructure including the proposed storm water attenuation dams and erosion prevention structures are constructed first, together with the site preparation for the SEGP and WWTP.</i>	
2.1.5 <i>The detailed designs of the storm water attenuation dams shall be approved by the relevant authorities.</i>	
2.1.6 <i>The WWTP design must include temporary waste storage facilities.</i>	

L2.2 IMPACT MANAGEMENT STATEMENT : PRE-CONSTRUCTION PHASE		
<i>Comply with regulatory requirements pre-construction.</i>		
	OUTCOMES	PERFORMANCE MEASURE
2.2.1	<i>The applicant shall obtain approval in terms of other laws applicable to the proposed development</i>	<i>Obtain permits for removal and relocation of protected plants (if applicable). Obtain permit/authorisation for demolishing of the Heritage Site.</i>
2.2.2	<i>Permanent and temporary employees and contractors shall be made aware of the relevant provisions of the Environmental Authorisation and EMPR, sensitive environmental features and security arrangements.</i>	<i>Obtain written confirmation of obligations and compliance to the EMPR by contractors with hand-over of the site or at the first project meeting.</i>
2.2.3	<i>The Applicant/Developer shall finalise any administrative requirements as laid down in the Environmental Authorisation. A notice of the intention to commence with construction shall be submitted to relevant organs of state and a complaints register shall be opened for the duration of the construction/establishment period.</i>	<i>All complaints will be acknowledged within five (5) working days and must be responded to within 10 working days of receipt, unless additional information and / or clarification are required.</i>

L2.3 IMPACT MANAGEMENT STATEMENT: PRE-CONSTRUCTION PHASE		
<i>The construction site shall be prepared to prevent environmental impacts before the commencement of construction or any phase thereof.</i>		
	OUTCOMES	PERFORMANCE MEASURE
2.3.1	<i>Protected plants / trees within the development footprint area shall be rescued / removed (where possible) before clearing of vegetation.</i>	<i>A thorough search for resident fauna and protected flora shall be executed and such species be shall relocated to a safe open space areas on- or off-site.</i>
2.3.2	<i>The construction areas and haul roads shall be demarcated and prepared to prevent the potential occurrence of damaging activities before and during the commencement of construction.</i>	<i>The development footprint, sensitive areas, lay-down areas, haul roads construction yard and batching areas shall be marked on the ground. The site plan shall be used to verify the correct demarcation.</i>
2.3.3	<i>The construction staff shall be informed of the environmental consequences of all construction activities and awareness training shall be conducted before commencement of construction.</i>	<i>The Contractors shall conduct awareness training and shall be monitored and report on any incident that may result in environmental degradation, with remedial actions. Written confirmation is required to the ECO.</i>

L2.4 IMPACT MANAGEMENT STATEMENT: CONSTRUCTION PHASE		
<i>A main objective during the construction period or any phase thereof shall be to prevent undue environmental damage during site preparation and construction, to control waste generation and to prevent pollution.</i>		
	OUTCOMES	PERFORMANCE MEASURE
2.4.1	<i>Activities that may result in a nuisance to adjacent land owners shall be limited and managed during the construction period.</i>	<i>Respond to noise and dust complaints received during the construction period and if necessary verify against norms and standards.</i>
2.4.2	<i>Solid waste emanating from construction activities shall be managed to prevent contamination of natural veld and watercourses.</i>	<i>Monitor and report on the occurrence of litter and verify the manner of storage and disposal of solid waste during the construction period.</i>
2.4.3	<i>Liquid waste emanating from construction activities shall be managed to prevent contamination of soil and water resources.</i>	<i>Monitor and report evidence of liquid contamination and verify the manner of storage and disposal of liquid waste during the construction period.</i>

L2.5	IMPACT MANAGEMENT STATEMENT: CONSTRUCTION REHABILITATION	
	<i>The main objective after completion of construction of the development project or any phase thereof is to ensure that the required site rehabilitation aims have been achieved as part of the construction period.</i>	
	OUTCOMES	PERFORMANCE MEASURE
2.5.1	<i>Ensure clean-up, waste removal, earth shaping, apply soil conservation methods, construct erosion protection structures and re-vegetate the sites upon completion of construction.</i>	<i>Monitor all areas where construction work occurs and report thereon until completion and before the project becomes operational.</i>
2.5.2	<i>Ensure that site rehabilitation is completed as part of the construction phase according to a site rehabilitation plan.</i>	<i>Commission an Environmental Audit after completion of all construction work and site rehabilitation (per construction phase).</i>

L2.6	IMPACT MANAGEMENT STATEMENT: OPERATIONAL PHASE	
	<i>The main objective during the operational phase is to maintain the infrastructure, prevent any form of pollution and maintain and improve the storm water management system and erosion prevention / soil conservation measures.</i>	
	OUTCOMES	PERFORMANCE MEASURE
2.6.1	<i>Maintain open areas free of alien invading plant species and maintain and improve the natural vegetation within the watercourse area, rehabilitated areas and within the buffer zones.</i>	<i>Institute a seasonal program for eradication of declared alien and invader plants on the site Institute a seasonal program to clear fire breaks without impacting on the effectiveness of the vegetated buffers. Institute a seasonal program to replace any damaged lost vegetation within the watercourse, rehabilitated areas and buffer zones.</i>
2.6.2	<i>Maintain and enhance the storm water system as well as all soil conservation measure and erosion protection structures as to ensure their effective functioning.</i>	<i>Compile a maintenance plan for the scheduled cleaning of the storm water systems and outlets as well as the periodic removal of deposited silt, sand and debris from the dam basins and where applicable also from the watercourse.</i>
2.6.3	<i>Maintenance of the water and wastewater treatment plant to ensure good quality wastewater re-use on-site / off-site.</i>	<i>Compile a maintenance plan for the scheduled servicing of the water and wastewater treatment plant and scheduled water quality reporting to DWS.</i>

L2.7	IMPACT MANAGEMENT STATEMENT: DECOMMISSIONING PHASE	
	<i>The main objective during the decommissioning of infrastructure for repair, replacement or closure is to prevent pollution and soil and water contamination.</i>	
	OUTCOMES	PERFORMANCE MEASURE
2.7.1	<i>Provide a plan for scheduled maintenance / repair to the wastewater treatment plant and describe the manner in which pollution shall be avoided.</i>	<i>Appoint an ECO to monitor the decommissioning of any infrastructure in order to report thereon to the Competent Authority.</i>
2.7.2	<i>Provide a plan for closure / decommissioning of the SEGP and describe the manner in which pollution shall be avoided.</i>	<i>Appoint an ECO to monitor the decommissioning of any infrastructure in order to report thereon to the Competent Authority.</i>

ENVIRONMENTAL IMPACT STATEMENT

This Section provides an environmental impact statement as required in terms of GNR 326, Appendix 3, Section 3(1)(i)(ii)(iii) as well as motivation for the preferred project alternatives and development footprint [Sect 3(g) & (n)]. The impact statement motivates each of the relevant regulated activities as identified in Section D of this report.

M1. DEVELOPMENT OF THE SOLAR ENERGY GENERATION PLANT AND ASSOCIATED INFRASTRUCTURE

Acty. No.	REGULATED DEVELOPMENT COMPONENTS	ENVIRONMENTAL IMPACT STATEMENT
LISTING NOTICE 2 ACTIVITY 1	A solar photovoltaic energy generation plant of 40 megawatt is planned outside an urban area on proposed Portion A and portion Re of the property, covering a development footprint area of ±68ha. Activity 1 of Listing Notice 2 thus requires authorisation.	<ul style="list-style-type: none"> ▪ The SEGP site is mostly modified and the development footprint is not located in any sensitive area. The development will thus not pose an adverse ecological impact. ▪ The SEGP will not impact adversely on any residential community or surrounding mining and industrial land uses. ▪ The SEGP will not pose a reflective glint or glare risk to nearby air traffic. ▪ The SEGP will not pose any negative economic impact on neighbouring land uses. ▪ The SEGP will pose a positive impact on local electricity supply.

M2. DEVELOPMENT OF THE WATER TREATMENT WORKS AND WASTEWATER TREATMENT PLANT AND ASSOCIATED INFRASTRUCTURE

Acty. No.	REGULATED DEVELOPMENT COMPONENTS	ENVIRONMENTAL IMPACT STATEMENT
LISTING NOTICE 1 ACTIVITY 14	Sewerage is classified as a hazardous waste and the wastewater storage volume of the proposed wastewater treatment plant is planned at 170m ³ (with allowance for further future expansion). Activity 14 of Listing notice 1 thus requires authorisation.	<ul style="list-style-type: none"> ▪ The WTW and WWTP sites are mostly modified and are not located in any sensitive ecosystem. The development will thus not pose an adverse ecological impact. ▪ The WWTP will be an enclosed system and a risk assessment revealed that the likelihood of contamination of surface and groundwater resources is very low. By implementing the recommended mitigation measures in terms of design, construction and operation it is expected that the WWTP will not pose any adverse impact on surface and ground water resources. ▪ The WWTP design is not likely to pose any noise or ambient air quality impacts and the site is not located near to any residential community. ▪ The ground water from boreholes that will be treated at the WTW to a domestic standard for use at surrounding mines and industries is sufficient for the current demand and the groundwater resource is not likely to be overexploited in compliance with the recommended groundwater abstraction rates (to be licenced and monitored). ▪ The WTW and WWTP will not pose any negative economic impact on neighbouring land uses and water users. ▪ The WTW will pose a positive impact on local supply of domestic quality water for supply to local users. ▪ The re-use of wastewater from the WWTP will pose a positive impact on the local supply of industrial quality water for supply to local users.

M3. DEVELOPMENT OF CIVIL INFRASTRUCTURE ASSOCIATED WITH THE ABOVE LAND USES

Acty. No.	REGULATED DEVELOPMENT COMPONENTS	ENVIRONMENTAL IMPACT STATEMENT
LISTING NOTICE 1 ACTIVITY 24	<p>A road with a reserve of 15m wide and with a length exceeding 1km, outside an urban area, is planned on Portion C and the Remaining Portion of the property to provide access to the proposed land uses. Activity 24 of Listing Notice 1 therefore requires authorisation.</p>	<ul style="list-style-type: none"> ▪ The proposed access road is mainly an upgrading and relocation of an existing “right-of-way” access road over a previously modified area. ▪ The route is not located in or over any sensitive ecosystem and will thus not pose an adverse ecological impact. ▪ The road will not impact negatively on any community (social) or neighbouring land uses (economic). ▪ The relocation of the access road will not impact on ant current traffic and road users. ▪ The upgrading of the access road on the property, including the off-site upgrading of the intersection with Road D1261 will benefit all road users of neighbouring properties over the long-term.
LISTING NOTICE 3 ACTIVITY 4	<p>Internal services roads wider than 4m and with a reserve of less than 13.5 m is planned will provide internal access to the relevant project components. These roads will be developed within ±9km from a national protected area namely the de Hoop Nature Reserve. Activity 4 of Listing Notice 3 therefore requires authorisation.</p>	<ul style="list-style-type: none"> ▪ The proposed internal service roads will be constructed mainly over previously degraded land and will thus not pose an adverse ecological impact. ▪ One road is planned across the watercourse on Portion A but will form part of the dam wall that is a proposed storm water mitigation measure and thus the impact is neutralised. Specialist investigation confirmed that the watercourse currently poses very low environmental sensitivity and the road crossing over the planned dam will not pose an adverse ecological impact. ▪ The internal roads will also not impact negatively on any community or neighbouring land use and none of the proposed internal roads will impact in any way on a the De Hoop National Protected Area.
LISTING NOTICE 3 ACTIVITY 2	<p>The proposed water storage reservoir of 1600 m³ will be developed on Portion C of the property to store treated water for supply to local water users. Water will be obtained from the Lebelelo Water Supply Scheme and supplemented with borehole water. The reservoir site is located within 9km from the De Hoop National Protected Area and therefore requires authorisation.</p>	<ul style="list-style-type: none"> ▪ The locality of the site is sufficient to provide for gravitational water reticulation and for pressurised water reticulation. ▪ The reservoir will provide sufficient initial capacity for the storage of treated water to a domestic quality standard for supply to local users. ▪ The site can be expanded in future if the need arises for additional storage capacity. ▪ The proposed reservoir site is located on a previously modified area and will thus not pose an adverse ecological impact. ▪ The reservoir will not impact negatively on any community or neighbouring land use and will not impact in any way on the De Hoop National Protected Area.
LISTING NOTICE 1 ACTIVITY 9	<p>A piped storm water system of ±1400m with an internal pipe diameter of 0,60 meters is planned over Portions A, Re and C. Activity 9 of Listing Notice 1 therefore requires authorisation.</p>	<ul style="list-style-type: none"> ▪ The on-site piped storm water system with field inlets will ensure that run-off is conveyed safely and effectively from the SEGP and discharged into two storm water storage dams. ▪ The storm water system will pose a positive impact by preventing peak flows into the watercourse and associated in-stream erosion. Preventing soil erosion and down-stream silt deposition will pose a positive ecological impact. ▪ The storm water system will prevent flooding of neighbouring properties and will thus not pose any negative economic impact on neighbouring land uses.

M4. CONSTRUCTION OF STORM WATER ATTENUATION AND EROSION PROTECTION STRUCTURES AND INFRASTRUCTURE

Acty. No.	REGULATED DEVELOPMENT COMPONENTS	ENVIRONMENTAL IMPACT STATEMENT
LISTING NOTICE 1 ACTIVITY 12	<p>An in-stream storm water detention dam and erosion prevention structures of ±12000m² and ±60000m² respectively will be develop in the degraded watercourse area. Furthermore the SEGP and associated infrastructure will be developed within 32m from the edge of the eroded watercourse. These activities require environmental authorisation.</p>	<ul style="list-style-type: none"> ▪ The development of an in-stream dam for storm water detention and up-stream erosion protection structures within the watercourse on Portion A will not pose a negative ecological impact as Specialist verification confirmed the low ecological sensitivity of the watercourse. Containment and buffering and subsequent slow release of run-off downstream will prevent the on-going degradation of the watercourse and will rather enhance the downstream health of the watercourse which will also be beneficial to downstream property owners. ▪ A development restriction buffer of 15m from the eroded edge of the watercourse will be maintained which is sufficient to prevent any indirect impacts of the SEGP and associated infrastructure on the watercourse banks.
	<p>Although the old mine quarry is not located within a natural watercourse the definition of a watercourse applies to the channels leading to a depression that is seasonally inundated. Therefore the two off-stream water storage dams with a combined surface area of ±56000m² and proposed land reclamation activities within the quarry requires environmental authorisation.</p>	<ul style="list-style-type: none"> ▪ The mine quarry on Portion C has limited use and the proposed development of two storm water detention dams within the quarry poses a positive use of the otherwise degraded and unused quarry area. ▪ The proposed infilling of the quarry will result in land reclamation which is positive for future use of the land. ▪ The infilling and reclamation of land within the quarry will also prevent further soil erosion of the quarry banks. ▪ Any development within 32m from the eroded edges of the quarry would not pose any negative impact as the purpose is to reclaim land within the quarry. A development restriction buffer is thus not required. ▪ The quarry is not ecologically sensitive and its use and rehabilitation will not affect neighbouring properties negatively.
LISTING NOTICE 3 ACTIVITY 14	<p>Similar to the above, storm water attenuation ponds and water storage ponds and erosion prevention structures are planned for development within an off-stream quarry on proposed Portion C and within a watercourse on the proposed Portion A of the property which will exceed a physical footprint of 10m² and which is located outside an urban area and within an Ecological support area (ESA1) and within 10km from the De Hoop National Protected Area. Activity 14 of Listing Notice 3 thus requires authorisation.</p>	<ul style="list-style-type: none"> ▪ A specialist aquatic biodiversity assessment verified the sensitivity of the watercourse and found that the watercourse and quarry within which the storm water attenuation structures are planned is ephemeral, does not include riparian vegetation, poses very low aquatic biodiversity sensitivity and do not provide any ecological service. ▪ The assessment found that it is of the utmost importance to stabilise existing erosion within and along existing watercourses and quarry edges and to ensure that the development will not result in increased soil erosion of the watercourse and quarry. ▪ The proposed structures within these watercourses are not expected to pose any adverse impact on downstream water quality, freshwater ecology and aquatic biodiversity. These storm water mitigation measures will positively contribute to enhanced water quality downstream and therefore restore biodiversity and ecological functioning. ▪ The above developments will also not impact negatively on any community or neighbouring land use and will not impact in any way on the De Hoop National Protected Area.
NOTICE 1 ACTY. 13	<p>Two off-stream water storage dams with a combined capacity of ±114200m³ are planned within the existing quarry on Portion C. Activity 13 of Listing Notice 1 thus requires authorisation.</p>	<p>The combined capacity of the off-stream dams are justifiable as the old quarry site within which the dams are planned are already excavated, mostly to a depth that is already suitable for the final shaping of two dam basins. There is thus no need to expand the dams to natural areas outside the original footprint of the quarry. The dam wall height will not exceed 5m and the dams would not pose any negative ecological, safety (social) or economic impact.</p>

LISTING NOTICE 1 ACTIVITY 19	<p><i>It is proposed to construct erosion prevention structures, road crossings including storm water detention dams and to rehabilitate and to reclaim land within a watercourse and eroded quarry on the property. The soil excavation and infilling volumes associated with these activities are expected to exceed 10m³. Activity 19 of Listing Notice 1 therefore requires authorisation.</i></p>	<ul style="list-style-type: none"> ▪ <i>The currently degraded watercourse and quarry areas will be subject to ongoing soil erosion, even if the proposed project will not be developed.</i> ▪ <i>The development may bring about additional degradation of the watercourse and quarry areas due to soil erosion by way of peak storm water flow.</i> ▪ <i>It is thus important to prevent additional soil erosion and land degradation that may occur due to the development.</i> ▪ <i>Earthworks including excavations, in-filling and shaping of degraded land within the watercourse and the quarry will contribute to land rehabilitation and land reclamation which will ultimately pose a positive impact on the property overall.</i>
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M5. ACTIVITIES ASSOCIATED WITH THE ABOVE-MENTIONED DEVELOPMENT

Acty. No.	REGULATED DEVELOPMENT COMPONENTS	ENVIRONMENTAL IMPACT STATEMENT
NOTICE 2 ACTIVITY 15	<p><i>Indigenous vegetation of ±140ha will be cleared within the development footprint of the proposed land uses and associated infrastructure on both Portions A, C and the Remainder of the property.</i></p>	<ul style="list-style-type: none"> ▪ <i>Specialist investigation verified extensive vegetation modification on all proposed development sites and only a few species of legally protected plant species were identified for which mitigation measures are feasible for their relocation or replacement.</i> ▪ <i>Overall the impact of vegetation clearance on the development sites would pose a low impact due to the current degraded state of the vegetation and would also not impact socially or economically on neighbouring properties.</i>
NOTICE 3 ACTIVITY 12	<p><i>The property is located within the Sekhukhune Mountainlands Ecosystem (MP9) which is listed as an endangered ecosystem. It is planned to clear indigenous vegetation of ±140ha within this ecosystem.</i></p>	<ul style="list-style-type: none"> ▪ <i>The Sekhukhune Bioregional Plan (2020) indicates that the occurring vegetation type is Sekhukhune Mountain Bushveld (SVcd28) which has a conservation status of “least concern”.</i> ▪ <i>Specialist site verification confirmed that the mentioned grassland ecosystem that constitutes the Sekhukhune Mountainlands Ecosystem (MP9) does not occur on the property.</i> ▪ <i>This was confirmed by way of an on-site verification by a qualified Specialist. The GNR 1002 (2011) “endangered” ecosystem status of the development site is therefore invalidated and the proposed development will not impact on a threatened ecosystem.</i>
NOTICE 1 ACTIVITY 28	<p><i>The proposed project site is situated outside an urban area and has an “Agricultural” land use zoning. The proposed utility infrastructure services which fall within the land use definition of industrial and institutional land uses and will cover an area of ±154 ha. Activity 28 of Listing Notice 1 thus requires authorisation.</i></p>	<ul style="list-style-type: none"> ▪ <i>The above impact statement deliberations confirms that the change of the land use zoning of the relevant subdivided portions of the property from “agriculture” to “special” for the development of “large engineering infrastructure” as defined in the FTLM Land Use Management Scheme, and specifically for the development of the activities listed above, would not pose any adverse ecological, social or economic impact.</i> ▪ <i>An agricultural specialist verified the poor agricultural potential of the property.</i> ▪ <i>The change of land use and rezoning in terms of the Municipal Land use Management Scheme can therefore be supported.</i>

M6. OVERALL ENVIRONMENTAL IMPACT STATEMENT

- *The assessment of the proposed utility service land uses and associated infrastructure and the preferred development sites of these development activities were considered in terms of the legislative environment and it was found that the proposed development can comply with all relevant legislative conditions, plans, policies, standards and guidelines.*
- *The assessment of the receiving environment revealed that the proposed land uses and associated infrastructure can be accommodated on the proposed sites. In this regard it was found that the selected development footprints and selected development activities alternatives will not pose any detrimental impact and risk on the following:*
 - *the physical and landscape characteristics of the site and its surroundings;*
 - *essential ecological integrity and the loss of biodiversity of the site and its surroundings;*
 - *the current and potential land-uses of the site and its surrounding;*
 - *heritage and cultural sites and the sense of place of the site and its surroundings;*
 - *the existing infrastructure and/or services in or around the site and holds no future opportunity cost;*
 - *the increase in levels of present and possible pollution or contamination of natural resources;*
 - *the health and safety of the public and different groups or individuals; and*
 - *social /economic welfare of current and future generations / communities located near the site and surroundings.*
- *A need and desirability assessment found the proposed development to be ecologically, economically and socially justifiable in support of sustainability objectives.*
- *A comparative assessment of the identified alternatives and their development footprints indicates overwhelmingly positive impacts and the few negative impacts can be mitigated to acceptable levels.*
- *The use of the matrix assessment and rapid cumulative assessment methods identified potentially significant impacts and risks related to the proposed development, however none so much as to discard any of the selected development activities and development sites.*
- *The alternative of not to develop the selected development activities on the selected development sites, poses an overall negative impact on potential ecological and land use benefits and economic and social opportunities locally.*
- *The assessment of identified impacts with potential significance in Section K of this report indicates that negative impacts can be avoided or can be minimised and managed by way of recommended mitigation measures to acceptable levels of change.*
- *It was ultimately found that the selected development layout and development activities will not give rise to significant adverse impacts when mitigation is applied.*

M2 SELECTED DEVELOPMENT ACTIVITIES AND DEVELOPMENT FOOTPRINT

Considering the above impact statement, the proposed development of utilities services and associated infrastructure on the proposed portions A, C and the Remainder of the farm Tweefontein 360-KT, and within the development footprints as indicated on the site development plan Appendix A, Site Plan No.V1_12/1/9/2-GS75 dated 3 November 2022 can thus be recommended as follows:

- *The development and operation of a solar energy generation plant and associated civil infrastructure.*
- *The development and operation of a water treatment works and a wastewater treatment plant and associated civil infrastructure.*
- *The development and maintenance of a storm water management system including the development on an in-stream storm water detention dam and two off-stream storm water storage dams.*
- *The rehabilitation and maintenance of the degraded watercourse sections by way of infilling, excavation and shaping and the installation of erosion prevention structures.*
- *The reclamation and maintenance of land in the degraded quarry for future development by way of infilling, excavation, and shaping and the installation of erosion prevention structures.*

VALIDATION AND RECOMMENDATIONS

This Section complies with GN R326, Appendix 3, Section 3(1)(n)-(r),(t)-(w).

N.1 Conditions of Authorisation

Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation [3(o)].

- *The recommended mitigation measures as contained in the EMPR (Appendix D) must be implemented during the various project phases and an ECO must conduct compliance monitoring and reporting.*
- *Where proposed activities or mitigation measures are regulated by laws, regulations, norms and standards, the compliance monitoring and enforcement shall be the responsibility of the relevant Department that administers the relevant laws, regulations, norms and standards.*
- *The Applicant must obtain a permit from the South African Heritage Resources Agency for demolishing of the identified heritage site (if necessary as the site is located outside the development footprint).*
- *The Applicant must obtain a permit from the relevant Authority for removal, relocation and replacement of protected plant and tree species that will be affected by the development.*
- *The Applicant must obtain a water use license for the taking of groundwater, the storing, the treatment of wastewater and the construction of dams and erosion protection structures within a watercourse.*
- *In line with the conditions of a water use license the Applicant institute a programme for the on-going monitoring of groundwater levels and groundwater quality.*
- *The Applicant must appoint a qualified person to compile a detailed land rehabilitation plan and land reclamation plan to ensure that the extent and scope of earth works and erosion protection structures within the watercourse and quarry will be efficient and effective and such plan must also include the periodic upgrading and maintenance.*

N.2 Assumptions and uncertainties in the knowledge base

A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed [3(p)]

This assessment, its findings and recommendations is based on the assumption that primary and secondary sources of information and data as well as findings of scientific research and models, including information provided by interested and affected parties, the specialist, technical professionals and the Applicant are applicable, accurate, correct and valid.

N.3 Reasoned opinion

A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation [3(q)].

The authorisation of the activities applied for in Section D of the report can be recommended for the following reasons:

- *Section E of this report verifies that no project activity or project action was identified that cannot align with the relevant legislation, policies, plans and guidelines. The proposed development can therefore be legally justified.*
- *Section F of this report investigates the suitability of the receiving environment and it also identifies potential impacts by focusing on the geographical, biological, physical, sensory, social, economic, and cultural aspects of the environment. The overall finding is that the proposed development and all of its components will be suitable within the selected sites and can as such be acceptable within the receiving environment subject to the incorporation of impact mitigation measures. Potentially significant impacts were identified for further assessment in Section I of the report.*
- *Section G of the report considers the need and desirability of the proposed development and all of its components in the context of the preferred location.*
 - *The need for the proposed development can be justified at the preferred location without compromising the natural environment within which it will be located subject to implementation of mitigation measures where applicable.*
 - *The proposed development can also be socially and economically justifiable and it is aligned with the Municipal*

Integrated Development Plan and its economic development objectives for economic growth, investment, employment opportunities and services provision.

- *The proposed development site is also desirable due to existing access to road networks and accessibility as well as its spatial position for purposes of services provision to existing and future mining and industrial land uses as earmarked in the Municipal Spatial Development Framework.*
- *The need and desirability assessment does not reveal any fatal flaw in terms of the project's ecological and socio-economic justification.*
- *Section H of the report considers potentially significant impacts as identified by way of public participation and specialist inputs, the identified issues are included for further assessment in Section I of the report.*
- *Section I of the report considers all of the above issues and identifies the key issues that may pose a significant negative impact for further assessment in Section K.*
- *Section K of the report assesses the potentially significant issues and identifies and recommends appropriate mitigation measures. The overall finding is that no component of the proposed development is expected to pose any significantly negative ecological, social or economic impact.*
- *Section L of the report summarises the mitigation outcomes in support of the development and finds that the mitigation measures are practical, achievable and measurable and will avoid or minimise or manage change to acceptable levels.*
- *The Environmental Impact Statement in Section M of the report motivates and recommends the authorisation of each of the relevant regulated activities associated with the proposed development.*
- *Overall the proposed development is considered to be environmentally, economically and socially justifiable.*
- *Conditions that should be included in the authorisation are listed in Section N1 above.*

N.4 Authorisation period

Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised [3(r)].

The construction period for which the environmental authorisation is required:

The development shall be phased and as this is a long term development project an authorisation validity period of 10 years should be appropriate.

The operational period for which the environmental authorisation is required will be ongoing: The periodic maintenance and upgrading of the proposed development components will be ongoing according to the approved Environmental Management Program and in this regard the authorisation period is perpetually applicable.

- *The date on which the first phase of the development is expected to commence: May 2023.*
- *Date on which the development is expected to be concluded : Unknown*
- *The date on which the post construction audit is expected to be finalised: A phased construction and monitoring approach will be applicable. The relevant authority will be informed of the commencement and expected finalisation of each separate project phase. Post construction auditing will thus be phased according to completion of each separate development component.*

N.5 Financial provisions

Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts [3(t)].

Not applicable

N.6 Motivation of Deviations

An indication of any deviation from the approved scoping report, including the plan of study, including— any deviation from the methodology used in determining the significance of potential environmental impacts and risk [3(u)].

The following deviations from the approved scoping report can be motivated:

- *The scoping report identified only a portion of Portion A of the property for the development of the SEGP of 60MVA. After more detailed design and layout by the project Architect and Electrical Engineer it was found that a 60MVA SEGP cannot be achieved on the originally proposed development area and the activity footprint had to be expanded even for a smaller capacity SEGP of 40MVA. This larger development footprint was included in the initial terms of reference of Specialist Studies and the deviation therefore does not compromise the validity or accuracy of the Specialist Studies. The total combined area of the proposed Portions A, C and Remainder was subsequently investigated and the expanded footprint, preferred sites and preferred development activity were effectively incorporated in the EIA.*
- *The scoping report did not include a water treatment works and only referred to the treatment of wastewater on proposed Portion C of the property. A later version of the civil engineering report did include the water treatment works as separate component to the wastewater treatment works on Portion C. This additional development component was included in the expanded terms of reference for the Specialist Studies and as the proposed site for a WTW and associated infrastructure was already under investigation by the Specialists, the deviation therefore did not compromise the validity or accuracy of the Specialist Studies. The assessment of the additional development component and preferred development site was effectively incorporated in the EIA.*
- *The Scoping Report makes mention of the use of boreholes but did not require a specialist geo-hydrological study. The reason is that such study was already commissioned by the Applicant before commencing with the Scoping Process and was completed during the Scoping Process. The study complies with the assessment requirements for water quantity, water quality and sustainable use and thus complies with the minimum requirements as stipulated by DWS. The findings of the geo-hydrological study was effectively incorporated in the EIA and the study is thus appended to this EIA as a valid Specialist Study.*
- *The scoping report did not include an in-stream storm water detention dam and initially only referred to the proposed in-stream erosion protection structures. During the storm water run-off modelling that was done by the Project Civil Engineer as part of the scoping terms of reference, it became clear that a storm water detention dam must be included as a component for effective storm water management in the watercourse. This additional development component was included in the expanded terms of reference for the Specialist Studies and as the watercourse and proposed erosion protection methods was already under investigation by the Specialists, the addition of the dam did not compromise the validity or accuracy of the Specialist Studies. The assessment of the additional development component and preferred development site was thus effectively incorporated in the EIA.*

After completion of the technical reports in support of the EIA it was found that certain initially identified activities that are regulated in terms of the EIA Listing Notices, are not applicable while other activities need to be added to the list of activities that require authorisation.

*The following activities that were initially included in the Scoping report are **withdrawn** from the list of applicable activities:*

- *Listing Notice 1 Activity 25 : Before the technical engineering report was completed it was initially estimated that a WWTP with a throughput capacity of 2500m³ will be applicable. However, after completion of the technical reports for the WWTP it became clear that the throughput capacity would only be 50m³ per day and therefore this Activity is being withdrawn from the list.*
- *Listing Notice 2 Activity 6 : Similar as above, before the technical engineering report was completed it was initially estimated that a WWTP with a throughput capacity of more than 2000m³ will be applicable. However, after completion of the technical reports for the WWTP it became clear that the throughput capacity would only be 50m³ per day and therefore this Activity is being withdrawn from the list.*

- Listing Notice 2 Activity 4: Before the technical engineering report was completed it was initially estimated that a WWTP with a storage capacity for dangerous goods of more than 500m³ will be required. However, after completion of the technical reports for the WWTP it became clear that the wastewater storage capacity would only be 170m³ and therefore this Activity is being withdrawn from the list.
- Listing Notice 3 Activity 10: This activity was erroneously included in the list of activities to be authorised as the storage facilities for dangerous goods with a combined capacity between 30m³ and 80m³ will not be included as part of the development. This Activity is therefore being withdrawn from the original list.

The following activities that were initially excluded in the Scoping Report are now **added** to the list of applicable activities:

- Listing Notice 2 Activity 4: Before the technical engineering report was completed it was not anticipated that roads wider than 4 meters with a reserve of less than 13.5 meters would form part of the development. The completed technical report and plan now lists service roads within these parameters and therefore this activity is added to the list.
- Listing Notice 1 Activity 9: Before the technical engineering report was completed it was not anticipated that storm water pipes with a diameter of more than 0.36m and exceeding 1000m in length would form part of the development. The completed technical report and plan now lists a storm water system exceeding these parameters and therefore this activity is added to the list.
- Listing Notice 1 Activity 14: With reference to Listing Notice 2 Activity 4 (in the list of withdrawn activities above), before the technical engineering report was completed it was initially assumed that a WWTP with a storage capacity for dangerous goods of more than 500m³ will be required. However, after completion of the technical reports for the WWTP it became clear that the wastewater (dangerous good) storage capacity would only be 170m³ and therefore this Activity is added to the list.
- Listing Notice 1 Activity 3: Before the technical engineering report was completed it was not anticipated that off-stream storm water storage dams would exceed a combined capacity of 50000m³. The completed technical report and plan now indicates the combined estimated capacity at 114200m³ which exceeds the above threshold. Therefore this activity is added to the list.

An amended application form that corresponds to the activities that are identified in Section D of the EIR accompanies this Report to the Department for replacing of the initial list of activities that requires authorisation.

The indicated deviations to the accepted scoping report do not invalidate that report as the original extent of the scoping study and timely additions to the terms of reference for specialist studies ensured that all components of the amended development proposal, preferred development activities and preferred development sites as well as on-site and off-site impacts could be verified and assessed for purpose of this EIA.

N.7 Specific Information

Any specific information that may be required by the competent authority [3(v)]

All information that were required by the competent authority were addressed (refer to the comments and response report attached as Appendix E).

N.8 Other matters

Any other matters required in terms of section 24(4)(a) and (b) [3(w)].

None

AFFIRMATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

This Section complies with GNR 326, Appendix 3, Section 3(s).

AFFIRMATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

ON THE DRAFT SCOPING REPORT

I, Riaan Visagie, practicing as Eco-8 Environmental Planners affirm to the best of my knowledge:

(i) the correctness of the information provided in the report;

(ii) written comments and inputs from stakeholders and interested and affected parties are included in this Report;

(iii) the inclusion of inputs and recommendations from the specialist reports where relevant;

(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties are included in this Report.



Riaan Visagie (EAP: EAPASA)
Eco-8 Environmental Planners

3 November 2022

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